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Inwood Business Park,
Whitton Road,
Hounslow,
Middlesex, TW3 3EB

**The Lensbury
Riverside Pavillion Restaurant
BS 5837:2012 Tree Survey,
Tree Constraints,
Arboricultural Impact
& Tree Protection**

**Address: The Lensbury,
Broom Road,
Teddington**

**Site Surveyed by Peter Holloway
Report prepared by Peter Holloway
BSc(Hons) FArborA CEnv**

Date: 5th August 2013

Report Prepared for The Lensbury

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1. Instruction:

1.1 I am instructed by The Lensbury.

My brief is:

- To carry out a Tree Survey of trees that may be affected by this proposal in accordance with the British Standard 5837:2012, 'Trees in relation to design, demolition and construction – Recommendations' April 2012.
- To produce a site plan with **Tree Constraints** illustrating the above ground constraints (tree crown spread) and the below ground constraints represented by the tree Root Protection Area (RPA).
- To Produce an **Arboricultural Implications Assessment** of the proposal.
- To produce an **Arboricultural (Tree Protection) Method Statement** and **Tree Protection Plan**.

2. Documents

2.1 I used the following electronic documents:

- i. Riverside Pavillion Restaurant, Ground Floor Plan, G056/SK010B dated 24.05.13 Preliminary.
- ii. Riverside Pavillion Restaurant, Elevations & section, G056/SK011A dated 24.05.13 Preliminary.
- iii. Riverside Pavillion Restaurant, Elevations & Section, G056/SK012A dated 24.05.13 Preliminary.
- iv. Riverside Pavillion Restaurant, Roof Plan, G056/SK013 dated 24.05.13 Preliminary.
- v. Proposed Site Plan dated 4 August 2013

2.2 Earlier versions of the above drawings showed the existing site layout as a layer that I used for the existing site plan.

3. Scope of this report

- 3.1 In addition to the report the following are included:
- i. Standard BS5837 Methodology (Appendix 1)
 - ii. Tree Survey Data (Appendix 2)
 - iii. Existing Site Plan with Root Protection Area (Appendix 3)
 - iv. Arboricultural Implications Assessment Plans (Appendix 4)
 - v. Arboricultural (Tree Protection) Method Statement (Appendix 5& 6)
 - vi. Tree Protection Plan (Appendix 7)
- 3.2 The trees were surveyed from ground level using a visual tree assessment method. No detailed tree examinations were undertaken during the survey.
- 3.3 A number of trees at this site are included in a Tree Preservation Order. The site is not in a conservation area as far as I am aware. Prior to carrying out any tree work the status of each tree should be confirmed and the correct procedures followed.
- 3.4 The Wildlife and Countryside Act 1981(as amended), the Conservation (natural habitats etc.) Regulations 1994, and the Countryside and Rights of Way Act 2000 provide protection for many species of animal that live in trees. This includes birds and bats. I did not see any protected species in the trees during my survey. If any tree works affect protected species then this could be a criminal offence. The absence of any protected species should be confirmed before undertaking any tree works.

4. Site visit and data collection

- 4.1 I completed the tree survey on 16th April 2013.
- 4.2 The positions of most trees were plotted on the site survey but some trees may have been added and plotted in there approximate positions using site features.

- 4.3 The bedrock in this part of the site is likely to be Kempton Park Gravel overlying London Clay as indicated on British Geological Survey Sheet 270, South London (NERC 1998). Kempton Park Gravel is a river terrace deposit of gravel which is sandy and clayey in part. Clay soils will be prone to compaction especially when wet.
- 4.4 The site is within the grounds of The Lensbury Club Hotel and Conference Centre.
- 4.5 The proposal entails building a single storey building on the site of an existing marquee.

5. Tree Survey

5.1 Tree survey method

- 5.1.1 The methodology for the tree survey is described in Appendix 1. I recorded those trees that could be affected by the proposal.

5.2 Appraisal of trees surveyed

- 5.2.1 I recorded thirteen existing trees and one group within, and surrounding, the site proposed for the restaurant.
- 5.2.3 The tree survey data is included in Table 1, Appendix 2.
- 5.2.4 The trees recorded include two A category trees, six B category trees, one B category group, five C category trees, and no U category trees.

6. Arboricultural Impact Appraisal

- 6.1 The proposal as described in paragraph 4.5 and graphically in drawings listed in paragraph 2.1.
- 6.2 There are a total of fourteen trees in and around the location of the restaurant.
- 6.3 The existing Golf Cabin will be dismantled and removed.
- 6.4 The existing marquee all be removed and the foundation pile caps cut off at ground level.



- 6.5 It is intended to retain all the trees on the site although the proposal has the potential to affect the crowns and root protection areas of a number of trees.
- 6.6 The possible impact on the tree crowns and root protection areas are indicated in Table 2 below.

Tree No.	Species	Root Protection Area (m ²)			Crown radius (m)	
		Total	Proportion affected		Total	Building overhang
			Building	Paths		
T1	Coast Redwood	261	33 (12%)	25 (10%) & decking	6.4	0.4
T3	Sycamore	168	28 (17%)	Decking	8	4.6
T4	Silver Maple	261	56 (21%)	Decking	6	3
T6	Norway Maple	118	22 (18%)	Decking	6	3
T7	Norway Maple	185	0	Decking	0	0
T8	White Horse Chestnut	470	0	0	0	0
T10	White Horse Chestnut	311	0	0	0	0
T11	White Horse Chestnut	391	0	0	0	0
T12	Lime	137	3 (2%)	Decking	5.3	0.2
T13	Lime	100	16 (16%)	0	6	4
T14	White Horse Chestnut	537	130 (24%)	0	6	2.8
T15	White Horse Chestnut	470	64 (14%)	18 (4%)	5	0
G17	Common Yew	179	0	8 (4%)	5	0
T18a	Deodar Cedar	489	0	0	8.4	0

- 6.7 The location of the new building will mean that the Horse Chestnut Stump on the plan will not be replaceable. There is a duty to replace any tree removed from a conservation area because it is dead diseased or dangerous. Therefore provision will need to be made for a replacement tree elsewhere within the landscaping proposals.

7. Mitigation

- 7.1 The existing small pile heads that were constructed for the marquee's support frame will be removed. The piles will stay below ground to minimise disruption.

- 7.2 The new pavilion will have new piles carefully installed with a small rig which will run on a protection mat to prevent soil compaction. There will be new ground beams and pile caps. These will generally be at or just above the existing ground level. Towards the main house they will be into the ground by up to 100mm. There will be a void over the ground and pre-cast concrete floors.
- 7.3 New paths and decking will be constructed using techniques requiring minimal excavations but some excavations will be necessary to match existing levels but excavations should not exceed 100mm.
- 7.4 There is no detail about the foundation for the decking. In simple terms the foundation type and its depth will dependant on the load and the bearing capacity of the soil. Decking is a lightly loaded structure and can be supported on wooden posts but is more commonly on concrete pads with columns or pier foundations with wooden posts. Pads and pier foundations can require excavations to 1m deep with an area of at least 0.5x0.5m. In order to minimise the impact on tree roots it will be necessary to minimise the foundation footprint. This may be best achieved with screw piles or perhaps the 'Swift' foundation (Shown in Appendix 10) but this would need to be confirmed by an engineer.
- 7.5 The proposed building is less than 3.5m high but two sections near T13, T14 and T15 are 4.7m tall. Some pruning of overhanging foliage may be necessary but to minimise the amount of pruning this will be undertaken during roof construction by a competent tree surgeon.
- 7.6 I have prepared a tree protection method statement where the root protection areas are marked and all root protection areas must be considered as requiring ground protection. In some circumstances the existing hard surface will act as ground protection.
- 7.7 The recommended tree protection measures are incorporated within the attached tree protection method statement in Appendix 5, 6 and 7.

8. References

- 8.1 British Standard 5837: 2012 'Trees in relation to design, demolition and construction – Recommendations' April 2012.

9. Appendix 1 Standard Methodology

A.1 Survey

A.1.1 All my observations were from ground level without detailed investigations and I measured tree stem diameters where possible and estimated height and crown spread by pacing and using a clinometer. I do not normally have access to trees outside the boundaries and so my observations and comments on these trees are based on the visual assessment made from within the site or the surrounding public highway.

A.1.2 All data was captured on paper table and transferred to an excel spreadsheet. I surveyed all trees objectively without reference to any design proposals supplied or suggested by the client. The trees were located using the topographical survey supplied. If the topographical plan did not include all relevant trees, they would be added in their approximate positions.

A.1.3 As suggested in the BS 5837:2012 all single stem trees with a stem diameter of less than 75 mm at 1.5 m above ground level were excluded from the survey as they are not deemed to be of significant size to be included. Tree stem diameters were measured in accordance with BS5837 (2012).

A.1.4 Trees and shrubs are living organisms whose health and condition can change rapidly, for this reason the BS 5837 grades, along with any conclusions or tree management recommendations can only remain valid for a period of 12 months.

A.1.5 Where possible trees were assessed as individual specimens, however, where there were trees that formed distinctive groups of the same species within the landscape they can be assessed and graded as groups.

A.1.6 Trees on or adjacent to development sites are a material consideration that may have a significant impact on the future development and use of the site.

A.2 Use of survey data

A.2.1 The British Standard 5837:2012 provides guidance on the principles to be applied to achieve a satisfactory juxtaposition of tree with structures.

A.2.2 The tree survey with minimum requirements of BS5837 is enclosed in the appendices of this report.

- A.2.3 The tree survey data is used to produce a Site plan with tree constraints. The site plan with tree constraints shows the crown spreads and retention categories of all the trees within the surveyed area.
- A.2.4 The British Standard 5837:2012 'Trees in relation to design, demolition and construction – Recommendations', provides guidance and specifies measures to be adopted in order to avoid or minimise damage to trees retained on or in proximity to construction sites. One of the key recommendations is that a Root Protection Area (RPA) should be established around each retained tree. The RPA is calculated as an area equivalent to a circle with a radius 12 times the stem diameter measured at 1.5 metres above ground level for a single stem tree. In order to prevent disturbance or contamination of the RPA they are usually enclosed by robust fencing.
- A.2.5 Circular Root Protection Areas (RPAs) can be adjusted by an arboriculturalist by taking into account obstructions for root growth, including building foundations, retaining walls, metalled roads, topography, soil type and tolerance of individual trees.
- A.2.6 The British Standard recommends that trees within categories A-C (where A is highest quality) are a material consideration in the development process. Category U trees are trees that will not be expected to exist for long enough to justify their consideration in the planning process. The tree categories are used with the number 1, 2, or 3, which is shown in Table 1. These signify whether the justification for the category was made based on mainly arboricultural values, mainly landscape values or mainly cultural/conservation values respectively. The tree categories are shown on the tree constraints plan by colour coding. Category A trees are green, category B trees are blue, category C are grey and category U are dark red.
- A.2.7 It is important to recognise that tree roots are particularly vulnerable during any adjacent construction operations. Tree roots grow where conditions are most favourable, this tends to be near the soil surface, for this reason the majority of tree roots grow in the upper 600mm of the soil. This means that operations during construction such as shallow excavations, soil compaction by heavy plant or machinery or contamination by substances such as cement, diesel or other chemicals, even water in excess, can be damaging to the root system.



- A.2.8 The presence of surrounding walls, roads and retaining walls can affect the root distribution of trees within and around the site. Normally when a Root Protection Area is adjusted its shape is changed but the total area is maintained.
- A.2.9 Approved tree work should be carried out in accordance with BS 3998:2010 by suitably qualified and experienced professional tree surgeons. Under no circumstances shall site personnel undertake any tree pruning operations. All tree works should also take into consideration The Wildlife and Countryside Act 1981(as amended), the Conservation (natural habitats etc.) Regulations 1994, and the Countryside and Rights of Way Act 2000 protected species of flora and fauna.
- A.2.10 If the site is within a conservation area then the local authority will need to be notified of your intention to prune the tree which they can prevent by making a Tree reservation Order. Some forms of tree work are exempt from this requirement and tree works directly required to accommodate a development that has planning permission would be exempt. However, to avoid error I would always recommend notifying the local authority to avoid costly mistakes.
- A.2.11 If individual trees are protected by Tree Preservation Orders then written consent is required for tree pruning or tree removal except for a few exemptions and also if the work is directly required to accommodate a development which has planning permission. As above, I would always recommend applying for consent rather than assuming that works are exempt from requiring consent.



10. Appendix 2 Table 1 'Tree data'

Tree Table

Key to Tree Table

Tree number: the tree numbers used in the table corresponds to the plans in the appendices.

Species: the Botanical names of each tree.

Height and branch spread are estimated listed in metres.

Stem diameter has been measured at 1.5m above ground level (a.g.l.). It is listed in the table in mm.

Estimated dimensions

* estimated dimensions

Height of crown above ground level (a.g.l.): gives an indication of whether the crown extends to the ground, or has low hanging branches.

Age class: this refers to the age of the individual tree relating to the average life expectancy of each species in a similar environment.

Y - young
MA - middle aged
M - mature
OM - over mature

Physiological condition: general state of health of the tree, good (G), fair (F), poor (P) or dead (D).

Structural condition: Any defects/ habits/previous management of note.

Remaining contribution in years: has been estimated by taking the age of the tree away from an estimate of the total number of years the tree may live for in those conditions, it has been banded, as recommended in BS5837:2012.

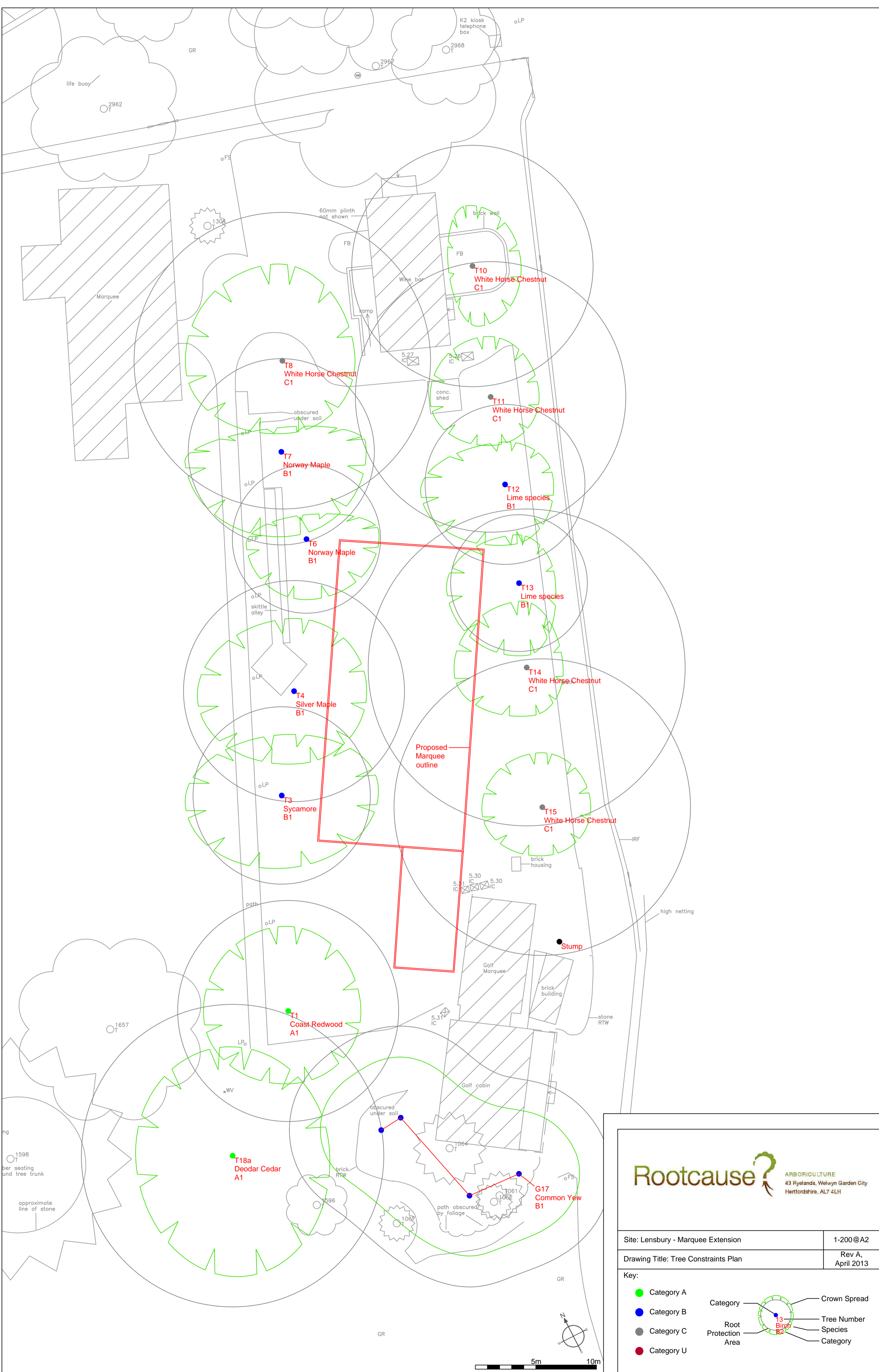
Retention category: each tree is given a category from the guidance in BS 5837:2012.



Table 1		The Lensbury Family Pavillion Restaurant															16 Apr 2013			
Tree Number	Tree Name (species)		Estimated dimensions	Height (m)	Calculated Stem Diameter (mm)	Number of Stems	Root Protection Area (Radius, m)	Root Protection Area m2	Crown constraints			North (m)	South (m)	East (m)	West (m)	Age class	Observations		Remaining contribution years	Tree Category
	Common	Botanical							Crown height m	Lowest branch m	Direction lowest branch						Summary of Physiological condition	Structural Condition & General comments		
T1	Coast Redwood	Sequoia sempervirens		20	760	1	9.12	261	2	4.5	S	7	6	6	7	MA	G	Reasonable tree	40+	A1
T2		Tree removed																		
T3	Sycamore	Acer pseudoplatanus		15	610	1	7.32	168	4	3	All	5.0	6.0	8.0	8.0	M	G	Reasonable tree	20 to 40	B1
T4	Silver Maple	Acer saccharinum		17	760	1	9.12	261	3	4.5	N&W	6.0	6.0	6.0	8.0	M	G	Trifurcate from 4-5m agl. Pruning stub on east side	20 to 40	B1
T5		Tree removed																		
T6	Norway Maple	Acer platanoides		14	510	1	6.12	118	3	3	W	2	5	6	5	M	G	Bifurcates 2m agl. Tension fork.	20 to 40	B1
T7	Norway Maple	Acer platanoides		18	640	1	7.68	185	4	2.5	S	2	7	7	8	M	G	Bifurcates 2m agl. Compression fork. Lighting in tree	20 to 40	B1
T8	White Horse Chestnut	Aesculus hippocastanum		22	1020	1	12.24	470	3	6	SW	8	6	6	8	M	G	Originally pollarded form. Ascending branches. Woodpecker cavity below lowest limb west side. Slime flux from occluded pruning wound NW side	10 to 20	C1
T9		Tree Removed																		
T10	White Horse Chestnut	Aesculus hippocastanum		12	830	1	9.96	311	5, epics below	6	NE	5	5	4	2	M	F	Crown reduced 4 years ago. Originally pollarded form. Some signs of bleeding canker	10 to 20	C1
T11	White Horse Chestnut	Aesculus hippocastanum		16	930	1	11.16	391	6	6	W	5.0	4.0	4.0	5.0	M	F	Crown reduced 4 years ago. Originally pollarded form. Some signs of bleeding canker	10 to 20	C1
T12	Lime species	Tilia sp.		14	550	1	6.60	137	4	4	SE	3.5	5.0	4.0	7.0	MA	G	Bifurcates 3m & 6m a.g.l. Compression fork. Recommend competing limbs reduced in next maintenance period	20 to 40	B1
T13	Lime species	Tilia sp.		17	470	1	5.64	100	4	3	S	4	6	3	6	MA	G	Reasonable tree, partially suppressed by T14	40+	B1
T14	White Horse Chestnut	Aesculus hippocastanum		18	1090	1	13.08	537	6	6	W	5.5	4.0	3.0	6.0	M	F	Long strip canker probably bleeding canker. Originally pollarded form. Lighting in tree	10 to 20	C1
T15	White Horse Chestnut	Aesculus hippocastanum		15	1020	1	12.24	470	5	5	W	4.5	4	4	5	M	P	water filled cavities. Tight lighting band. Low vigour.	10 to 20	C1
T16		Tree removed																		
G17	Common Yew	Taxus baccata	*	12	630	1	7.56	179	2.5	4	N	5	5	5	5	M	F	Compression fork with appressed stems 1-3m agl. Slightly sparse.	20 to 40	B1
T18a	Deodar Cedar	Cedrus deodara		21	1040	1	12.48	489	2.5	4	S	9	10	8	8	M	G	Typical mature Cedar. Minor deadwood and crossing branches. Lighting cables on stem	40+	A1

11. Appendix 3 Existing Site Plan with Tree Constraints



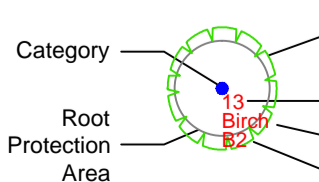


Rootcause? ARBORICULTURE
 43 Ryelands, Welwyn Garden City
 Hertfordshire, AL7 4LH

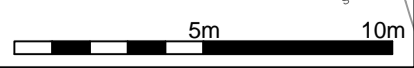
Site: Lensbury - Marquee Extension	1-200@A2
Drawing Title: Tree Constraints Plan	Rev A, April 2013

Key:

- Category A
- Category B
- Category C
- Category U

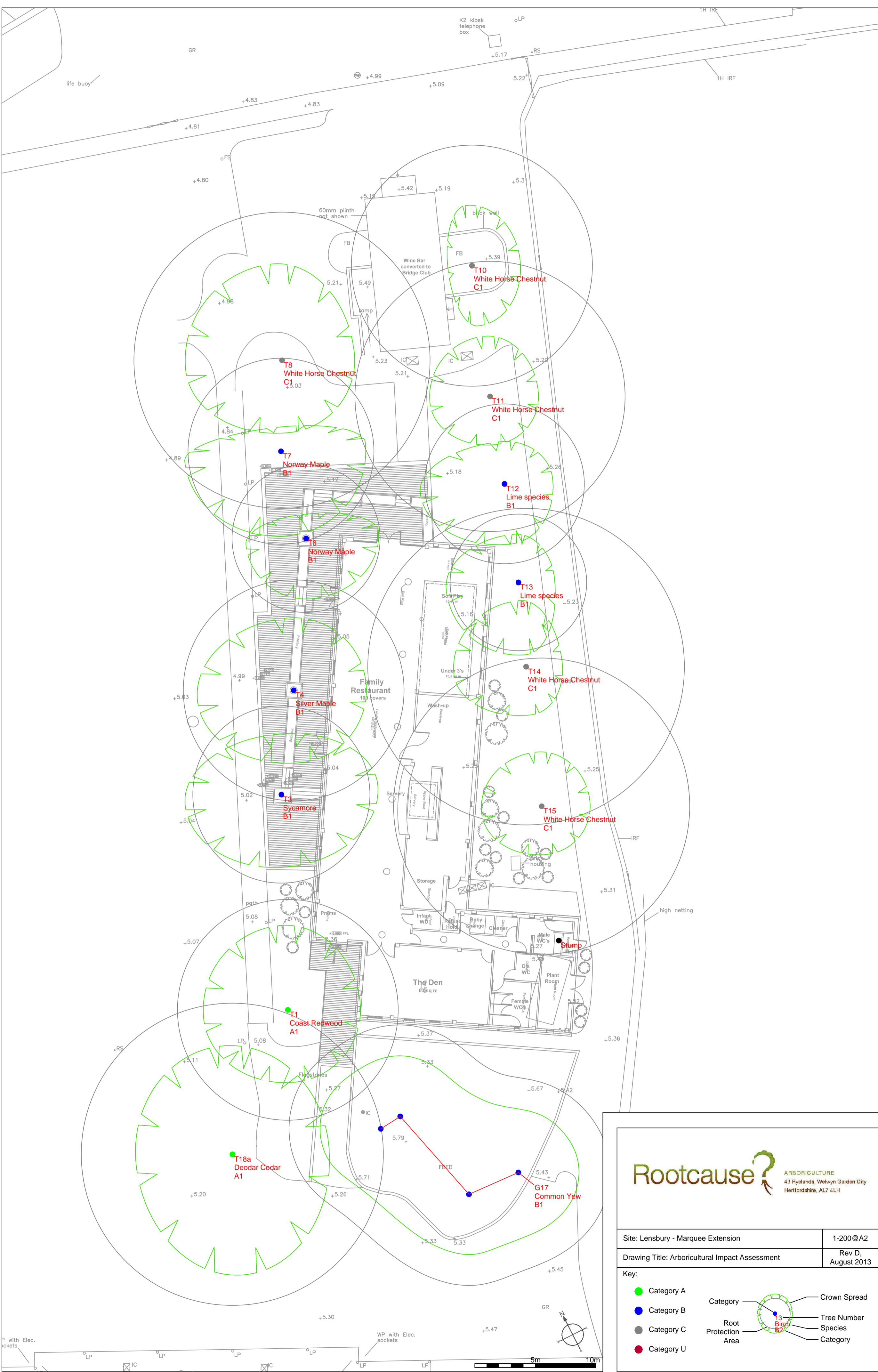
Category 

- Crown Spread
- Tree Number
- Species
- Category



12. Appendix 4 Arboricultural Implications Assessment Plan for Proposed Riverside Pavillion Restaurant





Rootcause? ARBORICULTURE
 43 Ryelands, Welwyn Garden City
 Hertfordshire, AL7 4LH

Site: Lensbury - Marquee Extension	1-200@A2
Drawing Title: Arboricultural Impact Assessment	Rev D, August 2013

Key:

- Category A
- Category B
- Category C
- Category U

13 Category
13 Tree Number
13 Species
13 Crown Spread
13 Root Protection Area

13. Appendix 5 Arboricultural (Tree Protection) Method Statement

1 Tree Work

It will not be necessary to remove any trees. Some trees will need to be pruned by crown lifting to up to 5m above ground level where they overhang certain parts of the building. The light piling rig proposed is unlikely to affect the crowns of trees but if necessary bespoke pruning or tying back of branches will be arranged when necessary. Any tree works should be carried out in accordance with BS3998:2010 and preferably using an Arboricultural Association Approved Tree Contractor (www.trees.org.uk).

2 Provision of information for all site operatives

A copy of the arboricultural method statement will be provided to site managers.

3 Erection of protective fencing and ground protection

3.1 The Tree Protection Plan in Appendix 7 shows the positions of Tree Protection and ground protection around the retained trees. Tree Protection will be as described in BS5837:2012 and consist of 2.3m weld mesh fencing panels fixed to a scaffold framework so that it cannot be moved or breached. There is minimal space for a scaffold framework and no heavy plant is anticipated so the fence can be fixed using stakes so that it cannot be easily moved. The Fenced area acts as a construction exclusion zone and marked with signs accordingly.

3.2 Ground protection is required to protect the roots, and the soil they are growing in from compaction and contamination. Ground protection as indicated on the Tree Protection Plan (Appendix 8) is provided by some existing hard surface but some soft landscape requires ground protection. If the existing hard surface deteriorates or any soil is exposed during demolition then ground protection must be installed and maintained during construction. The design of ground protection will depend on the loading of materials, plant and machinery to be used. Plywood boards on a bed of wood chips incorporating a membrane to prevent chemicals, fuels and cement contaminating the ground will be adequate for pedestrians and light machinery (concrete mixers, tracked mini excavator/piling machine up to 1 Tonne) but the design of ground protection should be checked by an engineer for adequacy and also for site safety considerations. Some examples of proprietary ground protection are included in Appendix 6.



4 Demolition

The existing Golf Cabin, toilets and marquee will need to be removed to allow construction. These buildings will need to be removed by hand with the tree protection proposed in the plan. Part of the golf cabin is outside of the tree protection fencing indicated. The golf cabin will be dismantled and then the fencing moved to the position indicated. If it is necessary to remove any building foundations then this will need an adjustment to this method statement because the removal of concrete foundations will need an excavator and additional precautions will be necessary.

5 Construction

Additional precautions during construction

- i. It is not anticipated that any large machinery will be used other than a mini-piling system. The use of large machinery such as cranes, tall piling rigs and excavators must be planned to avoid any damage to the crowns or roots of retained trees. Construction and access occurs beneath the crowns of retained trees and so if tall machinery is used it must be closely supervised to avoid damage to parts of trees.
- ii. Storage of materials can cause soil compaction, provide a source of combustible materials and/or chemical contamination. The storage of materials within the Root Protection Area (RPA) must be avoided.
- iii. Many building materials are toxic to trees. Excess cement, cement washings, waste water, diesel fuel and even clean water in excess can kill or seriously damage trees. Any runoff or spillages should be controlled so that they do not contaminate the RPAs of retained trees or landscape areas.
- iv. Parts of the building are within root protection areas and ground protection areas. To construct foundations in these areas ground protection will protect the soil and roots in the surrounding area. All excavations within the ground protection areas must be carried out by hand to a depth of 1m and supervised by an Arboriculturist. Any roots discovered will be pruned to the edge of the excavation using hand tools. Mechanical excavations can rip and damage roots beyond the excavation and so hand excavation is essential.



- vii. Fire is harmful to trees and therefore combustible materials together with sources of ignition must be controlled within 10m from the crown of a retained tree in case of accident. Fire fighting equipment and suitably trained staff must be available when people are working on site especially when combustible materials are stored near tree protection zones. This includes fuel and plant and machinery.
- viii. Any new services within root protection areas and/or ground protection areas must be excavated by hand and any roots in excess of 25mm diameter retained where possible. This work must be supervised by an arboriculturist to ensure that root damage is controlled and minimised.
- ix. Any other unavoidable excavations within the RPAs of retained trees will be conducted such that as many roots as possible are retained and all roots greater than 25mm are retained unless the arboriculturist supervising the work agrees that the loss of a large root is unavoidable.

6 Landscaping

- i. Tree protection and ground protection will need to be removed during this work. Any heavy plant and machinery for landscaping will need to be operated so that they avoid the root protection areas of the retained trees.
- ii. The proposed decking and paths must be constructed using ground protection when necessary to prevent compaction and contamination of the soil. The paths will be constructed with minimal excavations as no excavation in excess of 100mm will be permitted. If any roots greater than 25mm are affected it may be necessary to alter the path location. Decking will be supported on a low impact foundation system (Paragraph 7.4) and the system should be designed to minimise damage to roots and the available root space in consultation with an arboriculturalist.

7 Excavations within Root Protection Areas.

- i. All excavations within the RPAs of retained trees will be carried out by hand as described in Appendix 8. This includes any reduction in ground level, installation of services, and excavations for foundations or other below ground construction.

7 Site Supervision

- i. A programme of Arboricultural Site Supervision is advisable when working near retained trees. A detailed programme of site supervision can be compiled when a construction timetable has been prepared and copied to the council tree officer. The critical periods are as follows:
 - a) Meeting prior to commencement to appraise staff and site managers. The Local Authority Tree Officer will be invited to attend.
 - b) During excavations for underground services
 - c) When tree protection measures are put in place.
 - d) During excavations within root protection/ground protection areas.
 - e) When tree protection removed (usually on completion).
 - f) In emergencies or if any accidents or unforeseen incidents occur that affect tree protection or might affect tree health and condition.

- ii. So that the Local Planning Authority is assured that site supervision is taking place copies of site inspections should be copied to the appropriate council arboricultural (tree) Officer.

The Arboriculturalist is employed by the client and will act as a representative of the client. The arboriculturalist has full authority delegated by the clients to instruct the construction staff to make alterations to tree protection and working methods to prevent damage to trees. Any additional or consequential cost will be the responsibility of the construction company. The Arboriculturalist will not be liable for any variation in cost as this would compromise their ability to perform tree protection duties.

- iii. An example of the Site Supervision Record Sheet is enclosed in Appendix 9.
- iv. The Key Personnel cannot be named at present but they will be notified to the relevant parties by the supervising arboriculturist.

- v. The key personnel will be invited to a pre-commencement meeting and at that time the names of the key personnel will be confirmed. The principles of tree protection will be discussed in relation to this project and a written statement, based on that discussion and this method statement will be prepared to be included in site induction procedures for all staff working at the site.



14. Appendix 6: Examples of ground protection

Heavy Duty Ground Protection

PORTATRACK HEAVY DUTY panels are manufactured from Recycled High Density Polyethylene and can be bolted together with steel connecting strips.

- The panel size is 3m x 980mm x 24mm
- Each panel weighs 45 kgs and can be handled by two people.
- These panels will take up to 80 tons
- No special equipment is required.



PORTATRACK standard panels

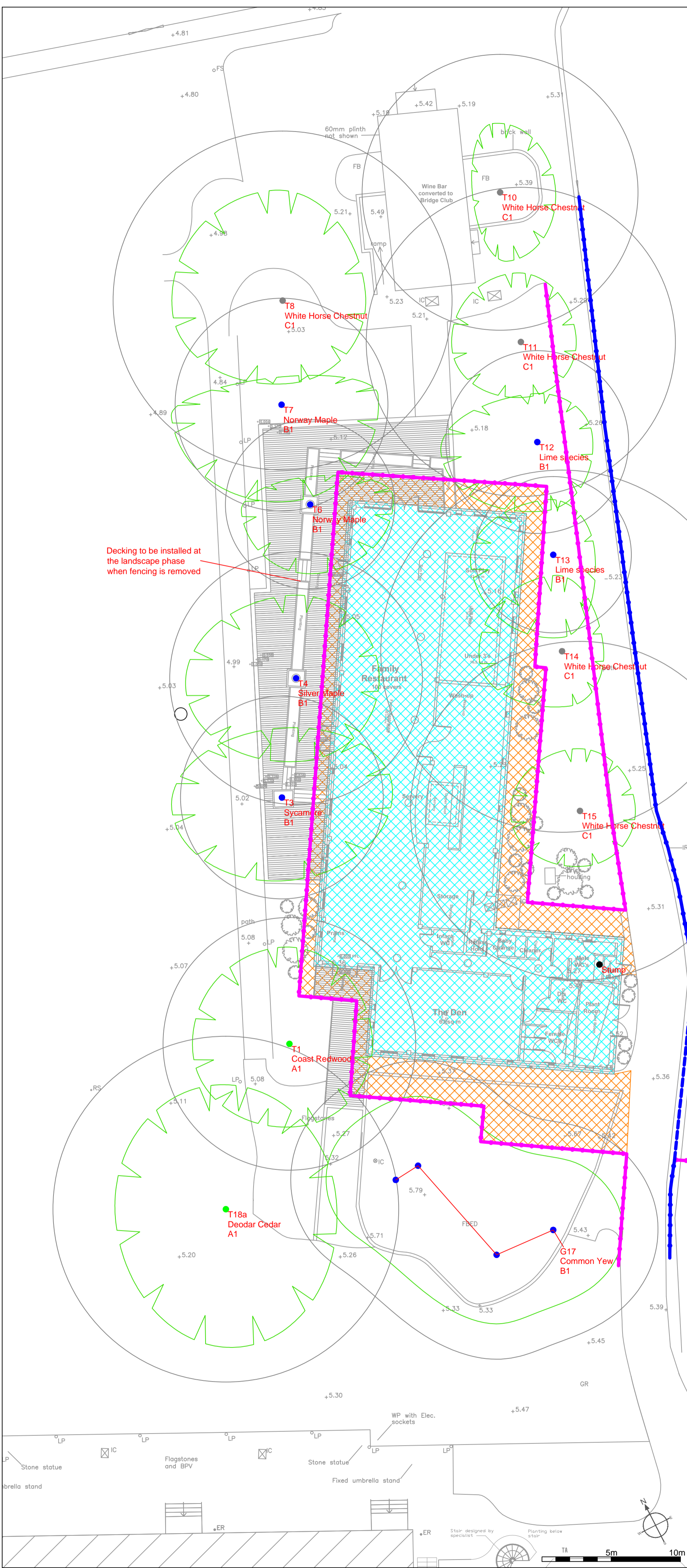
Lightweight panels are useful for pedestrians

PORTATRACK standard panels are manufactured from 12mm thick recycled polyethylene. They will take up to 30 tons and are virtually indestructible. The Standard panel has an embossed surface is suitable for all vehicle types. The Slip-resistant panel has grooves cut into the surface making it suitable for pedestrians as well as vehicles.




15. Appendix 7 Tree Protection Plan





Decking to be installed at the landscape phase when fencing is removed



43 Ryelands, Welwyn Garden City
Hertfordshire, AL7 4LH

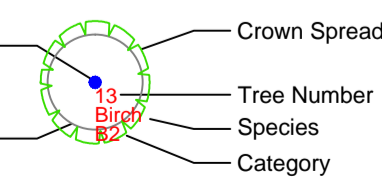
Site: Lensbury - Marquee Extension	1-200@A2
Drawing Title: Tree Protection Plan	Rev B, August 2013

Key:

- Category A
- Category B
- Category C
- Category U

Category

Root Protection Area



- Tree Protection Fencing
- Existing Fence
- Ground Protection
- Ground protection during piling and floor construction

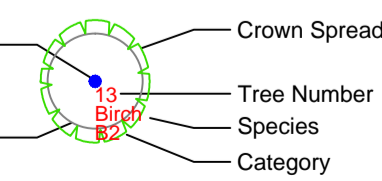
Site: Lensbury - Marquee Extension	1-200@A2
Drawing Title: Tree Protection Plan	Rev B, August 2013

Key:

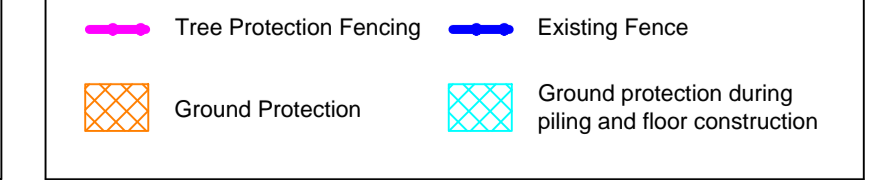
- Category A
- Category B
- Category C
- Category U

Category

Root Protection Area



- Tree Protection Fencing
- Existing Fence
- Ground Protection
- Ground protection during piling and floor construction



16. Appendix 8 Method Statement for Hand Excavations (within Root Protection Areas)

Method for Hand Excavations within Root Protection Areas.


The purpose of the excavation is to establish the presence/absence of significant roots within the RPA's of retained trees during excavations so that important roots can be retained undamaged.

Method:

- a) Excavations will use hand tools like forks, spades and shovels. An 'Air Spade' could be used in special cases but the depth of excavations is limited with these tools. Other power tools must not be used unless approved by an arboriculturist.
- b) During excavations any roots less than 25mm should be cut cleanly to the sides of the excavation with a pair of secateurs. Shallow Air Spade excavations may not need this but deeper excavations will need fine roots removed to allow access to remove loosened spoil. Larger roots will be retained in the trench where possible.
- c) The depth of the excavation to discover the majority of roots should be up to 1m for foundation trenches, service trenches or to the maximum depth of proposed structures if less than 1 metre deep.
- d) Roots to be retained, if exposed for more than one hour, will be covered with Hessian to prevent damage from high or low temperatures depending on the ambient weather conditions and it will also protect them from sun scorch. Roots may also need to be protected with cut sections of plastic pipe, if excavations using hand tools are close to them, to prevent physical damage.
- e) If any large roots (>25mm) are found within the excavations these will be recorded and retained. This information will be passed to the arboricultural, architectural design team. In many circumstances the position of the post, pile, service or path might be altered to allow important tree roots to be retained. In some cases roots can be retained in the trench and 'bridged' by the foundation or structure but if that is not practical then they can be removed if approved by the supervising arboriculturist where directly affected by building foundations.

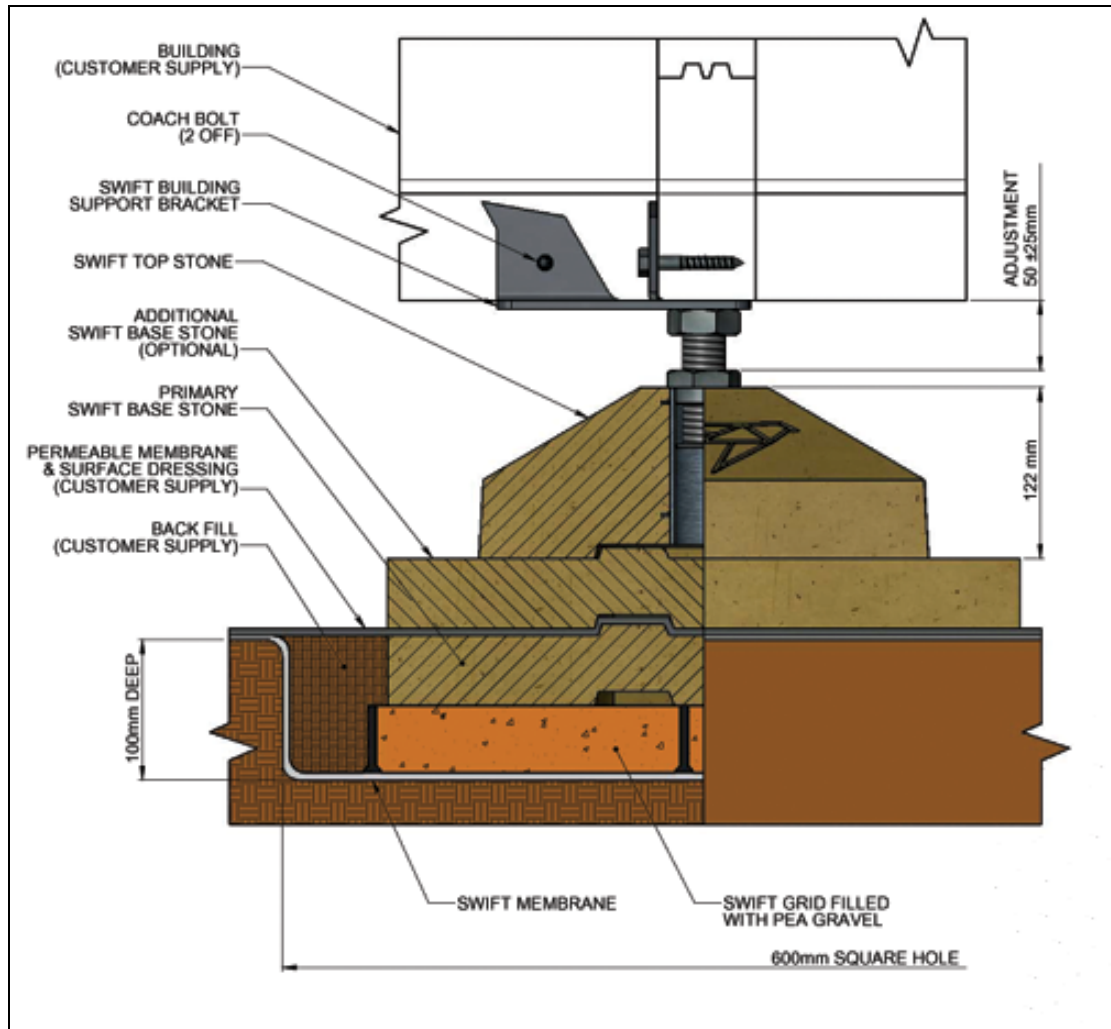


17. Appendix 9: Arboricultural Site Supervision Record

THE TREE COMPANY			
			
Tree Protection Monitoring Record			
Reason for visit	Stage/Planned/Unplanned/Emergency		
Site:			Site Manager:
Site visit by:			Client:
Date of visit:			Time of visit:
Tree Protection Element	Comments/Action		Rating*
Site Access routes			
Location of Site Accommodation/ Car Parking etc			
Tree Protective Fencing			
Ground Protection			
Planned Construction Exclusion Zone			
Site Storage			
Soil contamination			
Excavations/ level changes			
Tree Condition			
Plant used on site			
Landscaping			
General Observations			
Document Review Required			
Signed:			Overall Site Rating

*Rating: P is inadequate, F is adequate as specified, G is above specification

18. Appendix 10: Swift Foundation Design for Decking



http://www.swiftfoundations.co.uk/swift_plinth.php