Arboricultural Impact Assessment

Grange Service Station, London Road, Rayleigh, Essex, SS6 9DW

Trevellyan Developments Ltd

Marishal Thompson Group
Arboricultural & Ecological Consultants

Address	Grange Service Station, London Road, Rayleigh, Essex, SS6 9DW		
Client	Trevellyan Developments Ltd	**Client Ref**	
MT Ref	D2602141221	**Consultant**	Paul Allen Dip Arb(RFS) MICFor
Report Date	10 March 2014	**Quality Checked**	Victoria Telford BSc (Hons) MSc
Technical Approval **Andrew Cayley Bsc (Hons) Arb, M.Arbor.A**			

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Contents

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Report Caveats

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Specific - Trees

All tree inspections, unless specified, have been undertaken from ground level and using non-invasive techniques. Comments contained within the report on the condition and risk associated with any tree relate to the condition of the tree at the date and time of survey. Please note that the condition of trees is subject to change. This change may occur, but is not limited to biological and non-biological factors as well as mechanical/ physical changes to conditions in the proximity of the tree. Trees should be inspected at intervals relative to identified site risks and in accordance with relevant HSE and Central Government guidance. Marishal Thompson can provide further information on this matter if required.

Please note no statutory control checks have been undertaken (unless specified). Where tree surgery works have been identified these works are based on the assumption that planning is approved, no tree works should be undertaken prior to determination of this application without up to date confirmation of the Tree Preservation Order / Conservation Area Status of the vegetation. All works should be undertaken in accordance with the appropriate Duty of Care. This should include, for example, site specific risk assessments and due diligence inspections for the presence of protected species.

Any comment relating to 3rd party trees has been made without full access to the tree(s). Should these trees have any impact on the proposed development we would advise you to instruct us to contact the 3rd party and undertake further inspection work.

1.0 Introduction

1.1 Marishal Thompson Group have been appointed by Bayliss Design on behalf of Trevellyan Developments Ltd, to provide advice on the arboricultural issues relating to the proposed development of the above site.

1.2 We undertook a Pre-Development Tree Condition Survey (see Appendix 1), on the 5th March 2014. This survey assessed the condition of the tree resource, categorised the trees and provided the Root Protection Area (RPA) information according to the BS5837:2012 "*Trees in relation to design, demolition and construction – Recommendations*". Following preparation of our Tree Condition Survey we received a copy of the layout drawing showing the development proposal for the site.

1.3 We have been informed That the trees on and adjacent to the site are not subject to statutory protection under a Tree Preservation Order neither is the site within a Conservation Area. The tree numbers used in this report refer to the tree numbers used in our Tree Condition Survey.

2.0 Executive Summary

2.1 The site is currently split into two sections, with a working fuel filling station and convenience store on the southern half and a detached residential property and ample sized garden within the northern half.

2.2 The site has offsite trees around three of the four site boundaries and excludes the southern boundary adjacent to London Road. The trees are early mature to mature and of low to modest amenity value; younger trees and shrubs were also growing within the site but have now been removed, all of low quality and landscape value.

2.3 The development proposal is to demolish the existing buildings / filling station and redevelop the site for a new larger and improved design and capacity filling station and shop with associated improved access, car parking and landscaping.

2.4 All the higher quality 'B' category offsite trees have been recommended to be retained and protected with only six poor condition and low amenity value 'C' and 'U' category individual trees identified for removal and replacement, three from each category. All the trees recommended to be removed are 3rd party owned by the Council on land to the north and east of the site boundary. Any works to these trees will need written approval from the council and are likely to be requested to be replaced to maintain a visual screen of trees around these site boundaries.

3.0 Scope of Tree Survey

3.1 To carry out a tree condition survey on the trees and hedgerows at and immediately adjacent to the site, identifying any hazard trees and making recommendations for those trees to be retained and low amenity value and hazard trees to be replaced.

3.2 To undertake the tree survey in accordance with the principles of BS5837: 2012 'Trees in relation to design, demolition and construction – Recommendations'.

3.3 To produce a tree constraints plan (TCP), showing the location of surveyed trees, their BS5837: 2012 categorisation, the theoretical Root Protection Areas (RPA) and any shading arcs required to be shown for those trees south of the development window.

3.4 To carry out an arboricultural impact assessment on the effect of the new development at the site identifying the construction exclusion zones (CEZ) shown on the tree protection plan (TPP). This will also show the locations for tree protective fencing, any temporary ground protection required and identify 'No-Dig' zones for RPAs shown outside of CEZs.

3.5 The purpose of this report is to comment on the arboricultural implication of the proposed development and to aid the preservation of trees to be retained at and adjacent to the site during the construction works by setting out the tree protection methods, construction techniques and working practices that are to be adopted on this site.

3.6 If the guidelines and principles outlined in this report are not adhered to, as with all development sites there is a risk that the construction activities will result in damage to and potentially the death of the retained trees. Damage to the trees will significantly increase the risk of their health declining and may increase the risk of their complete or partial failure.

4.0 Terms of Reference

4.1 Reference Documents:

- BS5837:2012 'Trees in relation to design, demolition and construction – recommendations'
- BS3998:2010 'Tree work – recommendations'
- NJUG 4 – National Joint Utilities Group "Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees. Volume 4, issue 2. London: NJUG 2007"
- Information from the Rochford District Council local plan and website

5.0 Description of Site and Proposed Works

5.1 The site consists of an existing fuel filling station and residential property to be removed and replaced with a larger filling station with improved capacity, site access, car parking and landscaping.

5.2 The immediate and distant landscape character is sub-urban / rural with London Road being an arterial root between Chelmsford and Rayleigh / Southend off the A130. Trees in the immediate landscape are located within private and open space, but mainly as standards within highways verges and hedgerows.

5.3 The topography of the site is level with the soils in relation to the site known to be London Clay Formation - Clay, Silt and Sand. (British Geological Survey – online)

http://mapapps.bgs.ac.uk/geologyofbritain/home.html

6.0 The Trees

6.1 **Tree Numbers:** There were 8 Individual trees, 2 tree groups and 1 shrub group surveyed onsite or immediately adjacent to the site boundary. These trees can be grouped into three locations; Northern, eastern and western:

- T1 & TG1 – Western site boundary
- T2, T3 and TG2 – Northern site boundary
- T4 -T8 & SG1 – Eastern site boundary

6.2 **Amenity Value:** All the trees have a similar amount of amenity value / worth as they all contribute to both the immediate and distant landscape affect for their boundary visual screening benefits to and from the site. The trees with the greatest surveyed amenity value are the Grey Poplars, T4 -T8, located offsite on the eastern site boundary located on Council owned land on the verge of the access drive to Rayleigh Sports and Social club.

6.3 **BS5837:2012 Categorisation:** Individually there were;

- 2 'B' category trees – T4 and T5
- 4 'C' category trees – T1, T6, T7

6.3.1 By tree group there were:

- 2 'C' category tree groups – TG1,TG2
- 1 'C' category shrub group - SG1

6.3.2 In total there were 3 'U' category individual trees, T2, T3 and T8, which were identified as in poor condition or dead / in decline with less than ten years useful life expectancy. These will be recommended to the Council to be felled and replaced regardless of any impact of the development proposal, for health and safety reasons.

7.0 Arboricultural Impact Assessment

7.1 With reference to BS 5837: 2012 '*Trees in the relation to design, demolition and construction – Recommendations*', an assessment of the tree resource has been undertaken and using the guidance in BS5837 would comment as follows:

7.2 **Tree Retention / Removals:** As part of the proposed new development of the filling station site all the poor condition trees and shrubs previously growing within it have been removed prior to our site tree survey. The remaining trees recommended to be removed are located offsite on the site boundaries and have been recommended to the tree owner and the council that they should be removed due to their poor condition, short useful life expectancy and health and safety risks they would present to the continuing and future use of the site as a filling station. The 6 Individual trees recommended to be removed, by BS5837:2012 category, are:

'C' – T1, T6, T7

'U' – T2, T3, T8

7.3 **Levels:** Issues surrounding some changes in levels do apply to the proposed development layout. These are mainly in relation to the new car parking spaces located on the north east and eastern boundary of the site within the Root Protection Areas of T4 and T5, offsite Council owned Grey Poplar. Changes in levels should be minimised to the removal of surface vegetation and hard surfacing only with these undertaken by approved site specific arboricultural method statements and while supervised by the Marishal Thompson arboricultural consultant.

7.4 **Retained tree impact upon the proposed development:** The retained offsite Grey Poplar trees T4 and T5 and Leyland Cypress off the northern and western boundaries, within TG1 and TG2, have the potential to influence foundation design on the proposed new fuel filling station building and store. Given that the site has a previous history of tree related subsidence, the soil is known to be a shrinkable London clay soil, and multiple trees / shrubs have been removed from within the site, a structural engineer will need to be consulted to advise on the most appropriate foundation design given these site specific constraints.

7.5 **Impact of the proposed new car park on retained trees**: The construction of the proposed new car parking spaces have the potential to damage tree roots of the adjacent retained trees both directly and indirectly through compaction and reduction in precipitation through the new hard surfacing. Therefore it is recommended that the sub-base to the new car park is constructed using a 'no / reduced dig' sub-base using 'Arboraft' or 'Infraweb'.

7.5.1 Which system is utilised will depend on both cost and whether a SUDS surface water system is required to store precipitation from the car park rather than install a surface water drainage system. Edging to the new car park will also preferably need to be 'no-dig' timber edging instead of concrete kerbing. (see appended construction detail and method statement at Appendix 10).

7.6 **New Services Excavation:** It is not known at the time of writing this report the precise location of any new services excavations. These should, where possible, not encroach within the RPAs of retained trees. Where excavations slightly encroach into adjacent tree RPA's their excavation should only be considered when supervised by the consultant arboriculturalist from Marishal Thompson and installed using excavations with a compressed air lance 'Airspade' according to arboricultural protection method statements approved by the council tree officer.

7.7 **Special Surfacing:** The new proposed car parking spaces are located within offsite, 3rd party retained tree RPAs. The design of the surfacing should be 'no' / 'reduced –dig' with finish surfacing applied being permeable. This will reduce compaction and therefore damage to any underlying retained tree roots and allow precipitation to permeate to any tree roots underneath newly laid surfacing. Any required excavation / levelling works within retained tree RPAs should only be undertaken by approved arboricultural method statements and carried out while supervised by a Marishal Thompson consultant arboriculturalist.

Figure 1. - Installed 'Arboraft' system around retained existing trees.

7.8 **Excavations within Retained tree RPA's:** These will be required for the construction of the new 'Trolley enclosure', within the RPA of the offsite Poplar T4, and the new 'Car wash' building, close to the offsite tree group TG1. Both sets of excavations for these structures foundations encroach into adjacent tree RPA's and so their excavation should only be considered when supervised by the consultant arboriculturalist from Marishal Thompson and installed using excavations including the use of a compressed air lance 'Airspade' according to arboricultural protection method statements approved by the council tree officer.

7.9 **Tree Works and New Tree Planting:** The existing offsite tree groups to be retained, TG1 and TG2 will require specific annual tree group trimming and pruning works to branches which overhang the site boundary over the new car parking spaces / car wash access road.

8.0 Recommendations

8.1 The preliminary tree works recommended are included in the tree tables contained within this report within the tree works schedule at Appendix 5.

8.2 That during the construction build phase, following current consultation with the arboriculturist, adequate provision is made for the protection of existing trees on site and the areas to be planted with new trees and shrubs.

8.3 That by liaison with the council tree officer, formal agreement should be sought regarding the tree pruning required and tree protection methods employed to protect retained trees. These will be via the production of a site specific method statement (SSMS) and will include:

- Tree protective fencing as shown on the tree protective plan
- No ground excavations within tree RPAs, unless approved by the tree officer
- Any anti-compaction measures taken
- The specific location of services trenches where possible to avoid excavations within RPAs, or if necessary to be undertaken by hand dig only
- Specific methods for construction of new car parking spaces, structures close to or within retained trees RPAs

8.4 Pre-commencement site meetings should be arranged to discuss the recommendations in this and subsequent reports and method statements. Copies of all relevant arboricultural reports should be available on site.

8.5 The SSMS should be developed further with the contractor through the development process to include comments made by them and the client and design team as well as council officers. A copy of the tree report, including the site specific method statements and tree protection plan is kept on site at all times.

8.6 That details of site inspection / supervision visits by the Marishal Thompson consultant arboriculturist are recorded and sent to the council tree officer with copies retained by the site manager.

9.0 Conclusions

9.1 The site is located within a rural landscape setting, there are no significant amenity value trees on the site with the primary tree related constraints emanating from two offsite council owned Grey Poplar trees, T4 and T5. These two trees are the dominant individual tree species adjacent to the site along with two further Grey Poplars T7 and T8 at the site entrance to the adjacent Rayleigh Sports and Social club drive entrance. A further tree, T1 (Oak), constrains the sight lines to the improved site entrance off London Road, but is in decline and poor general condition with a high density of crown dead wood. None of the surveyed trees are protected by Tree Preservation Orders neither is the site within a conservation area. Most of the trees are in need of some basic crown pruning works due to their lack of recent management.

9.2 Three 'C' category individual trees have been recommended to their 3rd party owners to be removed due to their poor general condition and three further trees are 'U' category and should be felled regardless of the proposed new development of the site.

9.3 Tree protection measures, including the use of cellular confinement sub-base systems for the construction of the proposed car parking spaces along the eastern site boundary, and the installation of tree protective fencing will adequately protect the offsite retained trees RPAs, when accompanied by detailed methods and supervision by the Marishal Thompson consultant arboriculturist.

9.4 Sufficient development room will be available after tree protection measures are instigated as described within this report. Excavations within retained tree RPAs for construction operations such as; service trenches; changes in levels, foundations excavations and removal of existing hard surfacing will be avoided where possible.

9.5 The development of the site will bring an opportunity for best practice tree management of the remaining trees and group areas adjacent to the site and an opportunity for further tree and landscape planting. All tree works and landscape replacement tree planting will require agreement with the council officers.

Paul Allen MICFor Dip Arb(RFS)
Consultant Arboriculturist
14 March 2014

10.0 Appendices

Appendix 1 Key to Survey Sheets

Appendix 2 Tree Survey Sheets

Appendix 3 Tree Constraints Plan

Appendix 4 Tree Protection Plan

Appendix 5 Tree Works Schedule

Appendix 6 Site Inspection & Monitoring Schedule

Appendix 7 BS5837:2012 Tree Constraints & Protection Methods

Appendix 8 Tree and Ground Protection Specification

Appendix 9 Photographs

Appendix 10 'Arboraft' and 'Infraweb' Specification and Method Statement

Appendix 1 – Key to Tree Survey Sheets

The classifications adhere to the principles of the British Standard 5837:2012 "Trees in relation to design, demolition and construction – Recommendations". However, explanations for the terms have been changed to reflect the approach of this company to the practical aspects of categorising trees in the field.

NP	Trees newly planted
Y	Trees from seedling. Less than a third life expectancy
MA	Early indicators of maturity in bark tissue, reproductive tissue, leaf and crown morphology may be present. (Notably, excurrent shoot growth, not readily transplantable and still likely to increase significantly in size).
M	Strong indicators of maturity in bark tissue, reproductive tissue, leaf and crown morphology will be present. Shoot growth decurrent. (Middle aged phase of growth when the tree has effectively reached up to 90% of its ultimate size for the species & location)
OM	Trees in senescence, decline from disease, decay, root death, structural or stability problems resulting primarily from old age. (Senescence is an ageing related category, i.e. a young tree subject to disease and decay because of say an impact injury would not be senescent. Characteristically, senescent trees are likely to be reducing in mass due to the shedding of branches)
V	Veteran Tree. A tree older than typical age of the species and of great ecological, cultural and aesthetic value
Ht	Height of tree (measured to the nearest metre)
Cr Ht	Crown height (from ground to lowest branch tip)
Ult Ht	Ultimate height of tree
NSEW	Crown measurements from trunk to leaf tip in a north, south, east and west direction
Cond	Physiological condition
Life Exp	Life expectancy
RPR	Root protection area radius
RPA	Root protection area
ERCY	Estimated Remaining Contribution in Years
*	Tree unable to be fully inspect with trunk diameter estimated due to restricted access

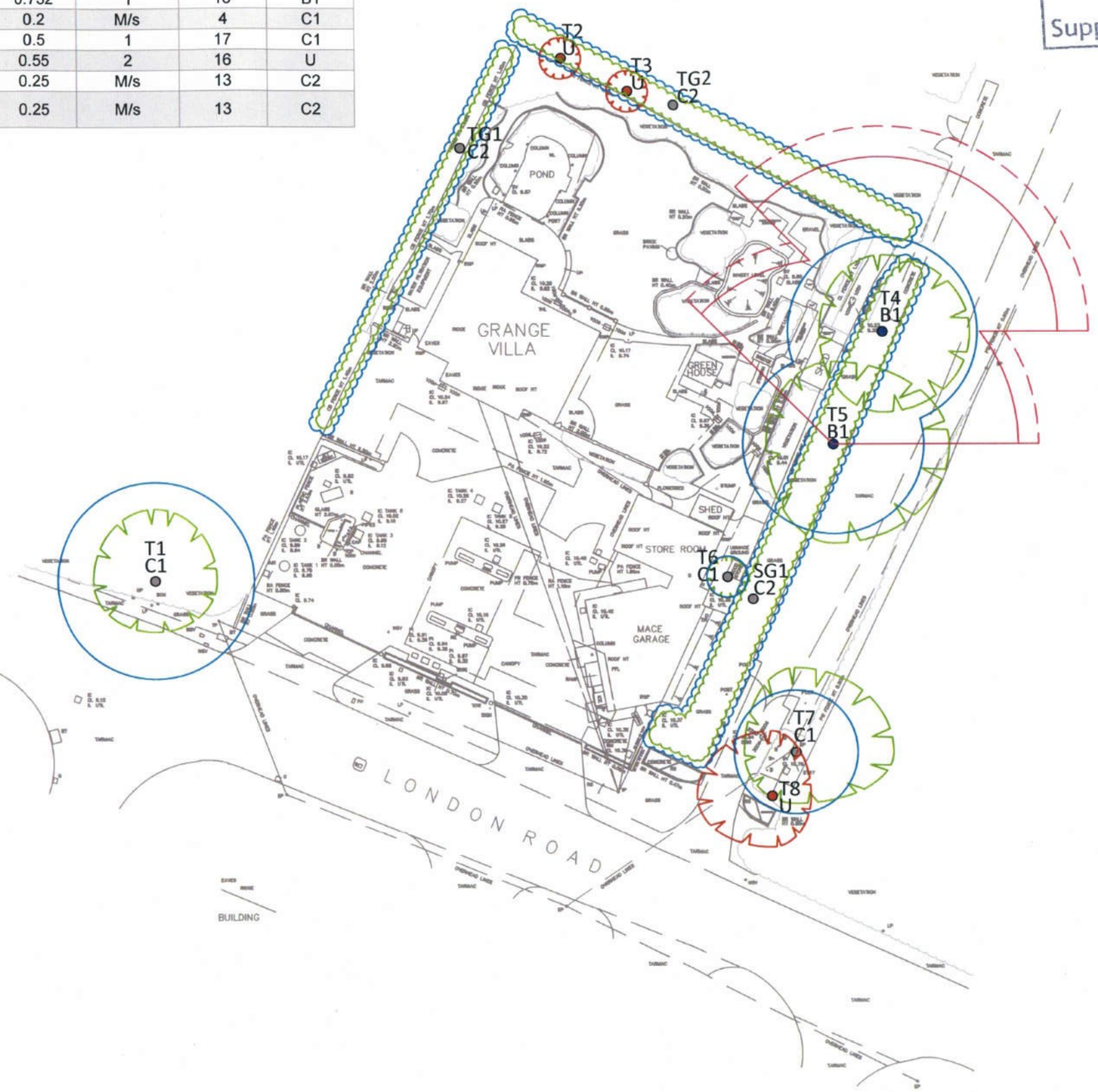
BS Category BS5837:2012 "Trees in Relation to design, demolition and construction – Recommendations."

Category	Description
A **Green**	**Trees of High Quality and Value** A1 - Mainly arboricultural values A2 - Mainly landscape values A3 - Mainly cultural values, including conservation
B **Blue**	**Trees of Moderate Quality and Value** B1 - Mainly arboricultural values B2 - Mainly landscape values B3 - Mainly cultural values, including conservation
C Grey	Trees with Low Quality and Value C1 - Mainly arboricultural values C2 - Mainly landscape values C3 - Mainly cultural values, including conservation
U **Red**	**Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.** **NOTE: Category U trees can have existing or potential conservation value which it might be desirable to preserve.**

Appendix 2 – Tree Survey Sheets

Appendix 3 – Tree Constraints Plan

Tree No	Species	DBH(m)	No of Stems	Ht (m)	BS Cat
T1	Oak*	0.8	1	8	C1
T2	Leyland Cypress	0.25	M/s	11	U
T3	Leyland Cypress	0.2	M/s	10	U
T4	Grey Poplar	0.764	1	17	B1
T5	Grey Poplar	0.732	1	18	B1
T6	Elder*	0.2	M/s	4	C1
T7	Grey Poplar*	0.5	1	17	C1
T8	Grey Poplar	0.55	2	16	U
TG1	Leyland Cypress* x 29	0.25	M/s	13	C2
TG2	Leyland Cypress*, Blackthorn*, Hawthorn*	0.25	M/s	13	C2



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17. 03. 2014
Support Services

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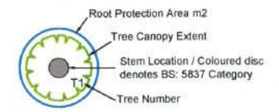
Tree Survey Drawing Key



See Marishal Thompson Tree Survey for Individual Tree Details

KEY

Please refer to Marishal Thompson arboricultural report for details

- Category A - high quality and value
- Category B - moderate quality and value
- Category C - low quality and value
- Category U - removal

RPA - root protection area as defined by Table 2 BS 5837:2012

Category U - removal

Shading Arc

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REV AMENDMENTS DRAWN DATE AUTHD

PROJECT
Grange Filling Station
London Road
Rayleigh SS6 9DW

CLIENT
Trevellyan Developments Limited

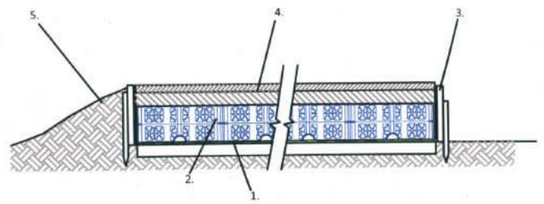
TITLE
Tree Constraint Plan (TCP)

Job	Scale	DRG NO	Revision
D2602141221	1:500 @ A3	10203	-
Date 10/03/2014	Type MT.TCP.10203.v1		

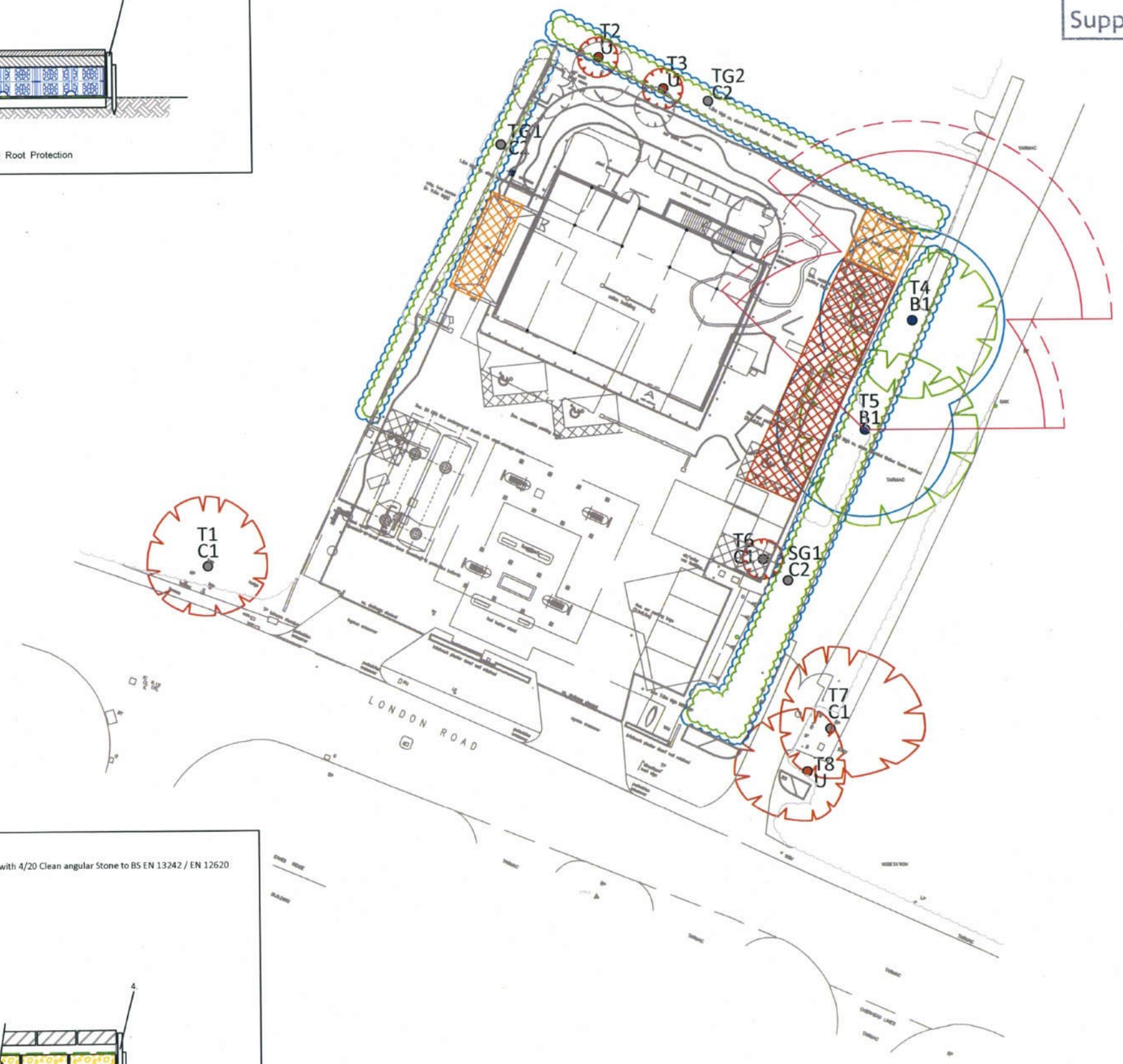
MT Group

Appendix 4 – Tree Protection Plan

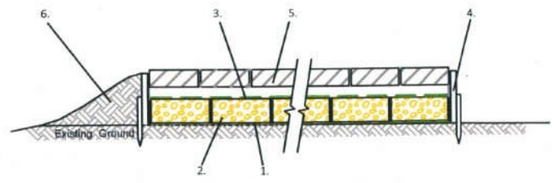
KEY
1. Permatex 300 geotextile
2. 150mm deep ArborRaft tree root protection system on 30-50mm blinding layer
3. Treated timber edging (Or other Edging detail acceptable)
4. Asphalt surface to engineers details
5. Soil graded to edging (if required)



ArborRaft Section - Tree Root Protection
c/w Asphalt Surface



KEY
1. Permatex 300 geotextile
2. 100mm deep InfraWeb tree root protection System infilled with 4/20 Clean angular Stone to BS EN 13242 / EN 12620
3. Permatex 200 separation geotextile
4. Treated Timber Edging (Or other Edging Detail Acceptable)
5. Block Paving with sand bed to Engineers Specification
6. Soil graded to edging (if required)

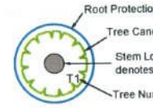


InfraWeb Section - Tree Root Protection
c/w Block Paving Surface

scale bar 1:500

5m 0 10m 50m

Tree Survey Drawing Key



See Marishal Thompson Tree Survey for Individual Tree Details

KEY

- Tree to be retained
- Tree to be removed
- Shading Arc
- Tree protective fencing
- No Dig Surface
- Supervised Excavations

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REV	AMENDMENTS	DRAWN	DATE	AUTH'D

PROJECT
Grange Filling Station
London Road
Rayleigh SS6 9DW

CLIENT
Trevellyan Developments Limited

TITLE
Tree Protection Plan (TPP)

Job	Scale	DRG NO	Revision
D2602141221	1:500 @ A3	10203	-
Date 10/03/2014	Type MT.TPP.10203.v1		

MT Group

Appendix 5 – Tree Works Schedule

NOTE: All tree works to be undertaken in accordance with BS 3998:2010 'Treework - Recommendations'. All pruning cuts to be made at suitable growing points, in line with the principles of natural target pruning.

Tree Works Schedule

Tree No.	Species	Proposed Tree Works	Reason	BS Cat
TG1	Leyland Cypress* x 29	Annual trimming maintenance branches over site.	Average form, shape and condition linear, un-managed tree / boundary screening group. 3rd party offsite trees, unable to fully inspect. Offsite boundary trees with overhanging branches. Lower branch die-back due to shade.	C2
TG2	Leyland Cypress*, Blackthorn*, Hawthorn*	Annual trimming maintenance of branches overhanging boundary fence line.	Average form, shape and condition linear boundary tree group. 3rd party offsite trees with overhanging branches, unable to fully inspect. Ivy clad crowns and stems. Leyland Cypress with understory of Hawthorn / Blackthorn scrub.	C2
T4	Grey Poplar	Remove/ ring Ivy. Re-inspect root crown.	Average form, shape and condition. Dense crown, low crown deadwood. 3rd party offsite tree with overhanging branches, unable to fully inspect. Ivy clad crown and stem. Basal scrub / ivy hindering root crown inspection.	B1
T5	Grey Poplar	Remove/ ring Ivy. Re-inspect root crown.	Average form, shape and condition. Dense crown, low crown deadwood. 3rd party offsite tree with overhanging branches, unable to fully inspect. Ivy clad crown and stem. Basal scrub / ivy hindering root crown inspection.	B1

To Be Removed

Tree No.	Species	Proposed Tree Works	Observations	BS Cat
T1	Oak*	Recommend to 3rd party tree owner to Fell to ground level and remove stump completely.	Poor form, shape and condition. 3rd Party offsite highway verge tree. Showing signs of upper crown stress with high amount of upper crown deadwood 'Stag-heading'. Basal / trunk epicormic growth. Ivy clad crown and stem. h	C1
T2	Leyland Cypress	Recommend to tree owner to fell to ground level for Health & Safety reasons.	Poor form, shape and condition. Dying / Dead Hazard tree. 3rd party offsite tree, unable to fully inspect.	U
T3	Leyland Cypress	Recommend to tree owner to fell tree to ground level for Health & Safety reasons.	Poor form, shape and condition. Dying / Dead Hazard tree. 3rd party offsite tree, unable to fully inspect.	U
T6	Elder*	Remove & Replace with suitable species of tree within final landscape scheme	Average form, shape and condition. Self-set, pioneer 3rd party offsite tree. Dense crown, low crown deadwood. Low branches.	C1
T7	Grey Poplar*	Recommend to Council to Fell to ground level and treat stump.	Average form, shape and condition. Asymmetric canopy Located immediately adjacent to Power line pole with main trunk rubbing power line. Dense crown, moderate crown deadwood. 3rd party offsite tree, likely Council owned. Ivy clad crown and stem	C1
T8	Grey Poplar	Recommend to Council to Fell and treat stump on Health & Safety grounds.	Poor asymmetric form, shape and condition. Co-dominant tree with likely included unions Dense crown, moderate/major crown deadwood. Both stems submerged in water in ditch. One stem used as 'Ground Anchor' to Power line pole. Hazard tree.	U

Appendix 6 – Site Inspection & Monitoring Schedule

In order to ensure that the principals of tree protection set out in the statement are adhered to, it is important to set out communication details for key individuals and tasks that require supervision. These details should be retained by all relevant parties and available on site at all times. Relevant parties will be advised of any changes in personnel or contractor during the development process.

To ensure that the construction process is undertaken with minimal disturbance to the retained tree stock, we recommend that the experienced Marishal Thompson Arboricultural consultant be appointed to undertake regular inspections of the site according to a site inspection / supervision schedule below.

It is our experience that a mix of scheduled and unannounced site visits are appropriate these unannounced inspections will serve to identify any damage to the Tree Protection Fencing, poor working practices, potential problems and points of conflict between the construction process and the health of the trees. These reports will include recommendations for remedial action.

During these visits any changes to the proposed works will be discussed, their impact assessed and recommendations for best practice will be outlined. After each of these visits a copy of the report should be sent to the Site Agent, Local Authority Tree Officer and Client. The remedial action undertaken will be recorded on the next visit.

It should be noted that these visits will only be undertaken if a written instruction is received from the client prior to commencement of works on site.

With reference to relevant published guidance, the methodology of this statement follows a logical sequence essential to the efficacy of the protection measures. References may include: British Standard 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'; British Standard 3998:2010 'Tree Work - Recommendations' and National Joint Utilities Group 'Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees, Volume 4' 2007.

It is essential to the successful implementation of the principals set out in this document that effective supervision and enforcement are implemented from the outset as detailed in the following construction phases.

Constraints Item	Site Supervision required	Number of Visits Expected	Timing of Site Visits	Actual Visit Date
Tree works operations	Optional	Visit 1	Prior to construction	
Pre-commencement meeting between relevant parties informing Council of development start date	Yes	Visit 2	Prior to site clearance	
Establishment & protection of Root Protection Areas (RPA) for retained trees	Yes	Visit 2	Prior to site clearance	
Changes in soil levels in close proximity to retained offsite trees; T4, T5, TG1-TG2 for the new proposed car parking spaces and the installation of 'no / reduced-dig' sub-base systems for the new car park surfacing.	Yes	Visit 3	During site clearance phase	
Location of temporary access route through / adjacent to the retained trees	Yes	Visit 3	During construction phase	
Protection and prevention of damage to retained tree canopies during construction	Yes	Visit 3	During construction phase	
Site access for construction vehicles and avoidance of compaction to the RPA of retained trees	Yes	Visit 3	During construction phase	
Excavation of services trenches in close proximity to retained trees	Possible	Visit 3	During construction phase	
Generic construction site constraints: **1 Site office / Welfare unit location** **2 Temporary toilets** **3 Siting of bonfires** **4 Location of contaminant storage and washout areas** **5 Location of stripped topsoil**	Yes	Visit 3	During construction phase	
Post construction site assessment for any required remedial treeworks operations recommendations.	Yes	Visit 4	Post construction	

Appendix 7 – BS5837: 2012 Tree Constraints & Protection Methods

Phase 1 Pre-Construction Meeting

Prior to commencement of the works an onsite meeting will be held with all relevant parties including the site agent and appointed Marishal Thompson arboricultural consultant. The purpose of this meeting is to record site features including tree condition, agree tree works (See Tree Works Schedule), location of site storage and welfare facilities and the location of tree protection measures.

Phase 2 Tree Protection Measures

Subject to planning the Tree Protection Measures outlined in this report will be revisited in detail based on the working drawings, construction programme and method statement to be prepared.

Tree protection fencing should be installed prior to any demolition or ground-works commencing, remain in place throughout construction and be removed only after completion.

The provision of tree protection and light tree surgery will reduce the risk of direct damage to the retained trees. The demolition and construction process should not be commenced until the tree surgery works has been completed and the protective areas have been fenced off.

Tree protection will be installed as per the Tree Protection Plan which will be agreed with the Local Authority Tree Officer and with reference to the British Standard 5837 2012 'Trees in relation to design, demolition and construction – Recommendations'. Prior to commencing any demolition or construction works, the fencing will be inspected by the appointed Marishal Thompson consultant.

Within the fenced zone, no materials or chemicals should be stored at any time, no fires should be lit, no pedestrian or vehicle traffic, and level changes within these areas should be kept to an absolute minimum. Every effort should be taken to protect a maximum possible area of the root system.

Within the Root Protection Area no level changes or excavation within the RPA should be undertaken without the consent of the LPA Tree Officer.

Clear notices are to be fixed to the outside of the fencing with words such as 'TREE PROTECTION AREA – NO ACCESS OR WORKING WITHIN THIS AREA'. See Appendix 8.

The site agent, all contractors and other relevant personnel are to be informed of the role of the Tree Protection Fencing and their importance. A copy of the Tree Protection Plan will be displayed on site at all times during construction.

Phase 3 Demolition and Enabling Works

Prior to any works commencing on site the Tree Protection Fencing will be erected. During demolition programme and enabling works the existing front access will be in use. Any plant or vehicles engaged in the demolition works will operate outside the fenced off No-Dig / Root Protection Areas.

Phase 4 Locations of Site Offices Compound and Storage Area

The site office, welfare facilities, storage yard and contractors parking area need to be located within an area of the site that is outside the Root Protection Area (RPA). The compound will remain at least 1 metre outside the RPA with access from the main access road.

All fuel storage and loose cement / sand to be batched and stored in the compound area.

Phase 5 Groundworks, Level Changes, Foundations and Services

All spoil, including excavated soil and demolition material will be removed from site or stored in a location remote from any tree protection barriers.

With regard to the drawings provided the construction of foundations for the new build is located beyond the Root Protection Area (RPA) of retained trees, therefore with regard to the health of the retained trees no specialised foundation design is required. If the subsoil is found to be plastic, the foundations will be specified to take into account the potential influence of the vegetation on the moisture content and volume of the subsoil.

We recommend that all drainage and underground service routes are located beyond the RPA of all the retained trees. If the service runs are to be located within the RPA, we recommend that this matter is dealt with by method statement secured by planning condition. If services are located within the RPA special implementation techniques such as moleing, airspade, or hand digging may be required by the LPA. In the majority of cases, however, careful excavation with a low tonnage mechanical excavator supervised by the Marishal Thompson consultant arboriculturist can adequately undertake services excavations. When tree roots are encountered, hand digging and root protection can then be undertaken as and when they are observed.

Phase 6 Dismantling Protection Barriers

Dismantling the protection barriers around retained trees may be required to allow completion of final surface treatments and landscaping. Supervision of this exercise and control of the landscaping thereafter will be administered by the appointed Arboricultural consultant from Marishal Thompson. The removal of the Tree Protection Fencing is not an opportunity for machinery to access the previously fenced off area.

No further excavation will be carried out during this process and soils levels will not be raised above that existing by greater than 100mm and not within 2m of the trunk. Any removal of existing structures within the Root Protection Area including gardens type walls or paths will be carried out by hand.

Appendix 8 – Tree and Ground Protection Specification

BS 5837:2012 **BRITISH STANDARD**

on retained hard surfacing or it is otherwise unfeasible to use ground pins, e.g. due to the presence of underground services, the stabilizer struts should be mounted on a block tray (Figure 3b).

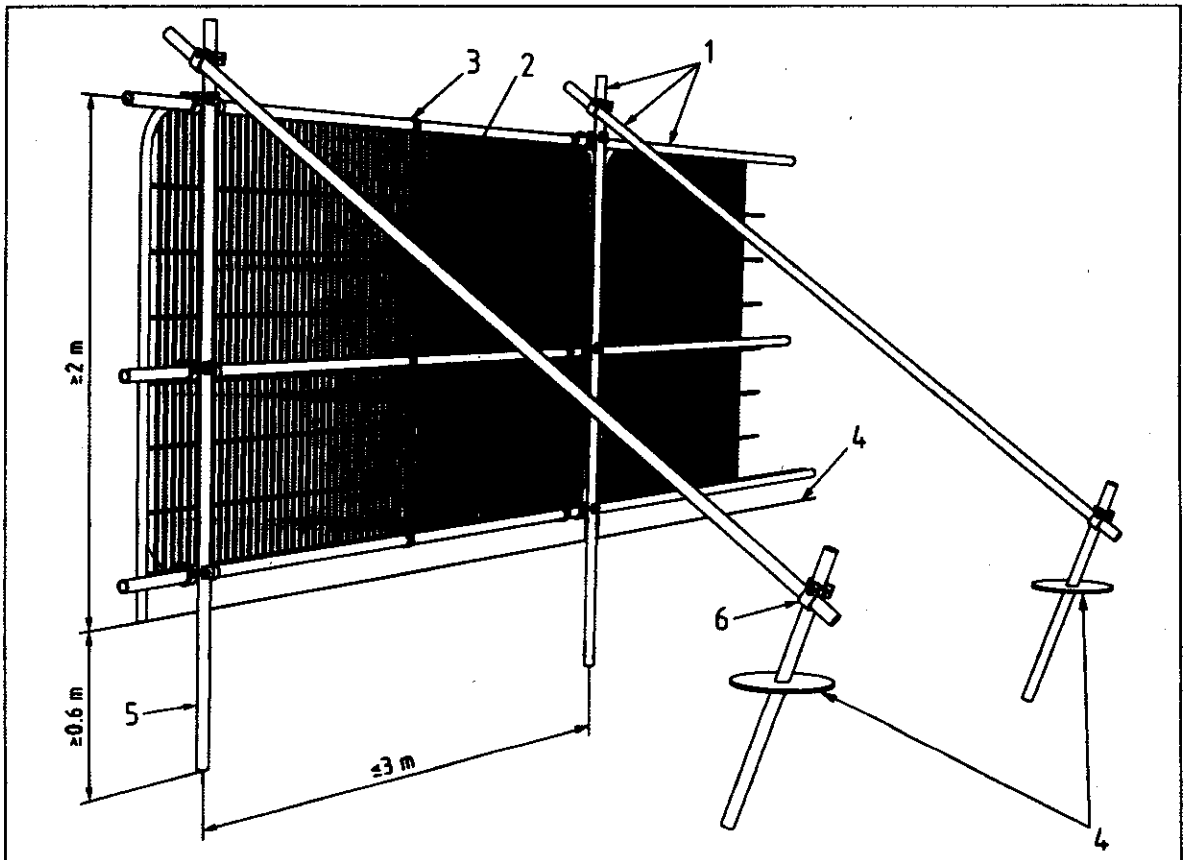
NOTE 1 Examples of configurations for steel mesh perimeter fencing systems are given in BS 1722-18.

NOTE 2 It might be feasible on some sites to use temporary site office buildings as components of the tree protection barriers, provided these can be installed and removed without damaging the retained trees or their rooting environment.

6.2.2.4 All-weather notices should be attached to the barrier with words such as:

"CONSTRUCTION EXCLUSION ZONE – NO ACCESS".

Figure 2 Default specification for protective barrier

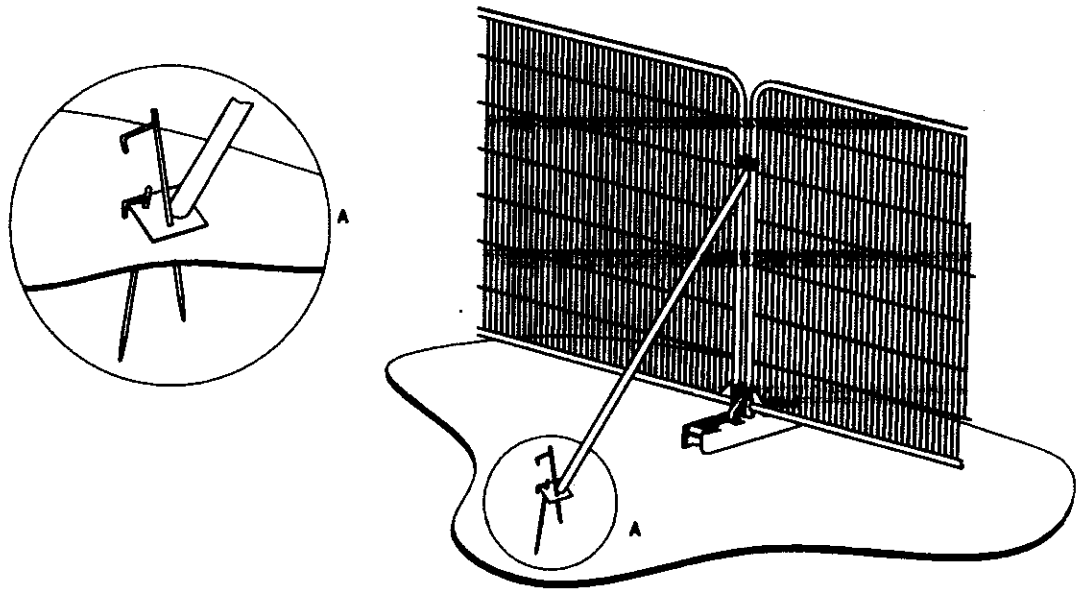


Key

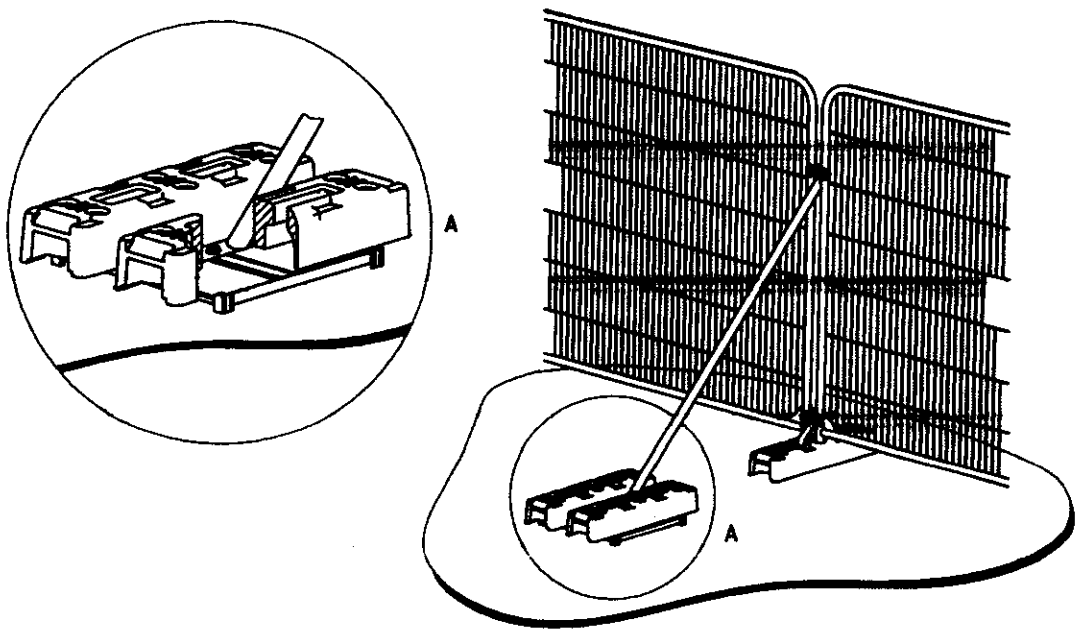
1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

BRITISH STANDARD **BS 5837:2012**

Figure 3 **Examples of above-ground stabilizing systems**



a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

6.2.3 Ground protection during demolition and construction

6.2.3.1 Where construction working space or temporary construction access is justified within the RPA, this should be facilitated by a set-back in the alignment of the tree protection barrier. In such areas, suitable existing hard surfacing that is not proposed for re-use as part of the finished design should be retained to act as temporary ground protection during construction, rather than being removed during demolition. The suitability of such surfacing for this purpose should be evaluated by the project arboriculturist and an engineer as appropriate.

Suggested protective fencing warning sign format

TREE PROTECTION AREA

KEEP OUT

(TOWN & COUNTRY PLANNING ACT 1990)

THE TREE VEGETATION PROTECTED BY THIS FENCE IS PROTECTED BY PLANNING CONDITIONS.

IF YOU REQUIRE ACCESS INTO THIS AREA PLEASE CONTACT THE SITE MANAGER OR PROJECT CONSULTANT ARBORICULTURIST FROM MARISHAL THOMPSON ON: 08702 414339

Temporary Ground Protection Specification

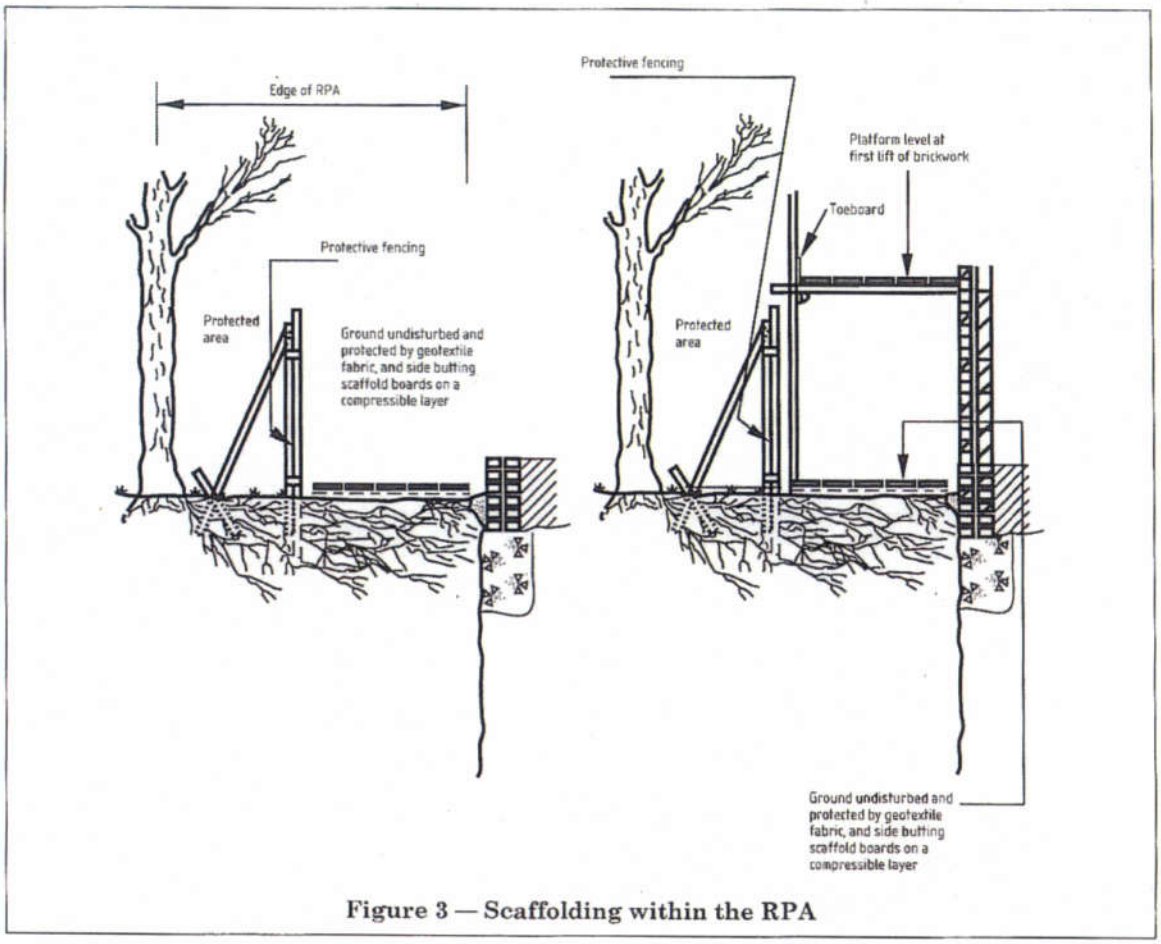


Figure 3 — Scaffolding within the RPA

(Extract from the new BS5837:2012 "Trees in relation to design, demolition and construction - Recommendations")

6.2.3.3 New temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

NOTE The ground protection might compromise one of the following:

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

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

c) For wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

6.2.3.4 The locations of and design for temporary ground protection should be shown on the tree protection plan and detailed within the arboricultural method statement. (See **6.1**).

6.2.3.5 In all cases. The objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that the tree root functions remain unimpaired.

Appendix 9 – Photographs

TG1, Leyland Cypress Group

Offsite tree group TG2

T4 and T5, Offsite Grey Poplar

T7, Grey Poplar rubbing power line

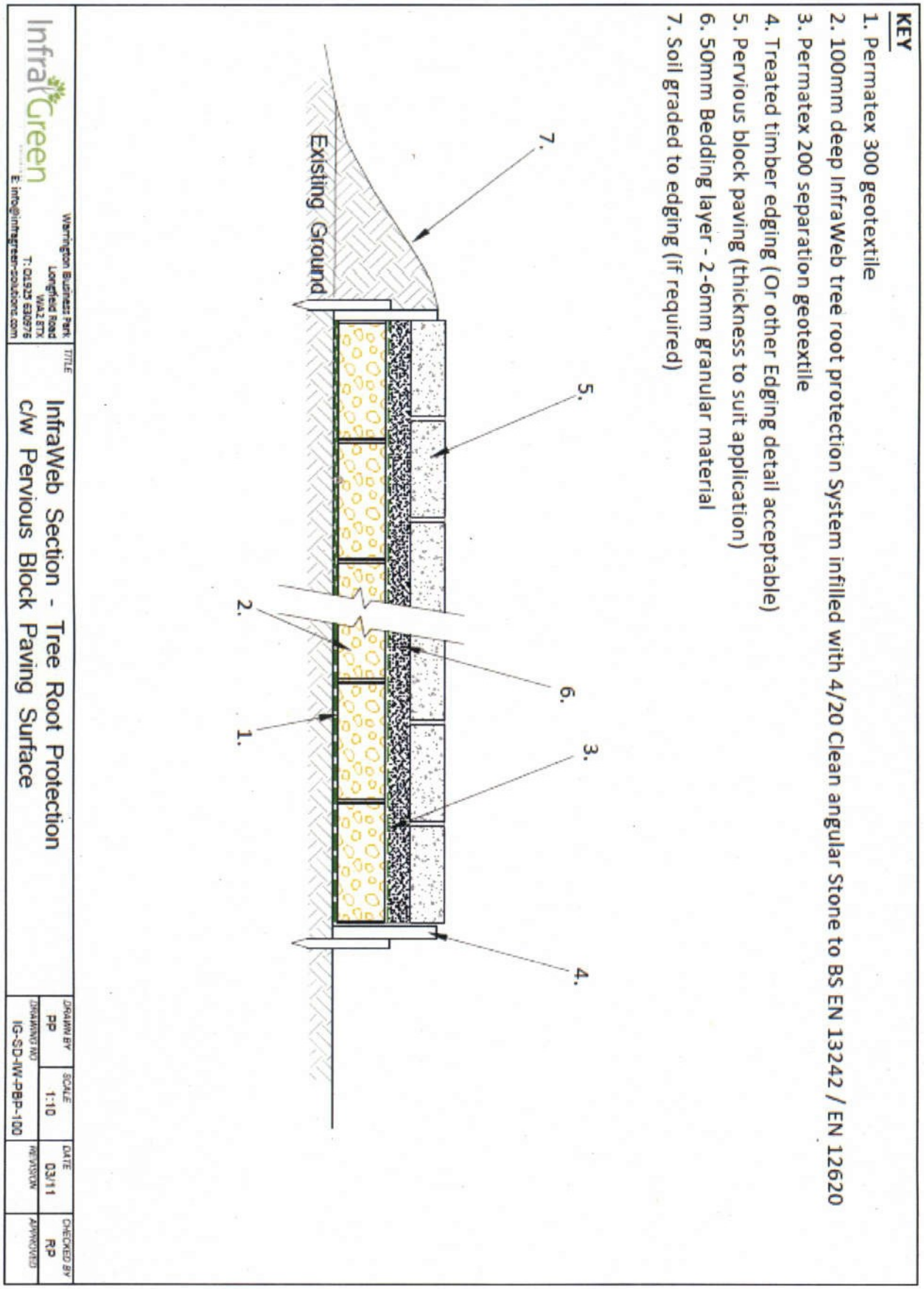
T7 and T8, Offsite Hazard Grey Poplar To Fell

Submerged stems of T8 and Ground Anchor

Development Area

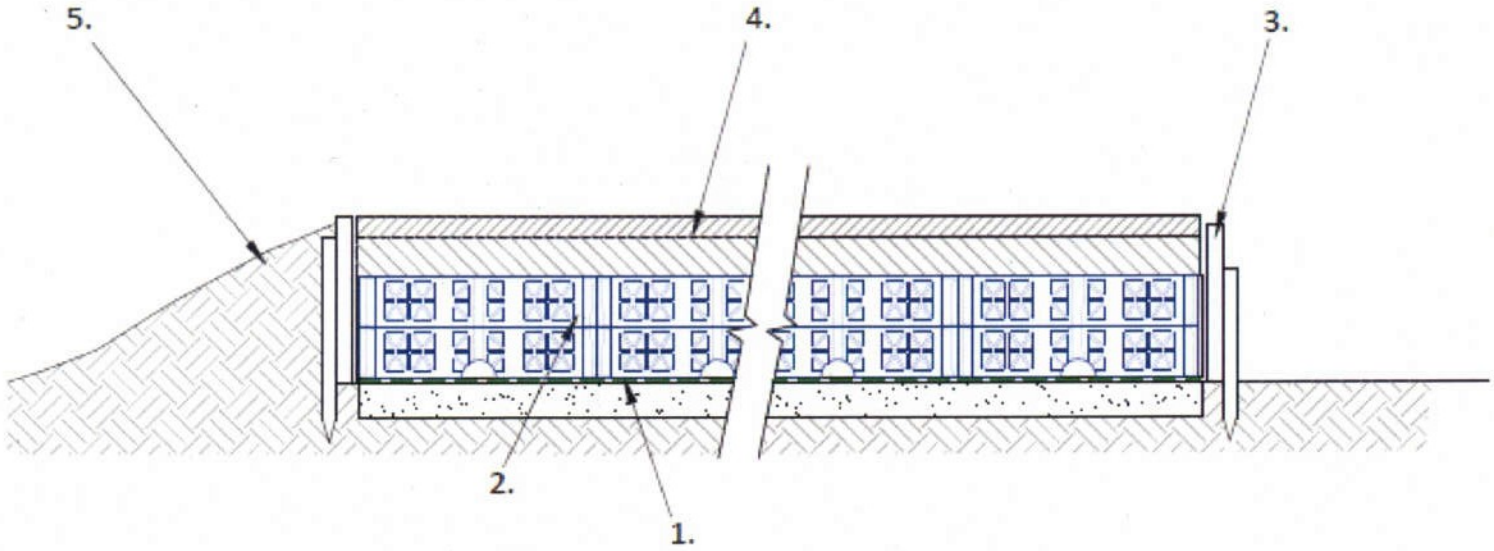
Mace Garage Site from London Road

Appendix 10 – 'Arboraft' and 'Infraweb' Specification and Method Statement



KEY

1. Permatex 300 geotextile
2. 150mm deep ArborRaft tree root protection system on 30-50mm blinding layer
3. Treated timber edging (Or other Edging detail acceptable)
4. Asphalt surface to engineers details
5. Soil graded to edging (if required)



InfraGreen
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E: info@infragreen-solutions.com

TITLE: ArborRaft Section - Tree Root Protection c/w Asphalt Surface

DRAWN BY	SCALE	DATE	CHECKED BY
PP	1:10	01/14	RP
DRAWING NO		REVISION	APPROVED
IG-SD-AR-AS-150			

Marishal Thompson Group
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Method Statement for the installation of InfraWeb Tree Root Protection System.

Introduction

The InfraWeb Tree Root Protection System is a combination of a 3 dimensional cellular confinement system, separation and filter geotextiles and a specific grade of granular material. This document should be read in conjunction with the appropriate section drawing for the specified system, to ensure the correct installation is achieved.

No Dig System.

The InfraWeb is a no dig Tree Root Protection System, however, some preparation of the existing formation may be required prior to installation.

System Components

- **InfraWeb 3 Dimensional Cellular Confinement System**
- **Permatex 300 Separation Geotextile**
- **Permatex 200 Separation Geotextile (depending on surface finish)**
- **InfraWeb Staking Pins**
- **InfraWeb Stapler and Staples**
- **4/20mm Clean angular stone to Bs EN 13242 and 12620.**
- **Surfacing Materials.**

Ground Preparation.

- Remove surface vegetation by hand or with suitable herbicide.
- Fill any hollows in the exposed ground with sharp sand or 4/20mm clean angular stone.
- Place Permatex 300 Geotextile over the area to be protected ensuring laps are a minimum of 300mm

InfraWeb Cellular Confinement System.

- Place the collapsed panel on the geotextile and pin through 3 cells across the 2.42m orientation using InfraWeb staking pins. (See diagram in appendix 1)
- Expand the panel to its full length of 8.7m and pin at across the opposite panel end using InfraWeb staking pins.
- Pin along the length of the panel with 2 pins on each side using InfraWeb staking pins.
- Staple any adjacent panels together using the Infraweb stapler and staples. (stapling detail enclosed in appendix 1)
- The InfraWeb panels can be cut to shape if required with a heavy duty Stanley Knife

Filling The InfraWeb.

The correct specification of the granular infill is vital to the long term performance of the system. Use only 4/20mm clean angular stone to Bs EN 13242 and 12620

- Fill the pockets of the InfraWeb with a 4/20mm clean angular stone.
- Allow for any settlement of the stone in the cells and top up if necessary.
- Slightly surcharge the Infraweb with 4/20mm clean angular stone if the area is to be trafficked immediately.

Surfacing Details.

The Infraweb TRP system can be surfaced with the materials listed below. Porous systems will be of greater benefit for the trees, however it is understood that this is not always possible.

Block Paving

- Place Permatex 200 separation fabric over the filled InfraWeb.
- Lay sand / gravel bedding material as per manufacturers recommendations.
- Place porous / standard blocks as per manufacturers instructions.

Porous and Standard Ashalt.

- Slightly surcharge the InfraWeb with 25mm of 4/20mm clean angular stone.
- Place hot Asphalt as per manufacturer's instructions.

Resin Bound Gravels

- Place Permatex 200 separation fabric over the filled InfraWeb.
- Lay Asphalt carpet and resin bound gravel to the required thickness and as per manufacturers instructions.

Loose Gravels

- Option 1 is to slightly overfill the InfraWeb with the clean angular stone.
- Option 2 is to place a 25mm thick decorative stone above the filled InfraWeb.

Slimblock Gravel Retention System

- Place Permatex 200 separation geotextile over the filled InfraWeb.
- Place 20mm bedding layer of 5mm single sized stone and lightly tamp.
- Lay Slimblock units and fill with a 10 to 14mm decorative gravel.

Slimblock Grass Protection System.

- Place Permatex 200 separation geotextile over the filled InfraWeb.
- Place 50mm of Rootzone (60% sand/40% soil) bedding layer and lightly tamp.

- Lay Slimb;lock units and fill with Rootzone mix and seed accordingly. (Please allow for 4 to 6 weeks for seed germination)

Tree Mulch

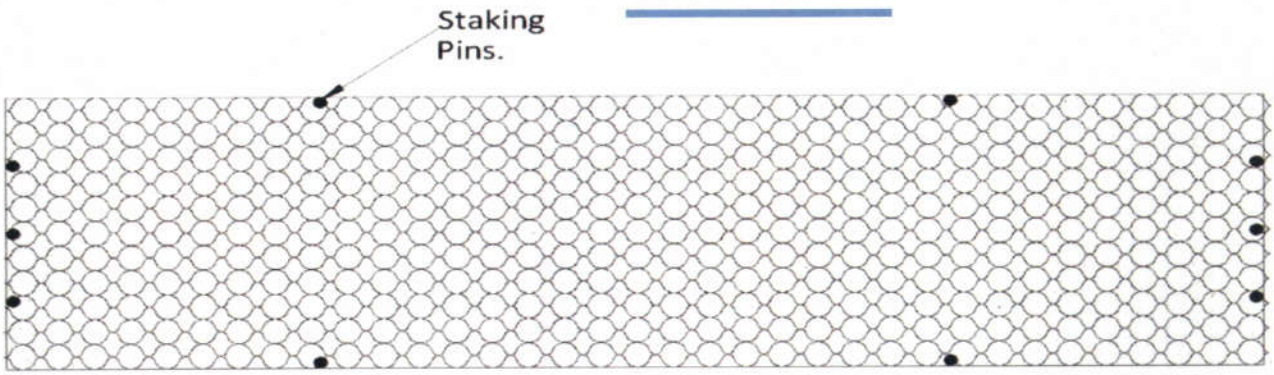
- Place Permatex 200 separation geotextile over the filled InfraWeb.
- Lay mulch to desired depth.

Concrete

- Place Permatex 200 separation geotextile over the filled InfraWeb.
- Cast the concrete slab over the geotextile.

If the system requires trafficking immediately after for construction purposes then a 50mm sacrificial surcharge of the 4/20mm granular material shall be placed on top of the InfraWeb.

Staking Pin Detail



Cells During filling