

Arboricultural Assessment

on

**Gerrards Lane, Halewood,
Merseyside**

for

Four Architects

113 Portland Street,
Manchester
M1 6DW

Prepared by

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Gerrards Lane, Halewood, Merseyside.

Proposed Development Works

Arboricultural Report

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1.0 INTRODUCTION

- 1.1 This arboricultural report, has been requested by Mr Matthew Atkinson, Director of Four Architects, 113 Portland Street, Manchester M1 6DW and refers to a vacant area of land at Gerrards Lane Halewood, Merseyside.
- 1.2 The purpose of the report is to support a proposal to develop the site by constructing seven detached residences with associated services and access roads.
- 1.3 The site in general comprises of large open area with both hard standing and rough stone areas. Much of the north and west peripheries have some level of tree cover on them in the form of a woodland belt. There are also a small number of native trees towards the east boundary of the site. There is one redundant partially constructed detached residence on site.
- 1.4 The trees are mainly mature and in general do have some impact on the local landscape, but as the majority of the trees are situated along the northern and western boundaries of the site they have a limited impact on the landscape of this area of Gerrards Lane.
- 1.5 The visual impact of this woodland buffer will be more relevant to the rear gardens of the proposed properties, which are to be situated along the northern boundary of the development
- 1.6 The trees mentioned above are covered by Tree Preservation Order No2-24004, which is administered by the Planning and Development Services of the Metropolitan Borough of Knowsley
- 1.7 Individual information regarding the trees is included in the attached report tables and these relate to the information shown on the constraints drawing which can be found elsewhere in the planning submission
- 1.8 A key to the individual tree report tables is also included.
- 1.9 The inspection work was carried out from ground level using measuring equipment and observations.

No.	Species	Age	Ht (m)	Crown Sprd (m)	Clear Stem (m)	Dia. (mm)	Cond	Comments	RPA Rad/ m	Age Proj	Retain Cat	Maintenance Suggestions
1	Acer pseudoplatanus	M	18	N 4 E 4.5 S 2 W 0	4	300 av 600 base	B	Basically part of a belt of trees which form a boundary to the north and west of the site. Many supporting dense Ivy	6	25 +	B2	Consider Crown Lifting on site face to a height of 4 metres. Sever Ivy at base
2	Acer pseudoplatanus	M	17	N 0 E 1 S 8 W 6	4	325	C	“ “	3.9	25 +	C2	As No1
3	Acer pseudoplatanus	M	17	N 2 E 6 S 7 W 4	3	400 av 600 Base	B	“ “	6	25+	B2	As No1
4	Acer pseudoplatanus	M	17	N 4 E 4 S 6 W 5	0	450	B	“ “	5.4	25 +	B2	As No1
5	Acer pseudoplatanus	M	16	N 2 E 1 S 3 W 1	0	150 av 400 Base	C	“ “	4	25 +	B2	As No1

No.	Species	Age	Ht (m)	Crown Sprd (m)	Clear Stem (m)	Dia. (mm)	Cond	Comments	RPA Rad/ m	Age Proj	Retain Cat	Maintenance Suggestions
6	Acer pseudoplatanus	M	16	N 4 E 2 S 4 W 2	0	250 av 600 Base	C	“ “	6	25+	B2	As No1
7	Acer pseudoplatanus	SM	6	N 3 E 2 S 3 W 1	2	200	C	Poor suppressed tree and not worthy of retention	2.4	15 +	U	Remove
8	Acer pseudoplatanus	M	17	N 5 E 5 S 6 W 3	2	450	B	More open balanced crown, standing as a solo tree. At this point the plantation is only one tree deep. Some scrub below	5.4	40+	B2	As trees 1
9	Acer pseudoplatanus	M	17	N 4 E 4 S 6 W 4	3	450	B	As tree 8	5.4	40+	B2	As No1
10	Acer pseudoplatanus	M	17	N 4 E 3 S 6 W 3	0	150 av 500 Base	B	As No1.	5	30+	B2	As No1
11	Acer pseudoplatanus	M	16	N 6 E 2 S 5 W 3	3	500	C	“ “	6	30+	B2	As No 1

No.	Species	Age	Ht (m)	Crown Sprd (m)	Clear Stem (m)	Dia. (mm)	Cond	Comments	RPA Rad/m	Age Proj	Retain Cat	Maintenance Suggestions
12	Acer pseudoplatanus	M	16	N 5 E 4 S 7 W 4	0	150av 500 Base	C2	As No1	5	25 +	C2	As No 1
13	Acer pseudoplatanus	M	17	N 0 E 1 S 6 W 3	4	300	C	Poor suppressed tree which adds very little to the woodland belt.	3	10	U	Remove
14	Acer pseudoplatanus	M	17	N 4 E 4 S 6 W 5	0	450	B	Similar to many of the other internal woodland trees. Slightly suppressed and supporting dense Ivy	5.4	25 +	B2	As No1
15	Acer pseudoplatanus	M	15	N 6 E 6 S 7 W 4	0	300 av 600 Base	B	As No1	6	25 +	B2	As No1
16	Acer pseudoplatanus	M	15	N 5 E 4 S 6 W 2	0	150 av 500 Base	B	“ “	5	25 +	B2	As No 1

	Species	Age	Ht (m)	Crown Sprd (m)	Clear Stem (m)	Dia. (mm)	Cond	Comments	RPA Rad/ m	Age Proj	Retain Cat	Maintenance Suggestions
17	Acer pseudoplatanus	M	17	N 4 E 4 S 7.5 W 2	2	800	B	As tree No 1 Although backed by woodland, which is owned by others it does stand as a reasonable independent tree.	9.6	40+	B2	As No 1
18	Acer pseudoplatanus	M	17	N 4 E 2 S 7 W 4	0	300 av 800 Base	C	This tree would be better monitored over the next 10 years due to the multi stemmed base.	8	40+	C2	
19	Acer pseudoplatanus	M	18	N 6 E 6 S 4 W 6	4	500	B	Reasonable tree with a bifurcation at 1.5 metres.	6	40+	B2	As No1
20	Acer pseudoplatanus	M	18	N 5 E 7 S 6 W 6	1.5	700	B	Reasonable woodland edge tree. Bifurcated at 3 metres. Crown supported on three main trunks	8.4	40+	B2	As No1

No.	Species	Age	Ht (m)	Crown Sprd (m)	Clear Stem (m)	Dia. (mm)	Cond	Comments	RPA Rad/ m	Age Proj	Retain Cat	Maintenance Suggestions
21	Acer pseudoplatanus	M	15	N 3 E 5 S 5 W 4	2	400	C	Crown is suppressed on north side by tree No 22 Ivy throughout the crown	4.8	40+	C1	Remove Ivy from crown and trunk. No other work
22	Acer pseudoplatanus	M	16	N 3 E 3 S 4 W 3	5	150	C	Low amenity value, although the proposals are not affected by its retention	1.8	25+	C1	It would be better to remove this tree and replace with a more ornamental specimen
23	Acer pseudoplatanus	M	16	N 3 E 4 S 3 W 4	0	300av 500 Base	C	This tree forms a single tangled crown with No 22, It is of a low amenity value and could not really be retained as a stand-alone tree. Extensive amounts of Ivy throughout the whole tree.	5	30+	C1	It would be better to remove this tree and replace with a more ornamental specimen
24	Acer campestre	SM	5	N 3 E 3 S 3 W 3	0	150	C	Good young tree but it has a large power cable running through the east side of the crown. This will create a constant maintenance issue and the essential services will remove the offending area of the crown.	1.8	30+	C1/B1	Retain if possible

KEY TO TABLES**2.0 SPECIES**

- 2.1 The full botanical identification is used within the tables, including variety names where these are appropriate.
- 2.2 Every effort is made to clarify the identification, but in some instances due to unusual characteristics, seasonal deficiencies, confusion with similar species or rarity, only the genera may have been used with a sp after it indicating that with the information available a more detailed identification has not been possible. This situation does not normally have a bearing on the affect of the tree on its surroundings.
- 2.3 Within each report is a list of names of the trees that are included, along with the Common Name or the none botanical name that they are normally known by in the United Kingdom.

3.0 AGE CATEGORIES

- 3.1 The age categories used within the attached tree report tables, relate to the stage of development that the tree in question has been assessed to have reached. It cannot relate to a specific number of years, as different species of trees take a varying number of years to reach their mature age and size. For example, a *Quercus robur* (Common English Oak) would take up to 200 years and onwards to reach maturity, but a mature stature of this species may have been reached well before then. A *Betula pendula* (Common Silver Birch), however, would be of a mature stature at approximately 40 years and onwards.
- 3.2 The purpose of using age categories in the tree survey is to give the reader an impression of any one of the individual trees and to help create an overall picture of all trees included in the report.

Age categories used:-

Y	-	Young	YM	-	Young Mature
SM	-	Semi Mature	M	-	Mature
OM	-	Over Mature			

4.0 MEASUREMENTS

4.1 The measurements within the tables are given as follows:-

Height:	Calculated with a purpose made measuring devise.
Crown spread:	Measured at ground level with a measure device. Based on radius measurement at the main compass points
Diameter:	This relates to the diameter of the trunk at breast height and is taken using a tape measure.
Clear Stem	The height of clear trunk from ground level to the lowest branch union. The outer extremities of the crown may be lower than this measurement

5.0 CONDITION CATEGORIES

- 5.1
- A A healthy tree requiring little or no attention.
 - B A tree that is exhibiting correctable deficiencies, or showing some level of stress due to environmental influences. This category may include trees that require some major work to eradicate a problem (eg mechanical damage).
 - C A tree that is exhibiting major flaws, deficiencies or such levels of stress that it may be inappropriate to retain it. It may also be the case that careful consideration for its retention would be required in relation to any future proposals for the area of land within close proximity of the tree.
 - D A tree that is dead, dying or considered dangerous in relation to its surroundings.

6.0 ROOT PROTECTION AREA (RPA)

- 6.1 The Root Protection Area is a radius measurement based on the trunk diameter of the tree and calculated using a formula as set out in BS5837:2005 Trees in Relation to Construction.
- 6.2 This area has to be determined and demarcated by fencing on development sites and no construction activities or storage of materials can take place within this zone.

7.0 AGE PROJECTION

- 7.1 Indicates an approximate estimation of the number of years the tree will continue to grow before a point of over-maturity is reached. This does not necessarily represent the point at which it is expected that the tree would need to be removed, it would however suggest that, especially within a group situation some removal and replacement considerations would have taken place as part of forward planning for a tree perpetuation policy. This figure is based on optimum growing conditions prevailing throughout its life.

8.0 RETENTION CATEGORIES

- 8.1
- A Highly desirable and of major importance. Retention most desirable. Of high quality and value and in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested). Retention is essential.
 - B Very desirable and having a significant impact on the surrounding landscape. Retain if possible.
 - C A tree having some impact but its retention may result in implications due to its condition location or its effect on the future development of adjacent trees. Not essential for retention.
 - R Unsuitable for retention.

9.0 MAINTENANCE SUGGESTIONS

- 9.1 An indication of the work required to overcome deficiencies or lack of management.
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10.0 TREE IDENTIFICATION

- 10.1 For the purpose of this report the identification of the individual trees within the property has been carried out using their botanical names.
- 10.2 The botanical names of trees within the report are listed below, along with the common name that they are usually associated with in the United Kingdom.

Acer campestre	Field Maple
Acer pseudoplatanus	Sycamore
Aesculus x carnea	Red Horse Chestnut
Betula pendula	Silver Birch
Fraxinus excelsior	Common Ash
Salix alba	White Willow
Sorbus aucuparia	Rowan
Ulmus procera	English Elm

11.0 ARBORICULTURAL REPORT AND IMPACT ASSESSMENT

- 11.1 The planning application to which this arboricultural report relates is the proposal to construct a residential development of 9 detached houses, including the introduction of associated services within the property which at one time was known as Northend Garage
- 11.2 The proposal is to clear the site of existing constructions, accumulated debris and hard surfaces and construct residential properties as indicated in 11.1 above and on the Tree Constraints Plan
- 11.3. The site is bounded on the north side and part of the west side by a substantial belt of woodland trees but most of these are situated outside of the site boundary. Only those trees which are within the site or it is felt could be directly affected by the proposals have been included in the individual tree report tables. The remainder have been referred to under a group report which is referenced in this Arboricultural Implication Statement
- 11.4 Close to the east boundary of the site, there are a small number of trees which could be affected by the construction of two of the proposed dwellings.
- 11.5 Broadly speaking the trees in are in a moderately reasonable condition and in the main typical of close grown and unmanaged, self regenerated woodland trees. There are few, if any, which could be isolated to stand as individual specimen trees, however the woodland belt does have some visual impact and offers some added value to the site in general.
- 11.6 In respect of the proposals, there are only four points where the location of a dwelling could come into conflict with the trees. These are:-
- The north west corner of unit No 2
 - The north east corner of Unit No 4
 - The north east corner of Unit No 5
 - The eastern most extent of Unit No's 6 and 7
- 11.7 With regards to unit No 2, it would appear that the extent of the Root Protection Area (RPA) of Tree No 19 would fall just outside the proposed paving surround. This however would have implications for both the placing of the tree protection fence and the movement of plant during the construction of the property. This will be further addressed in the Arboricultural Method Statement which forms part of this report.
- 11.8 The situation with Unit No 4 is similar in many ways to that of Unit No 2 in that it is basically the paving surround that would possibly intrude slightly into the RPA's of tree No's 8 and 9. This would once again restrict the construction operations allowed to take place between the dwelling boundary and the trees.

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- 11.9 The location of Unit No 5 definitely has implications in respect of the trees, as there is intrusion of a small section of the actual building into the RPA's of Tree No 2 and possibly No 3, plus the paving surround will intrude into the RPA's of Tree No's 1, 2 and 3
- 11.10 There is an *Acer pseudoplatanus* (Sycamore) close to the east boundary of the site and shown as Tree No's 23 on the Tree Constraints Drawing which is located close to the paving line of Units No 6 and 7. It is not felt that the siting and construction of these two units will affect the trees.
- 11.11 As a general comment on Tree No's 21 to 23, they could not be considered as having any outstanding landscape contribution. They are all poor in structure and much of the apparent density of the crowns is created by the amount of Ivy growing on the trunk and main scaffold branch structures. They have a limited impact on the local landscape in general and to remove them would give the opportunity to introduce more variety of trees to the landscape especially if this opportunity was used positively by planting species which are more ecologically enhancing than the *Acer pseudoplatanus* which dominates the site at present. This area also contains a number of Willow and Elm suckers which it is felt have little future in the landscape and therefore should be removed.
- 11.12 The woodland belt which wraps around the north and west boundaries of the site is comprised of mainly self seeded Sycamore (*Acer pseudoplatanus*) with a small number of Common Ash (*Fraxinus excelsior*) plus one Red Horse Chestnut (*Aesculus x carnea*). As has been stated previously in the report, there are only the trees on the frontage of the woodland belt that fall within the actual development site itself and all of these are Sycamore. These are identified on the Tree Constraints Drawing and detailed in the Arboricultural Report Tables. The remainder of the woodland belt is comprised of typical natural woodland belt trees where no intervention management has taken place leaving many tall multi stemmed and weakened trees.
- 11.13 In line with the requirements of BS 5837 Trees in Relation to Design, Demolition and Construction Recommendations an Arboricultural Method Statement has been included as part of this report. This lays out the requirement that the construction teams should follow in order to protect all the retained trees.
- 11.14 **Recommendations**
- 11.14a The density of the woodland belt between tree No's 1 and 6 would allow for tree No 2 to be removed completely with little detriment to the overall landscape and more suitable replacement native trees such as *Betula pendula* (Silver Birch) and *Sorbus aucuparia* (Rowan) planted along the north and east boundaries of plot No 5. This in effect would continue the woodland belt effect up to the east boundary.
- 11.14b If Tree No 2 was removed, the intrusion of the paving around Unit 5 into the RPA's of Tree No's 1 and 3 would only affect a maximum of approximately 5% of the RPA's which the two trees could easily adapt to. In fact a No-Dig construction technique could be adopted in this area for the paving.
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- 11.14c A similar situation presents itself with regards to Tree No's 8 and 9 where it is felt that the intrusion of any construction into the Tree's RPA's would be so minimal that the trees would easily adapt. Once again the paving could be constructed using a No-Dig technique.
- 11.14d The trees to the east of the site (No's 21 to 24) are in the main not affected by the proposals except in relation to Tree No's 21 and 23 where the paving along the rear of Unit No's 6 and 7 will intrude into the RPA of both trees and the rear foundations of Unit 6 will skirt across the extremities of the arc of the RPA of Tree No 23. As has been noted in 11.11 above consideration should be given for the removal of at least No's 21 to 23 inclusive.
- 11.14e It is recommended that all other tree and shrub material to the east and south of Units 5, 6 and 7 is removed. This consists basically of Young-mature *Ulmus procera* (English Elm) suckers and *Salix alba* (White Willow) regrowth.
- 11.14f On a pure management approach for the future development of the treescape across the site, it would be sensible where possible to remove a small number of the trees between No's 5 and 19 and introduce a wider variety of native trees including Scots Pine, Rowan, Bird Cherry and Holly in order to vary the landscape and its ecological impact. Any type of intrusion would have to be done carefully in order to prevent the woodland belt from being opened to wind exposure.

Arboricultural Method Statement

13.0 Introduction

- 13.1 The purpose of this Arboricultural Method Statement, is to support the proposal to develop the site at Gerrards Lane, Halewood, Merseyside and construct seven detached residential properties with associated services and access roadways.
- 13.2 A full Arboricultural Impact Assessment in the form of an arboricultural report has been prepared in relation to the property and contains all the relevant information required by BS5837:2012 Trees in Relation to Design, Demolition and Construction Recommendations.
- 13.3 The proposals will place responsibilities on the property owners and their representatives, to ensure that all the retained trees within the property are protected at all times.
- 13.4 Those responsibilities will require all bodies involved in the project to familiarise themselves with the requirements of BS5837:2012 Trees in Relation to Design, Demolition and Construction Recommendations and to make all allowances to ensure that no activity on the site will cause any threat to the well being of any tree retained as part of the project or affect any tree which is situated on adjoining ground in such a position that inconsiderate demolition or construction activity could have a detrimental effect on its health and future.

13.5 General Arboricultural Considerations

- 13.6 The object of the detail of this Arboricultural Method Statement (AMS) is to define the responsibilities of all parties involved in the inception, design, management and implementation of the proposals. The contents of this AMS relate directly to the requirements set out in BS5837:2012 Trees in Relation to Design, Demolition and Construction: Recommendations as mentioned above.
- 13.7 The object of the British Standard is to protect the health and well being of any tree which, may be affected by any demolition and/or construction project, whether that be by design, poor management or careless activity by any person connected with the proposals.
- 13.8 As part of the British Standard referred to above, there is a requirement to erect, on the circumference of the agreed Root Protection Areas (RPA) of any tree or group of trees, including trees not growing directly within the property to be developed, but growing close enough to any boundary where the RPA may protrude into the developed property; **a protective fence** equal to or above the specifications illustrated in the British Standard. **See Appendix 2.** If, due to site constraints, this is not possible the fence will be located on an alternative protection line, which will have previously been agreed between the architect and the local planning authority.

- 13.9 **The protective fence must be erected before any construction or delivery of material commences, and the site personnel as part of their induction procedure should have explained to them the relevance of the protective fence(s).** Additionally the full requirement of the British Standard should be introduced to them including the contents of this Arboricultural Method Statement and also the possibility of the local planning authority suspending work on the project should any contravention of the British Standard recommendations occur.
- 13.10 Instruction should be given to all construction personnel, that no materials or construction debris should be stored within the area excluded by the protective fence, even on a temporary basis.
- 13.11 That in no circumstance should any building work or excavations be carried out within the agreed RPAs unless it is directly associated with the approved development works. No construction activity in this instance should take place unless written instructions, including detailed drawings, are received from the architect. In respect of driveways and parking areas etc, if a 'No Dig' construction technique has to be used, an example of a typical construction using this technique is contained in Appendix 3. Any excavations should be discussed with the architect on site prior to any work commencing so that all parties are fully aware of the requirements included in BS5837:2012 Trees in Relation to Design, Demolition and Construction: Recommendations.
- 13.12 Where any conventional excavation work is essential within any RPA, this should where possible, be carried out totally by hand using a sharp garden type spade. Shovels and 'clay spades' should not be used as they are not sharp enough to sever small roots cleanly enough. During the process of carrying out any such excavations, no root over 25 mm in diameter should be cut. Any significant root smaller than this, should be cut using purpose made pruning equipment and not torn. In any doubts a qualified arboricultural consultant should be asked for advice.
- 13.13 In the event of any demolition work having to be undertaken, where there is a chance of intrusion into any RPA; it is a requirement for machinery and plant to be operated from outside the dimensions of any RPA. If this is not possible, every effort should be made to spread the weight of the plant by creating a temporary platform across the RPA. No work of this nature should be undertaken without first consulting the Arboriculturist and Architect and obtaining written permission from the same. It is worth having a consulting arboriculturalist on site during such work.
- 13.14 The erection of any scaffolding within the RPA must be verified with the architect after agreement with the local planning authority. The weight and downward pressure during use, of any scaffolding, within the RPA must be supported on bearers of a sufficient size such as scaffolding boards. The aim of the bearers is to spread the working load across the RPA. **The BS recommendation for scaffolding erection within an RPA is shown in Appendix 1.** The point at which all personnel would access the scaffolding should be outside the RPA.

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- 13.15 In the event that the erection of scaffolding will require the pruning of any retained tree to be carried out, this should first be agreed with the local planning authority and carried out by a suitable qualified and experienced Tree Work contractor and to the standards of practice laid down in BS 3998:2010 Tree Work Recommendations.
- 13.16 No activity should be carried out on site where it would be possible for toxic liquids, fuels or 'washings' to leach across or into the RPA. Likewise no fires should be lit on site where they are in a position where damage could occur to the tree. The local authority's Environmental Health Department should be consulted prior to any fire being lit, in order to determine their policy on the lighting of fires within residential areas.
- 13.17 If any matters arise, where it is felt any action may be detrimental to the well being of any tree, advice should be sought from an experienced and fully qualified Arboricultural Consultant.

13.18 Gerrards Lane - Site Specific Considerations

- 13.19 The requirement for protective fencing relates to all of the retained trees. In a number of instances, the location of the proposed housing units will prevent fencing being erected on what would normally be perceived as the extent of a tree's RPA for the entirety of the construction phase, this is specifically relevant in the following locations:-
- The north west corner of unit No 2
 - The north east corner of Unit No 4
 - The north east corner of Unit No 5
 - The eastern most extent of Unit No's 6 and 7
- In these instances common sense must prevail and the fencing erected along the line of the closest area of soft landscaping. The aim of the fencing is to prevent unintentional damage occurring to the root plates and structure of the retained trees throughout the site.
- 13.20 Where the proposals in the specific locations mentioned in 13.19 result in excavations being necessary close to or on the edge of any tree's RPA, these excavations should be carried out by hand and any roots which require cutting should be carried out in accordance with the information contained in 13.12 above and with a qualified Arboricultural Consultant in attendance
- 13.21 The demolition of the one redundant housing unit and removal of any debris with any demolition and clearance plant working from the existing hard surfaces where possible. There should be no tracking of plant close to the protective fencing along the line of the woodland belt or east side of the site.
- 13.22 The storage and preparation of any material required for any construction should be restricted to the areas as close to the site entrance as possible.
- 13.23 In the event of any damage occurring to any tree which is affected by the development, whether that is within the confines of the development site boundary or adjacent land, then the Arboricultural Consultant/Supervisor associated with the site should be called out immediately. The contact number for the Arboricultural

Consultant/Supervisor should be clearly displayed on site. The Local Authority Tree Officer should also be informed immediately of any damage to trees.

APPENDIX 1

British Standards Recommendations for Scaffolding Erection and Protective Fence Construction Associated with Tree Root Protection Areas.

The illustrations below are as shown in BS5837:2012 Trees in Relation to Design, Demolition and Construction: Recommendations

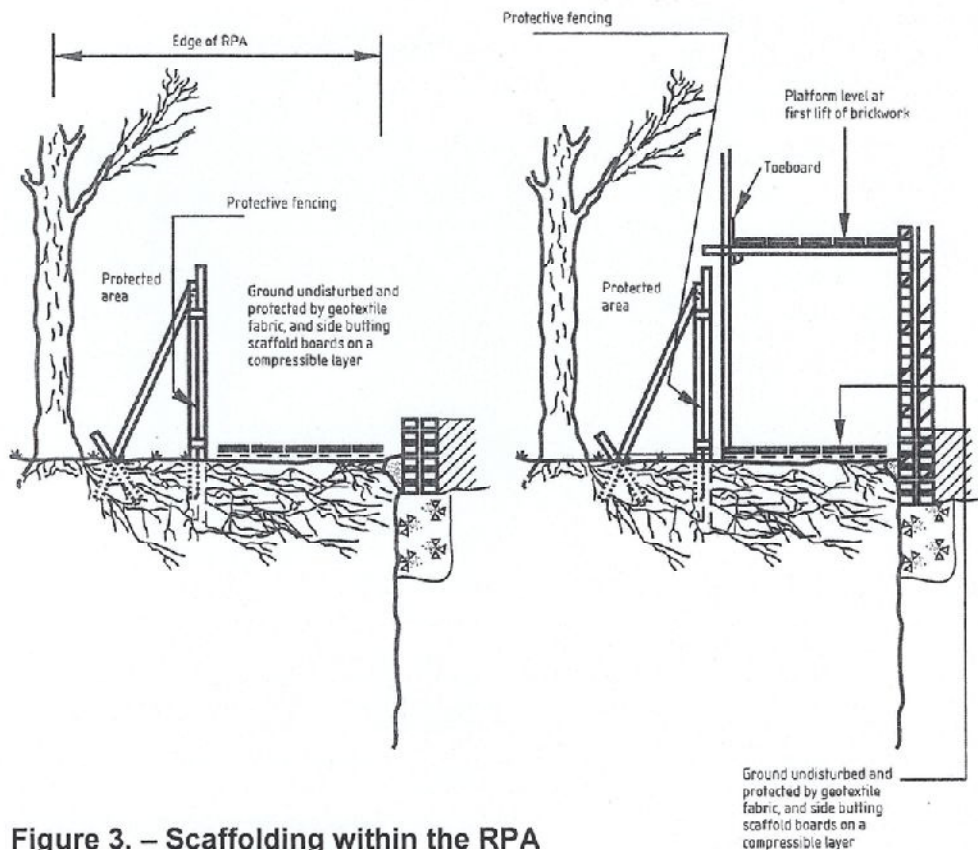


Figure 3. – Scaffolding within the RPA

APPENDIX 2

Protective Fencing to BS5837:2012 Recommendations

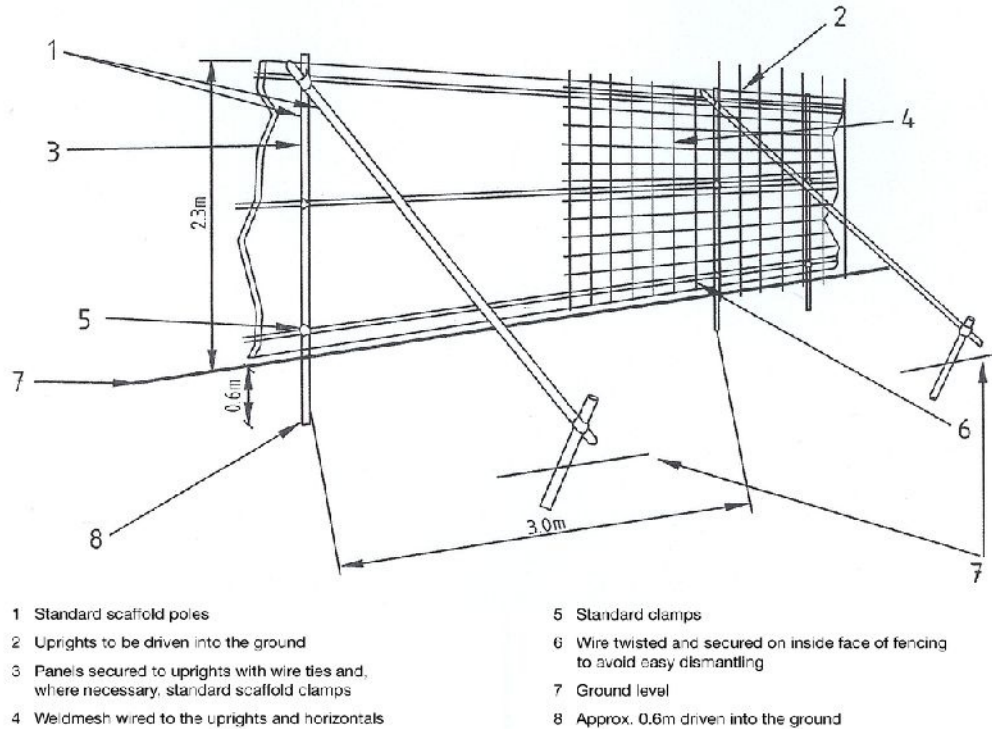
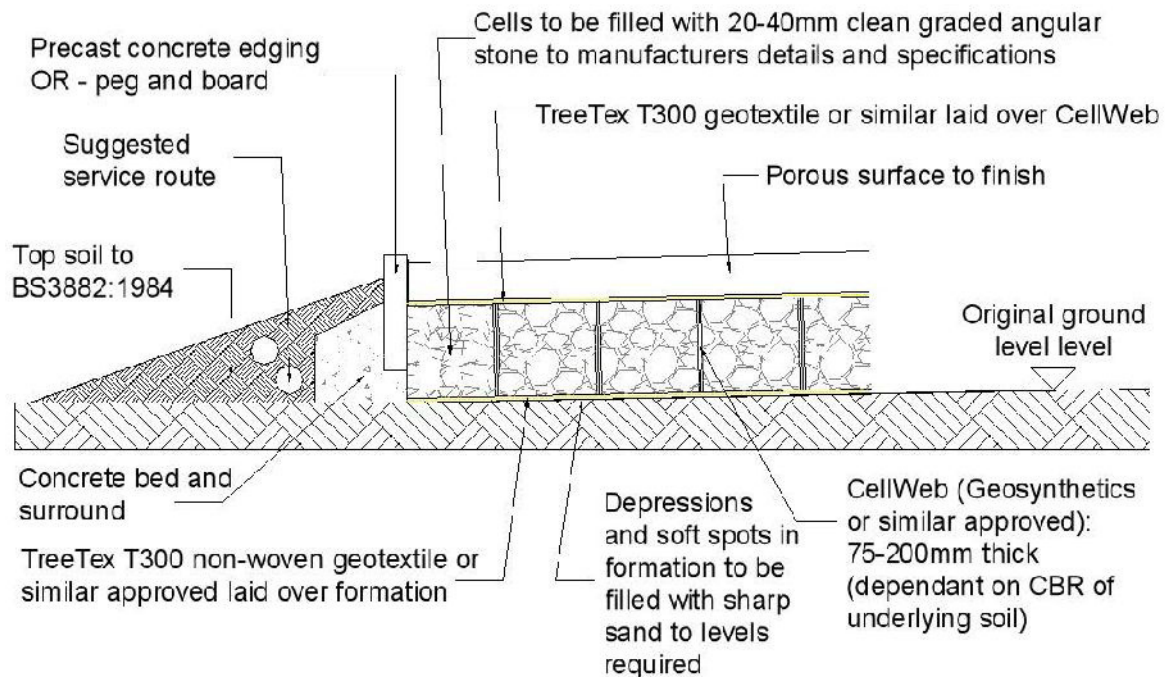


Figure 2. – Protective fencing for RPA

On smaller, short term construction projects, it is permissible to use Herris panel fencing as long as it is firmly supported in order that it is not possible to accidentally move the protection from the Root Protection Area. Supporting Herris fencing on the standard supplied block feet is not considered substantial enough to offer full protection to the RPA.

APPENDIX 3

Example of 'No Dig' Construction of a Permanent Access Way



Stages for Installation of the cellular confinement surface

- Remove existing vegetation by using a specific herbicide (as advised by a specialist) or manual removal with hand tools only. Agreed removal of shrubs, saplings or trees, within the protected areas of retained trees are to be cut, or ground out to just below ground level rather than grubbed or winched out, which can damage roots of retained trees.
- Retain all original ground levels after vegetation removal. No excavation deep whatsoever.
- Remove any existing hard surfaces (paving, tarmac etc.) Hand tools should be used if possible. If machinery is required for this operation, it must be used only on existing surfaces or outside the protection areas and tree canopies (approval from project Arboriculturist must be sought before using machinery). The sub base of existing surfaces or foundations should be left in situ where possible to avoid unnecessary root disturbance and provide a base for the new surface.
- Install a non-woven Geotextile (such as TreeTex T300) directly over soil grade level (levelled where necessary, by non-compacted washed sand) and fix in place.
- Lay the cellular system over the Geotextile, which is secured open under tension during the infill process with steel staples or wooden pegs.

- Install kerbs and edgings directly on top of existing soil grade level. For light structures, a treated peg and board may be acceptable. For more substantial structures, railway sleepers, haunched concrete with road pins, drilled kerbstones, gabions or cast in situ kerbs will be appropriate.
- Fill the cellular system ensuring any machinery works only on already filled areas. Typical infill consists of no fines angular granular material 20-40mm, which will remain un-compacted.
- Cover with a non-woven Geotextile (such as TreeTex T300).
- Install porous wearing surface.
 - Small Block Paving
 - Washed Gravel
 - Porous Asphalt

Any variation to the above specification must meet the following design criteria for low-invasive surfaces to provide the conditions for continued tree survival and growth:

Maintain oxygen diffusion through new surface to rooting area

Maintain sufficient passage of water to the rooting area

Avoid compaction by maintaining a soil structure sufficient to sustain root growth

Site analysis of the soil type and its structural characteristics will be required prior to determining the specific depth of products to be adopted for example, footpaths normally require a depth of 75mm and, 100mm to 200mm depths are used for residential driveways, while greater depths may be required for the passage of heavier traffic such as for construction access and delivery vehicles.

If ground levels are to be raised more than 150mm this should be achieved by the use of a granular material, which does not inhibit vertical gaseous diffusion. For example: no-fines gravel washed aggregate, structural soil (min. 20% sand content) or cobbles.