

BS 5837 Report on the Trees in Relation to
Emsworth Primary School 0.5 FE expansion

Document Reference:	P11226-L- BS 5837 Report on the Trees in Relation to Emsworth Primary School 0.5 FE expansion
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'



**BS 5837 Report on the Trees in Relation to
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Client: Hampshire County Council

Date: September 2016

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1.0 INTRODUCTION

- 1.1 Emsworth Primary School is situated in extensive and attractive grounds northwest of Emsworth village; a village on the north end of an arm of Chichester Harbour.
- 1.2 The school is assigned to accommodate the education of more students and therefore extra classrooms are required to accommodate them. The extension is proposed to be built to the east side of the school and includes 2 new classrooms and a communal breakout area. The development works include increased parking to accommodate the increase in staff numbers, increased hard surface for play and social interaction, upgrades to existing hard play areas and remedial works associated with the extension.
(See **Appendix 1**: Drawing 1: Site Plan).

2.0 SCOPE

- 2.1 The Local Planning Authority (LPA) require that the planning submission gives due consideration to trees which may be influenced / affected by the development works, together with information on which trees that should be retained and the means of protecting these trees during construction works. Reference is made to BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'
- 2.2 As the likely impact on the existing tree is considered to be minor it was agreed with the LPA that the Landscape Architects (HCC Landscape Architecture Group), who have been commissioned to design the external works associated with this project, will undertake a BS 5837 report to satisfy item 2.1 on behalf of Hampshire County Council (HCC) Property Services Team.
- 2.3 The purpose of the survey is to assess the landscape and visual amenity value of the existing vegetation and to identify the extent of Root Protection Area (RPA) to existing trees prior to any potential construction works of the site. The assessment / evaluation of tree condition detailed in this report is solely intended for the purposes of trees in relation to construction works and is NOT intended nor should be relied upon as a survey / assessment of the health and safety of trees.
- 2.4 This report will provide a synopsis of the proposals, description of the site, assess the implication for the trees to be retained & recommend surgery / tree protection measures necessary for the implementation of works.

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3.0 PROPOSALS

- 3.1 An area is required for access and a works compound for construction materials and machinery, and the proposed site/s provide the simplest solution. The most likely areas for the site compound (to be agreed with the main contractor) are either the grass area identified as increased parking or the area identified as increased hard/social play.
Following the completion of the building extension, the proposed compound site will be developed into their respective design designations.

4.0 SITE & ADDITIONAL INFORMATION

- 4.1 The school is situated in Victoria Road within a residential area of Emsworth Village in Hampshire.
- 4.2 The site boundaries are constructed of mainly blue (powder coated) 1.8 weld mesh with posts at 1.8m centres. The Northern boundary is 1.8m high chain link fence mainly obscured by shrubs/hedge
- 4.3 Vehicular access to Emsworth primary school is from the A27, A259 and either Selangor/Victoria Roads or Record Road. Access off of Victoria Road is via a narrow road between residential housing.
Of note is the West Coastway railway line, which runs the length of the northern boundary and a public footpath along the eastern and southern boundaries.
- 4.4 Havant Borough Council's Planning and Development department has confirmed that there are no trees, within Emsworth Primary school and immediate boundaries, subject to protection under a tree preservation order/ tree preservation area, and are not located within Emsworth Village Conservation Area.

5.0 SURVEY

- 5.1 The Tree survey for Emsworth Primary school and immediate boundaries was conducted on Friday 30/09/2016.
- 5.2 The survey was a visual inspection carried out from ground level, conducted in broad accordance with BS 5837 2012 to consider trees within the site and the immediate boundaries of the proposed development area, which may be affected by any construction works.
- 5.3 Please refer to **Appendix 1** for the following information;
Drawing 1 - Site Plan
Arboricultural Implications Assessment.
Explanation of tree survey terms

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6.0 SIGNIFICANCE OF THE TREES

- 6.1 The trees on and off the site are young to mature, and are a mixture of planted specimens and self set trees that have naturally established over the years. In the main the trees appear to be in good/fair condition with good vigour with a few that appear to be in poor health and will require extra monitoring.
- 6.2 The trees surveyed are the specimens that could be impacted by the construction of the proposed new extension and works compound area.
- 6.3 A total of 37 individual trees were inspected, and of those trees the following is a breakdown of the various numbers of trees and groups in each BS category.

BS Category	Tree/Group No.	Sub Total
A	12, 13, 16, 17, 18, 19, 20, 21, 31, 32, 33, 34, 35, 36	14
B	4, 5, 6, 7, 10, 11, 22, 23, 37	9
C	1, 2, 3, 8, 9, 14, 15, 24, 25, 26, 27, 28, 29, 30	14
U		0
TOTAL		37

7.0 ARBORICULTURAL IMPACT ASSESSMENT

- 7.1 For detail Arboricultural Implications Assessment & explanation of tree survey terms please refer to **Appendix 1**.
- 7.2 Not all of the trees surveyed that could be impacted by the construction works were on-site within Emsworth Primary School grounds; some were off-site. Where root protection areas partly fall within the construction area they have been included. (See **Appendix 1**: Site Plan).
- 7.3 Trees T25 and T27 within the school grounds are both planted *Malus* species. T25 was considered in poor condition due to twisted roots incorrect potting on at nursery stage and a cut wound most probably caused by failure to remove staking wire. T 27 was with good/fair condition and vigour. These trees will unfortunately have to be removed for the new proposed development. (See **Appendix 1**: Photographs of Surveyed Trees).
- 7.4 Trees T1 and T2 are young trees planted during the last extension. It is planned to carefully relocate these two trees. Relocation is to take place during the dormant period (Mid November 2016 – Mid February 2017) prior to the start of construction.

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The exact location of the relocation is to be agreed with the school but will most likely be in the wildlife area on the eastern side of the north boundary. It is recommended that the relocation of these two trees form part of a 12 months maintenance/defects period and be replaced with like species/size should the relocation fail.

- 7.5 Tree T26 does not need to have a tree protective fence (TPF) as, for the duration of the construction, it will be protected by an existing 1.8m bow topped fence. The bow topped fence is scheduled to be relocated 1.2m closer to tree T26 at which point a tree protection fence will need to be installed. Post holes within this area, to be hand dug to avoid damaging tree roots.
- 7.6 Trees T28, T29, T30 and T31 are within an area which will involve upgrades to existing services. A TPF is required for the duration of the development but the TPF will need to be moved to allow services upgrading work to proceed. All work within this TPF/RPA is to be appropriately supervised and should be carried out according to the guidance issued by the National Joint Utilities Group, "NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees"
- It has been noted that Tree T28 is in poor health, as there is decay at the base of the trunk and at the main branch junction where the main leader is absent, and will require extra monitoring.
- 7.7 The RPAs of trees T3, T4, T5, T8 and T9 and T32 fall outside the development boundary. These trees are already protected by the 1.8m high bow topped fence which is considered adequate and no additional TPF is considered necessary.
- 7.8 Trees T6 and T7 are outside the site, however, the RPA of trees T6 and T7 fall within the development boundary and the mound. The proposed works within this area are for the removal of the existing soil mound. A TPF is required for the duration of the development but the TPF will need to be moved to allow soil removal work to proceed. All work within this TPF/RPA is to be appropriately supervised.
- 7.9 The RPA of Tree 11 (Small leaved maple) falls outside the development area, however, due to the close nature of this tree it is recommended that a TPF be installed for the duration of the proposed development works.
- 7.10 Trees T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T33, T34, T35 and T36 (fastigiated poplars), T10 (Populus sp.) and T37 (unknown sp.) form part of the northern boundary.

The RPA of trees T21, T33, T34, T35 and T36 fall within the development boundary. However, the proposed works, the installation of a non-dig reinforced mesh to

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the existing grass area as well as installation of seating, fall outside the RPA. A TPF is required for the duration of the development but the TPF will need to be moved to allow soil removal work to proceed. All work within this TPF/RPA is to be appropriately supervised.

The RPA of trees T10, T12, T13, T14, T15, T16, T17, T18, T19, T20 and T37 fall outside of the development boundary and no TPF is required, however, due to the nature of TPF of other trees in this row it is recommended that the TPF cover these trees as well.

- 7.11 The RPA of trees T22 and T23 fall within the development boundary and within the area of the proposed works: resurfacing of the existing asphalt play area. A TPF is required for the duration of the development but the TPF will need to be moved to allow resurfacing works to proceed. All work within this TPF/RPA is to be appropriately supervised.
- It has been noted that Tree T22 is in poor health, as there is decay at the base of the trunk, and will require extra monitoring.

8. ARBORICULTURAL METHOD STATEMENT & TREE PROTECTION SCHEME

- 8.1 In order for trees to receive appropriate protection it is necessary for construction works to conform to an approved method of operations as recommended within the BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'. This work method together with specification for temporary protection / special construction detail / methods are detailed in the Arboricultural method statement and scheme of tree protection Ref **Appendix 2**.
- 8.2 Any removal of trees, branch removal, crown lifting, pruning etc. for development or to allow for construction or access for work machinery must be to BS 3998 2010 standard.
See **Appendix 2: TREE PROTECTION DETAIL: 10.2 TREE WORK**.
- 8.3 To protect the RPA's of any surrounding trees from compaction from machinery or accidental damage protective fencing should be erected to BS 5837 standard.
See **Appendix 2: TREE PROTECTION DETAIL: 10.3 TEMPORARY PROTECTION FOR THE TREES**
See **Appendix 2: DRAWING 2: Tree Protection Plan for protective fencing detail**.
- 8.4 Any excavation or ground surfaces altered within the RPA of retained trees needs to be conducted by hand.
See **Appendix 2: TREE PROTECTION DETAIL: 10.4 EXCAVATION WITHIN THE RPA**.

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- 8.5 Any storage of materials / plant etc., and site welfare facilities should be all outside the RPAs from trees. See **Appendix 2: TREE PROTECTION DETAIL: 10.8 STORAGE/ FIRES & 10.9 SITE WELFARE FACILITIES.**
- 8.6 New planting is recommended for the loss of trees due to the new development, and 12 trees are to replace the 2 trees removed.
(See **Appendix 1: DRAWING 1: Site Plan** and **Appendix 2: New Mitigation Planting & 10.14 LANDSCAPE**).
For planting information BS 4428: 1989 contains recommendations and guidance on general landscape operations, including tree planting.

9. CONCLUSION & RECOMMENDATIONS

- 9.1 The purpose of this report is to identify the trees most likely to be impacted upon by the proposed construction works, and to show how potential damage to them is to be avoided. This survey provides the basic data on the trees implicated on these sites. It does not set out to put arguments for or against the development works. The primary purpose is for the Council and client to review the information provided as a condition of the planning consent.
- 9.2 The trees in this survey are of mixed species and ranging in age from young to mature, and are a mixture of planted specimens and self-set trees that have naturally established over the years. In the main the trees appear to be in good/fair condition with good vigour with a few that are appear to be in poor health and will require extra monitoring.
- 9.3 Havant Borough Council's Planning and Development department have confirmed that there are no trees, within Emsworth Primary school and immediate boundaries, subject to protection under a tree preservation order/ tree preservation area, and are not located within Emsworth's Conservation Area.
- 9.4 All trees that impact the development should have their RPA's protected as described in **Appendix 2: (Arboricultural method statement & scheme of tree protection)**. With specified temporary ground and fencing protection any possible damage by construction traffic/ storage/ soil compaction etc. to their roots will be prevented. Please see **Appendix 2: Tree Protection Plan**.
- 9.5 Mitigation planting is recommended to replace the trees (T25 and T26) that have been removed for development. These trees, along with others over and beyond the 3 to 1 replacement requirements, will be planted around the new car park and to the hard play/social area in line with the existing/new classrooms within the school grounds.
12 new trees will replace the 2 trees removed, and placed as follows: 9 to the East and South of the new building extension and 3 within the grassed areas of the existing car park.

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- 9.6 On-site Arboricultural approval is recommended for any exclusion zones, temporary protection fencing, and temporary ground protection prescribed, with regular visits to monitor the site's tree protection measures. Any areas of 'work by hand only' methods within the RPA's where the contractor has discovered roots above 25mm diameter, arboricultural supervision is also recommended.

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Appendix 1: SURVEY & ASSESSMENT

Drawing 1 - Site Plan

Photographs of Trees On-site

Arboricultural Implications Assessment.

Explanation of tree survey terms.

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Site Ownership Boundary
Site Development Boundary

Vegetation Access
Pedestrian Access

Legend

Levels
 Existing levels
 Proposed levels

Vegetation
 Existing trees
 Proposed trees
 Existing amenity planting
 Proposed amenity planting
 Existing amenity planting
 Proposed amenity planting

Surfacing
 Existing surfacing
 Proposed surfacing
 Existing surfacing
 Proposed surfacing

Line markings
 Existing line markings
 Proposed line markings
 Existing line markings
 Proposed line markings

Fences and walls
 Existing fences and walls
 Proposed fences and walls
 Existing fences and walls
 Proposed fences and walls

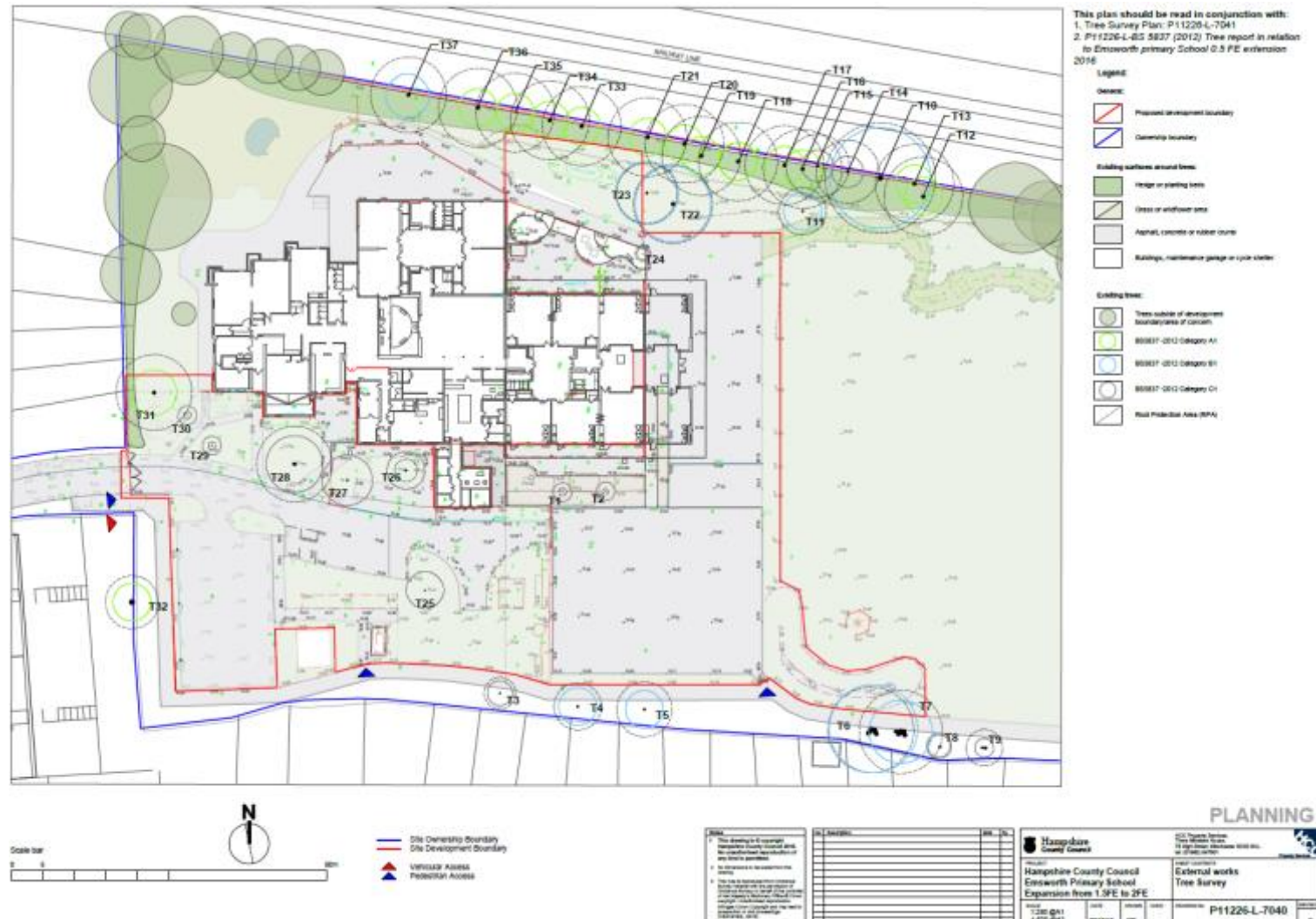
Materials
 Existing materials
 Proposed materials
 Existing materials
 Proposed materials

Quantities
 Existing quantities
 Proposed quantities
 Existing quantities
 Proposed quantities

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Drawing 2: Tree survey



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Photographs of Surveyed Trees

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T25 – *Malus sp.*

Picture 1: Looking south from the school building

Picture 2: Showing damage caused by failure to remove tree staking wire

Picture 3: Showing root malformation

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T27 *Malus sp*

Picture 1: Trunk and branch structure as well as compacted earth around base.

Picture 2: Looking east from school reception area

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T21 *Acer grosserii* *hyb*



T2 *Acer grosserii* *hyb*



T26 *Malus* *sp*

Picture 1: T1 looking south from school building

Picture 2: T2 looking south from school building

Picture 3: T26 looking northeast towards school building

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T28 *Acer sp.*

Picture 1: T28 Trunk and branch structure as well holes in trunk base and branches

Picture 2: T28 Holes in trunk at trunk base.

Picture 3: T28 Holes in trunk at branch formation

Picture 3: T28 Looking North towards school building

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T29 *Betula utilis 'Jacquemontii'*



T30 + inset *Betula utilis 'Jacquemontii'*



T31 *Populus alba*

Picture 1: T29 Young birch (looking towards school reception)

Picture 2: T30 Young birch with damage to trunk at base (looking north)

Picture 3: T31 Populus tree (looking North West)

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T3 *Crataegus monogyna*



T4 *Acer sp.* (Top))



T5 *Fraxinus excelsior* (bottom)



T4 closest and T5



T32 *Quercus robur*

Picture 1: T1 Mature hawthorn looking south from school

Picture 2: T4 Good specimen small leaved maple looking south from school

Picture 3: T5 Ash tree looking south from school

Picture 4: T4 and T5 showing close proximity to access path looking east

Picture 5: T32 Oak tree – tree outside school boundary (looking south)

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T7 Acer sp



T7



T6 Acer sp



T6

Picture 1: T7 Multi-stemmed maple trunks

Picture 2: T7 Large multi-stemmed maple looking from playing fields

Picture 3: T6 Large multi-stemmed maple looking from playing fields

Picture 4: T6 Multi-stemmed maple trunks

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T9 Acer sp



T9



T8 Acer sp



T8

Picture 1: T9 Over-mature small leaved maple close up of base

Picture 2: T9 Over-mature small leaved maple looking from playing field

Picture 3: T8 Over-mature small leaved maple close up of base

Picture 4: T8 Over-mature small leaved maple looking from playing field

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T11 Acer sp

T11

Picture 1: T11 Good specimen small leaved maple looking north from playing field

Picture 2: T11 Small leaved maple showing branching at 1.2m

Picture 3: T12, T13, T10, T14, T15, T16, T17, T18, T19, T20, T21, T33, T34, T35, T36, T10, T37 forming path of northern boundary



Right to left: T12, T13, T10, T14, T15, T16, T17, T18, T19, T20, T21, T33, T34, T35, T36, T10 and T37 *Populus nigra 'Italica'*

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Left to right T23 and T22
Prunus sp



Top: T22
Top Right and Right: T23



Picture 1: T3 and T22 Picture 2: *Prunus avium* looking north from school building
Picture 2: T22 showing compaction around base exposed roots
Picture 3&4: T23 showing decay at trunk base

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Arboricultural Implications Assessment

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Arboricultural Implications Assessment

Site name / ref: Emsworth primary school/Arb / Assessment

Date: 30/09/2016

										Single Stemmed Tree			Multi-Stemmed Trees			COMMENTS
Tree ref.	Species	Age Class Y,MA,M,OM or V	BS Cat	Remaining contribution in years	Single stem trees. Dia @ 1.5m (mm)	Multi- Stem trees. Dia abv root flair (mm)	Est Height (m)	Crown Spread Dia (m)	Height of crown clearan ce (m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m ²)	20% offset Value for Open Crown Trees (linear m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m ²)	20% offset Value for Open Crown Trees (linear m)	
T1	<i>Acer grosseri hyb.</i>	Y	C1	20-40	50	0	3.5	1.5	1.5	0.60	1.13	0.12	0.00	0.00	0.00	Good condition, good vigour, newly planted -2 years ago - tree in new 4m wide planting bed.
T2	<i>Acer grosseri hyb.</i>	Y	C1	20 -40	40	0	3.5	1.3	1.5	0.48	0.72	0.10	0.00	0.00	0.00	Good condition, good vigour, newly planted -2 years ago - tree in new 4m wide planting bed.
T3	<i>Crataegus monogyna</i>	OM	C1	10+	200	0	6	2	1	2.40	18.10	0.48	0.00	0.00	0.00	Fair condition, good vigour, showing signs of past pollard pruning by owners, 2m wide asphalt path 1m to the north of trunk, private gardens to the south.
T4	<i>Acer sp.</i>	M	B1	20+	300	0	7	3.5	1.8	3.60	40.72	0.72	0.00	0.00	0.00	Good condition, good vigour, good specimen tree, 2m wide asphalt path 0.5m to the north of trunk, path widened at point of trunk.
T5	<i>Fraxinus excelsior</i>	M	B1	20+	350	0	6	3	1.8	4.20	55.42	0.84	0.00	0.00	0.00	Good condition, good vigour, open crown typical of species, 2m wide asphalt path 0.5m to the north of trunk.
T6	<i>Acer sp</i>	M	B1	20+	1360	1360	25	7	4	15.00	706.86	3.00	13.60	581.07	2.72	Multi-stemmed tree, fair condition, good vigour, possible old Hedge plant allowed to grow into tree, east trunk will require monitoring as it may sheer off, 2m wide asphalt path 0.5m to the north of trunk.
T7	<i>Acer sp</i>	M	B1	20+	0	1322	25	5	3.5	0.00	0.00	0.00	13.22	549.05	2.64	Multi-stemmed tree, fair condition, good vigour, possible old Hedge plant allowed to grow into tree, 2m wide asphalt path 0.5m to the north of trunk.

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Arboricultural Implications Assessment

Site name / ref: Emsworth primary school/Arb / Assessment

Date: 30/09/2016

										Single Stemmed Tree			Multi-Stemmed Trees			COMMENTS
Tree ref.	Species	Age Class Y,MA,M,OM or V	BS Cat	Remaining contribution in years	Single stem trees. Dia @ 1.5m (mm)	Multi- Stem trees. Dia abv root flair (mm)	Est Height (m)	Crown Spread Dia (m)	Height of crown clearan ce (m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m2)	20% offset Value for Open Grown Trees (linear m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m2)	20% offset Value for Open Grown Trees (linear m)	
T8	Acer sp	OM	C1	10+	0	353	6	3.5	2	0.00	0.00	0.00	3.53	39.15	0.71	Multi-stemmed tree, fair condition, over mature tree with little vigour, possible old Hedge plant allowed to grow into tree, 2m wide asphalt path 0.5m to the north of trunk.
T9	Acer sp	OM	C1	10+	0	580	6	3	2	0.00	0.00	0.00	5.80	105.68	1.16	Multi-stemmed tree, fair condition, over mature tree with little vigour, possible old Hedge plant allowed to grow into tree, 2m wide asphalt path 0.5m to the north of trunk.
T10	Populus nigra	M	B1	20+	700	0	25	8	3	8.40	221.67	1.68	0.00	0.00	0.00	Good condition, good vigour, trunk within loose hedge.
T11	Acer sp	M	B1	20+	300	0	4	3	1	3.60	40.72	0.72	0.00	0.00	0.00	Good condition forming specimen tree, good vigour, tree within open grass area close to existing play equipment.
T12	Populus nigra 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigate species - part of row forming site boundary.
T13	Populus nigra 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigate species - part of row forming site boundary.
T14	Populus nigra 'Italica'	M	C1	10+	400	0	20+	2.5	2	4.80	72.38	0.96	0.00	0.00	0.00	Poor condition, less vigour than neighbouring trees in row, growth habit typical of fastigate species - part of row forming site boundary, showing.

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Document Reference: P11226-L- BS 5837 Report on the Trees in Relation to
Emsworth Primary School 0.5 FE expansion

Procedure / Process: BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Arboricultural Implications Assessment

Site name / ref: Emsworth primary school/Arb / Assessment

Date: 30/09/2016

										Single Stemmed Tree			Multi-Stemmed Trees			
Tree ref.	Species	Age Class Y,MA,M,OM or V	BS Cat	Remaining contribution in years	Single stem trees. Dia @ 1.5m (mm)	Multi- Stem trees. Dia abv root flair (mm)	Est Height (m)	Crown Spread Dia (m)	Height of crown clearan ce (m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m2)	20% offset Value for Open Grown Trees (linear m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m2)	20% offset Value for Open Grown Trees (linear m)	COMMENTS
T15	Populus nigra 'Italica'	M	C1	10+	400	0	20+	2.5	2	4.80	72.38	0.96	0.00	0.00	0.00	Poor condition, less vigour than neighbouring trees in row, growth habit typical of fastigate species - part of row forming site boundary, showing.
T16	Populus nigra 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigate species - part of row forming site boundary.
T17	Populus nigra 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigate species - part of row forming site boundary.
T18	Populus nigra 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigate species - part of row forming site boundary.
T19	Populus nigra 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigate species - part of row forming site boundary.
T20	Populus nigra 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigate species - part of row forming site boundary.
T21	Populus nigra 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigate species - part of row forming site boundary.

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Arboricultural Implications Assessment

Site name / ref: Emsworth primary school/Arb / Assessment

Date: 30/09/2016

										Single Stemmed Tree			Multi-Stemmed Trees			COMMENTS
Tree ref.	Species	Age Class Y,MA,M,OM or V	BS Cat	Remaining contribution in years	Single stem trees. Dia @ 1.5m (mm)	Multi- Stem trees. Dia abv root flair (mm)	Est Height (m)	Crown Spread Dia (m)	Height of crown clearan ce (m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m2)	20% offset Value for Open Grown Trees (linear m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m2)	20% offset Value for Open Grown Trees (linear m)	
T22	<i>Prunus</i> sp.	M	B1	20+	500	0	7	6.5	2.5	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, compacted soil within play area, growth habit typical of species.
T23	<i>Prunus</i> sp.	M	B1	10+	400	0	7	5	2.5	4.80	72.38	0.96	0.00	0.00	0.00	Good condition, good vigour, compacted soil within play area, growth habit typical of species, mechanical damage to lower branch - removal if rot develops, damage and rot to trunk at base. Tree will require yearly monitoring and removal if necessary.
T24	<i>Acer grosseri</i> var. <i>hersii</i> 'Snakebark'	Y	C1	20 -40	50	0	3.5	2	1.5	0.60	1.13	0.12	0.00	0.00	0.00	Good condition, good vigour, newly planted -2 years ago - tree in new 2m wide planting bed.
T25	<i>Malus</i> sp.	M	C1	10	200	0	4	2	1.5	2.40	18.10	0.48	0.00	0.00	0.00	Poor/damaged condition, old staking wire wound at 1m height, old root wound (under potted at young age). Tree will require attention in the near future.
T26	<i>Malus</i> sp. (crab apple)	M	C1	10+	150	0	4	3	1.8	1.80	10.18	0.36	0.00	0.00	0.00	Fair condition, reduced vigour, tree within 3m of building.
T27	<i>Prunus</i> sp.	M	C1	10+	250	0	5.5	4	2	3.00	28.27	0.60	0.00	0.00	0.00	Fair condition, reduced vigour, tree sits within play area and soil is compacted.
T28	<i>Acer</i> sp.	M	C1	10+	500	0	6	4	1	6.00	113.10	1.20	0.00	0.00	0.00	Poor specimen of species in open grass area, good vigour, tree within 1m of a 2m wide path to the south, all branches at 1m are from the same point and are creating too much pressure at this point; damage at point of nodes and base with holes developing. This tree will need yearly monitoring.

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Arboricultural Implications Assessment

Site name / ref: Emsworth primary school/Arb / Assessment

Date: 30/09/2016

										Single Stemmed Tree			Multi-Stemmed Trees			COMMENTS
Tree ref.	Species	Age Class Y,MA,M,OM or V	BS Cat	Remaining contribution in years	Single stem trees. Dia @ 1.5m (mm)	Multi- Stem trees. Dia abv root flair (mm)	Est Height (m)	Crown Spread Dia (m)	Height of crown clearan ce (m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m2)	20% offset Value for Open Grown Trees (linear m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m2)	20% offset Value for Open Grown Trees (linear m)	
T29	<i>Betula utilis</i> 'jacquemontii'	Y	C1	20+	50	0	3	1.5	1.5	0.60	1.13	0.12	0.00	0.00	0.00	Good specimen, good vigour. Young tree planted in grass.
T30	<i>Betula utilis</i> 'jacquemontii'	Y	C1	10	50	0	3	1.5	1.5	0.60	1.13	0.12	0.00	0.00	0.00	Poor specimen, good vigour. Young tree planted in grass, damage to trunk at base.
T31	<i>Populus alba</i>	M	A1	20-40	500	0	15	3.5	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, within grassed area and shrub bed, palisade fence very close to trunk, growth habit typical of species.
T32	<i>Quercus robur</i>	M	A1	20-40	700	0	15	3	4	8.40	221.67	1.68	0.00	0.00	0.00	Good condition, good vigour, in garden adjacent to school and within 3m of 2m wide access path to the east, showing signs of pruning/pollarding.
T33	<i>Populus nigra</i> 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigiate species - part of row forming site boundary.
T34	<i>Populus nigra</i> 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigiate species - part of row forming site boundary.
T35	<i>Populus nigra</i> 'Italica'	M	A1	20-40	500	0	25+	3	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, growth habit typical of fastigiate species - part of row forming site boundary.

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EXPLANATION OF TREE SURVEY & ASSESSMENT TERMS

Tree survey:

Undertaken from ground level, in broad accordance with British Standard 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'
Please note - survey may include assessment of trees beyond the site boundary which are considered likely to be affected by development proposals.

Land or topographical survey:

Scale plan depicting key site features and the location of trees

Tag Number / Ref Number:

Unique number, identifying each tree on the accompanying plan and corresponding with tree tag numbers where use of tree tags is deemed necessary by the Hampshire County Council arboriculturalist. Where appropriate, individual trees / tree groups with the same or similar characteristics may be identified and numbered as a group and surveyed accordingly.

Species:

Tree species giving common name and full botanic name where applicable.

Stem Dia Single:

Stem Diameter Single stem trees: Tree trunk diameter measured at 1.5m above ground level (on slopping ground above highest ground level). Expressed in milli-metres.

Stem Dia Multi:

Stem Diameter multi stem trees: Tree trunk diameter measured immediately above the root flare. Expressed in millimetres.

Height:

Tree top height expressed in metres this is an estimated figure

Height to lowest tree part:

Estimate vertical distance between ground level and lowest part of tree canopy along the four principle points of the compass.

Spread:

Estimate dimensions of the tree canopy extent taken from centre of tree trunk to edge of general canopy line along the four principle points of the compass. Note this distance is to the general canopy line, in certain cases an exceptional or etiolated branch may extend beyond the stated figure.

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Age:

- Y: Young - within third of normal life expectancy.
MA: Middle Aged - within second third of normal life expectancy.
M: Mature - within final third of normal life expectancy.
OM: Over Mature – senescent & veteran trees nearing the end of anticipated life expectancy.

BS Category Tree quality assessment grading in broad accordance with BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'.
Table 1 - Cascade chart for tree quality assessment.

Summary of attributes Category A – Tree retention of High/Good quality; trees of high quality and value likely to make a substantial contribution for 40 years plus.

Summary of attributes, Category B – Tree retention of moderate quality; trees of moderate quality and value likely to make a contribution for 20 years plus.

Summary of attributes, Category C – Tree retention of low quality; trees of low quality and value likely to make a contribution for 10 years plus; young trees with a stem diameter of less than 150mm dia.

Summary of attributes, Category U – Trees for removal; trees likely to be un-viable within 10 years or trees to be removed on the grounds of sound arboricultural management

Remaining contribution in Yrs:

Estimation of safe useful life expectancy.

Comment / Recommendations

Summary detail where appropriate of tree position / characteristics / defects etc.

Min RPA.

Minimum root protection area that should remain undisturbed around each retained tree necessary to maintain the trees vitality and avoid damage to above ground tree parts. Calculated from Table D1 of BS 5837 2012 and may be adjusted in shape (but NOT decreased in area) by the arboriculturalist to take account of site specific features.

Radius m – minimum radius in meters from the centre of the tree to remain undisturbed.

Area m² – minimum total area around the tree to remain undisturbed.

RPA comment

Comment relating to the position or extent of the root protection area.

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Key to abbreviations

AGL – above ground level.

BS – British Standard.

Dia – diameter.

Rqd – required.

VTA - Visual tree assessment.

Appendix 2: TREE PROTECTION DETAIL

**Arboricultural method statement & scheme
of tree protection.**

DRAWING 3 - Tree Protection Plan

FIGURE 2 - Protective barrier.

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10. ARBORICULTURAL METHOD STATEMENT & SCHEME OF TREE PROTECTION

Work sequence to be in accordance with points 8.1 including and the following:

Appendix 2: DRAWING 3 - Tree Protection Plan.

Appendix 2: FIGURE 2 – Protective barrier.

10.1 PROCEDURE

Specification, work sequence and methodology to be approved by Hampshire County Council landscape architect prior to commencement. The site manager to be instructed to advise all site workers at their induction of the purpose and restrictions implied by the protective fencing. Site manager to be responsible for the day to day prevention / exclusion of all actions / operations in the vicinity of protected trees that are likely to cause damage to retained / protected trees. E.g. Fires, use of cranes and excavators, use of hot bitumen etc.

10.2 TREE WORK

To be in accordance with BS 3998 2010 and subject to all necessary permissions. Tree work must be carried out in accordance with BCT guidance to comply with the legislation concerning the protection of bats and bat roosts. To follow legislation concerning nesting birds and protected species such as dormice, badgers and reptiles.

10.3 TEMPORARY PROTECTION FOR THE TREES

Erect temporary protective measures in accordance with approved plans and specifications agreed with the Local Planning Authority/ arboriculturalist: Temporary fencing (Ref FIGURE 2 – Protective barrier, or specification agreed with the LPA tree officer/Hampshire County Council landscape architect prior to commencement) will be required for all trees to be retained in this vicinity of work. Measures will be required to form effective Construction Exclusion Zones / Root Protection

Areas (RPA) as detailed on drawing (or in positions agreed with the LPA tree officer/ Hampshire County Council landscape architect prior to commencement).

If access is required for work within the RPA (working room / scaffolding etc.), temporary ground protection must be installed prior to commencement. In the case that plant / machinery access is required within the RPA specification for temporary ground protection to be appropriate for the intended loading and agreed with the Local Planning Authority Tree Officer/ Hampshire County Council landscape architect prior to commencement. No access whatsoever will be permitted within the fenced area without prior written agreement from the Local Planning Authority (LPA) tree Officer.

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Protective fencing and temporary ground protection must be maintained in good condition and retained for the duration of building works on site or until such time as agreed with the LPA/ Hampshire County Council landscape architect.

Protective fencing type to be - "Herras" type fencing secured to a scaffolding type frame as detailed in Figure 2 – protective barrier British Standard 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'. This will ensure that the protective zone is not eroded by the intentional / unintentional movement of the fencing.

Clear signage to be displayed to advise site workers of the purpose and restrictions implied by the protective fencing.
Ref to **Appendix 3: INFORMATION**.

10.4 EXCAVATION WITHIN THE RPA.

Excavation should be undertaken carefully, using hand-held tools and preferably by compressed air soil displacement.

Roots, whilst exposed, should immediately be wrapped or covered to prevent desiccation and to protect them from rapid temperature changes. Any wrapping should be removed prior to backfilling, which should take place as soon as possible.

Roots smaller than 25 mm diameter may be pruned back, making a clean cut with a suitable sharp tool (e.g. bypass secateurs or handsaw), except where they occur in clumps. Roots occurring in clumps or of 25 mm diameter and over should be severed only following consultation with an arboriculturist; as such roots might be essential to the tree's health and stability.

Prior to backfilling, retained roots should be surrounded with topsoil or un-compacted sharp sand, or other loose inert granular fill, before soil or other suitable material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots.

10.5 NOTICE TO THE LOCAL PLANNING AUTHORITY

Provide the Local Planning Authority with a minimum of 2 working days notice that protective fencing & ground protection has been and installed. No work to proceed on site until LPA/ arboriculturist approval of the temporary protective fencing / ground protection has been granted or expiry of the 2 working day notice period.

10.6 PLANNING OPERATIONS ON SITE

The planning and implementation of all operations will require due consideration of the limitations of clearance imposed by the presence of all trees on or adjacent to the site. All vehicle and crane operations will take

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appropriate action and care to ensure that trees are not damaged as part of their operations. No part of any tree must be used as a support or for anchorage. No fixings must be mounted on trees.

10.7 SITE ACCESS / EGRESS - CONSTRUCTION WORK

Access & egress only via areas not fenced, as to not compact RPA of retained trees.

10.8 STORAGE/ FIRES

Storage of materials / plant etc to be accommodated outside all RPA's / away from trees on areas of existing hard standing only. No fires permitted within 15m of any tree to be retained. Any area to be allocated for the mixing of concrete & cement / storage of diesel and other materials / storage of machinery in a location such that any spillage will be contained without risk of site contamination / damage to trees and or tree roots.

10.9 SITE WELFARE FACILITIES

To be accommodated if possible on existing hard standing areas / outside all RPA's and away from trees.

10.10 ARISINGS FROM ALL WORK

Arisings from excavation / construction work etc to be accommodated outside all RPA's, away from trees or removed from site on a daily basis.

10.11 UNDERGROUND SERVICES

Excavation / connection of underground services – to be routed outside of all RPA's / within previously compacted ground (existing hard standing) and in accordance with principals of; NJUG Volume 4 "Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees". (Documents may be downloaded from - www.njug.org.uk). Where the RPA cannot be avoided, such as where the sewer is to be rerouted adjacent to Scots Pine T4, trenchless techniques should be used in preference as described in Chapter 4 of the above guidance.

10.12 ABOVE GROUND SERVICES

To be routed away from trees and positioned to take account of likely growth potential of trees to avoid future conflict.

10.13 NOTICE TO THE LOCAL PLANNING AUTHORITY - REMOVAL OF TEMPORARY PROTECTIVE MEASURES

Following the completion of all works on site. Provide the Local Planning Authority with a minimum of 2 working days notice that tree protection measures / protective fencing is to be removed. All protective measures to remain in situ until LPA/ Tree Officer approval has been granted or expiry of the 2 working day notice period.

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10.14 LANDSCAPE

Landscape for all areas within RPA's - to remain as existing. Where reinstatement is required ground levels to remain as existing with only soft land-scape work permitted. Proposals to be specified to avoid rotavation / deep cultivation which may risk tree root damage. For more information BS 4428: 1989 contains recommendations and guidance on general land-scape operations, including sections on preliminary investigations, drainage, grading and cultivation, tree planting, and woodland planting.

The general treatment of areas around newly planted and existing trees should allow for adequate infiltration of water and free gas exchange, reduction of water evaporation and the retention of an open soil structure to encourage root growth.

10.15 REMOVING HARD SURFACING - AREAS WITHIN THE RPA

The removal of old hard surfacing should be conducted with care, and preferably with hand tools, and the sub base should not be disturbed. This existing surfacing could be retained and used as a base for new surfacing. If roots are exposed, they should immediately be wrapped or covered to pre-vent desiccation and to protect them from rapid temperature changes. Any wrapping should be removed prior to backfilling, which should take place as soon as possible.

Roots smaller than 25 mm diameter may be pruned back, making a clean cut with a suitable sharp tool (e.g. bypass secateurs or handsaw), except where they occur in clumps. Roots occurring in clumps or of 25 mm diameter and over should be severed only following consultation with an arboriculturist; as such roots might be essential to the tree's health and stability.

Prior to backfilling, retained roots should be surrounded with topsoil or un-compacted sharp sand, or other loose inert granular fill, before soil or other suitable material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots.

10.16 SUB-BASE AND FINISHING LAYERS

Recommended appropriate sub-base options for new hard surfacing include three-dimensional cellular confinement systems. Suitable surface finishes include washed gravel, permeable tarmac or block pavements set on a sand base. Where a permeable surface is to be used by vehicular traffic, a geotextile should be used at the base of construction to help prevent pollution contamination of the rooting area below. If the new surface is likely to be subject to de-icing salt application, an impermeable barrier should be incorporated to prevent contamination of the rooting area and run-off should be directed away from the RPA. Alternatively, piles, pads or elevated beams can be used to support surfaces to bridge over the RPA.

However, for lightly loaded surfacing or limited widths (<3m) such as pedestrian paths, pre-formed concrete slabs may be appropriate if the sub-base preparation is as set out above.

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10.17 CONSTRUCTION OF NEW HARD SURFACING WITHIN RPA's

The design should not require excavation, including changes of soil levels other than the removal, of turf or other surface vegetation. The new hard surface must avoid localized compaction by evenly distributing the loading over the track width and wheelbase of any vehicles expected to use the access. New permanent hard surfacing should not exceed 20% of any existing unsurfaced ground within the RPA. Where there is a risk of water logging suitable land drainage must be incorporated. The new hard surface should be resistant to or tolerant of de-formation by tree roots, and should be set back from the stem of the tree and its above ground root buttressing by a minimum of 500 mm to allow for growth and movement.

10.18 SOIL COMPACTION AND REMEDIATION MEASURES

Compacted soil will adversely affect drainage, gas exchange, nutrient uptake and organic content, and will seriously impede or restrict root growth. The risk of soil compaction is greatest in soils with significant clay content and in wet conditions.

Soil compaction should be avoided around existing vegetation, including trees, and in areas where new planting or seeding is proposed.

Where soil compaction has occurred in the vicinity of existing trees, arboricultural advice should be taken before carrying out any remedial or other works within RPAs to mitigate risk of further damage to roots.

Remedial works may include sub-soil aeration using compressed air, and the addition of other materials, preferably of a bulky, organic nature (but excluding peat), to improve structure. Heavy mechanical cultivation such as ploughing or rotavation should not occur within the RPA.

Any cultivation operations should be undertaken carefully by hand in order to minimize damage to the tree, particularly the roots. Decompaction measures include forking, spiking, soil auguring and tilled radial trenching. Care should be taken during such operations to minimize the risk of further damage to tree roots.

10.19 QUERIES

Any queries, arising from the scheme of protection, to be referred to the Local Planning Authority T (in writing and in a timely manner) to allow clarification of any issues arising

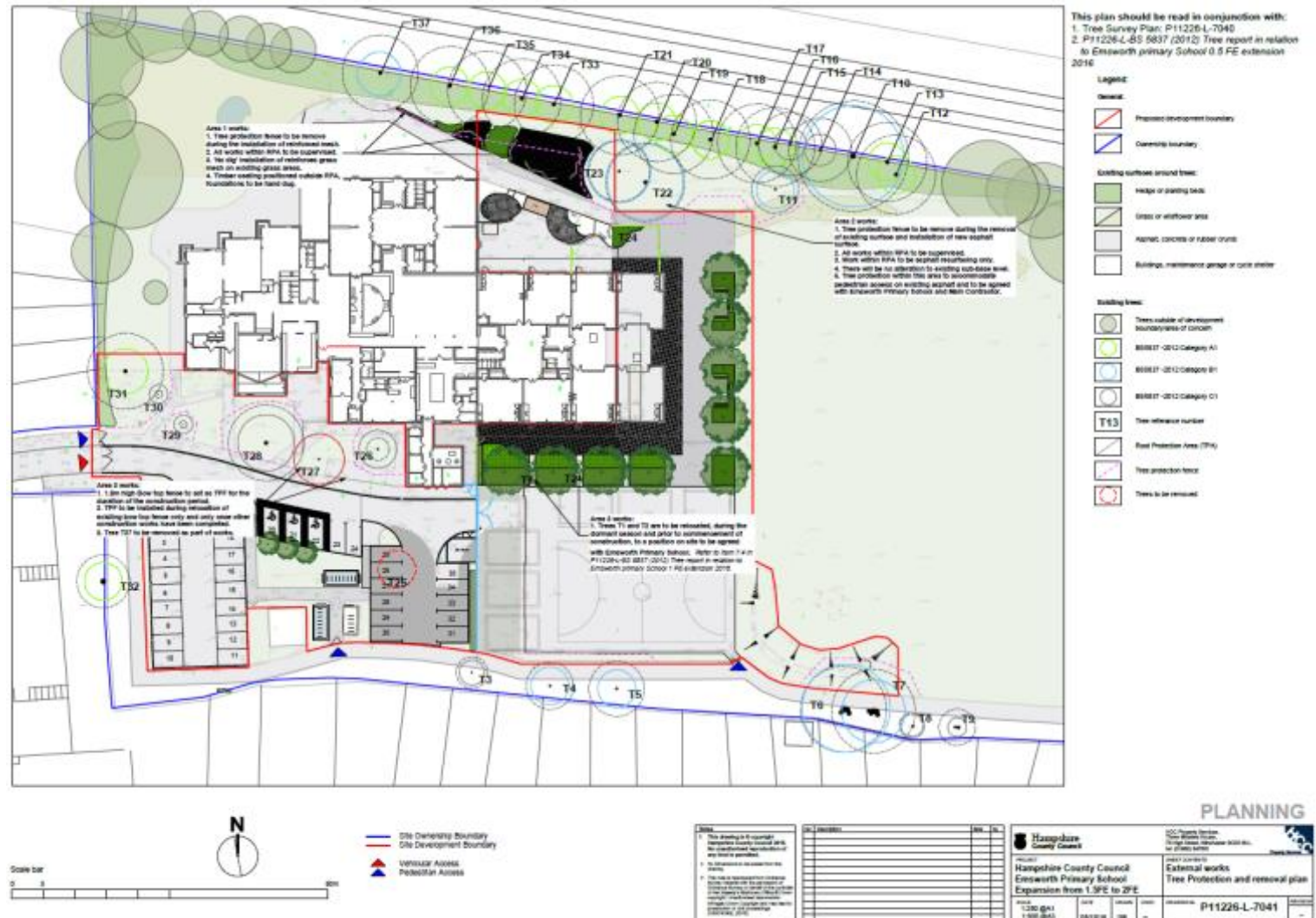
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Drawing 3: Tree Protection
and Removal Plan

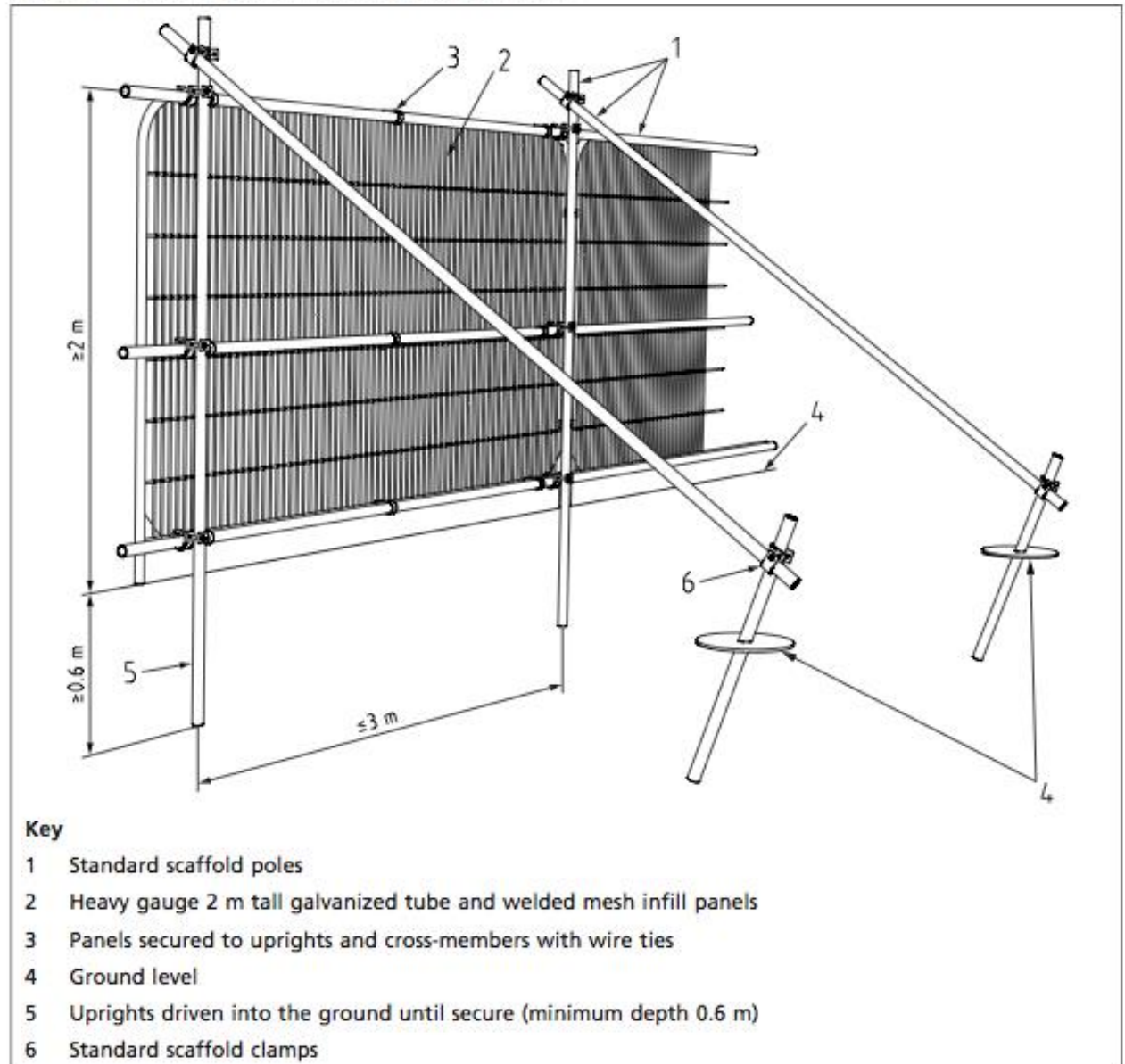


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Figure 2 Default specification for protective barrier



Document Reference:

Procedure / Process:

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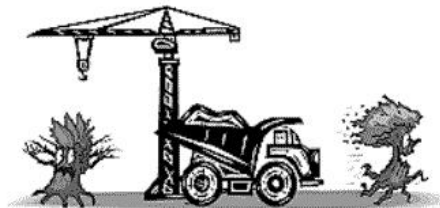
Appendix 3: INFORMATION

Poster: Construction and trees

Poster: Common causes of tree death

Sign: Root Protection Area

Construction and Trees



Why Is Fencing Erected Around Trees?

1. The major cause of damage to trees on construction sites is due to **soil compaction**.
2. Roots use the spaces between soil particles to obtain Oxygen, Water and Nutrients.
3. Heavy plant and machinery compresses (compacts) the soil, squashing out the air spaces and preventing root function.
4. A compacted soil structure will stay compacted.
5. Consequently the tree suffers and will show signs of branch die-back.
6. Symptoms such as die-back may take several years to appear.
7. Soil compaction over roots can be prevented by maintaining a fenced exclusion zone over the tree roots.
8. The exclusion zone distance is calculated using British Standard 5837.
9. Protective Fencing is installed at the calculated distance.
10. Protective Fencing is a condition of planning approval, if it is removed or repositioned the construction firm is in breach of a condition and may be subjected to legal action.

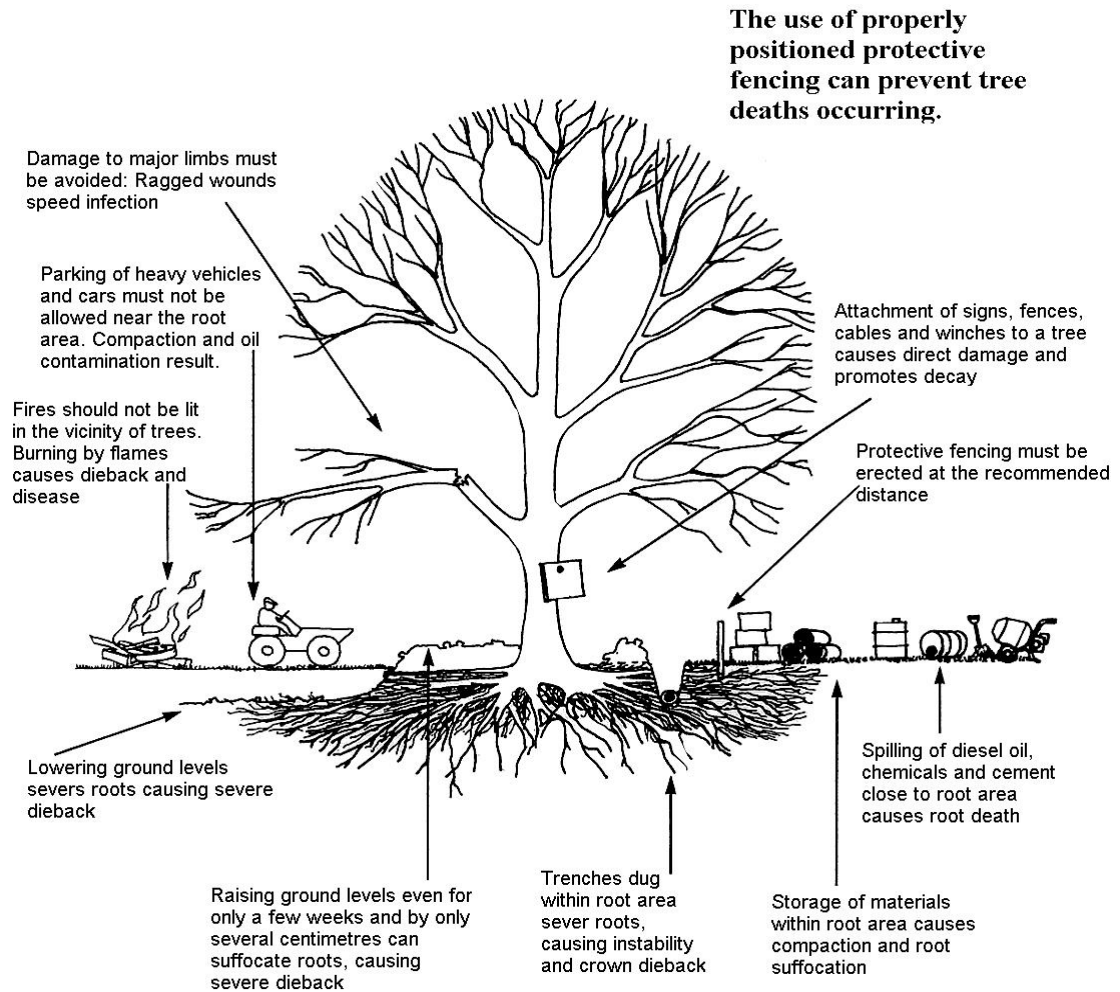
COURTESY OF ARBORICULTURAL INFORMATION EXCHANGE

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Common causes of Tree Death



Please use copies of this as an on-site poster for personnel



COURTESY OF ARBORICULTURAL INFORMATION EXCHANGE

A3 laminate signs such as the example below must be erected on tree protective fencing every 5m at a height of 1.2m



COURTESY OF ARBORICULTURAL INFORMATION EXCHANGE