

*BS5837:2012 Trees in relation to
design, demolition and construction*

Barnsley College,
Carrington Avenue,
Barnsley S75 1AT

2nd June 2014



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Contents	1. Introduction	2
	2. Data Collection	4
	3. Arboricultural Appraisal	6
	4. Arboricultural Impact Assessment	9
	5. Conclusions	11
	6. Recommendations	12
	7. Bibliography & Qualifications	13
	8. Tree Data Schedule	14
	9. Tabulated Tree Data Schedule	17

Appendices	Appendix A- Development within the root protection zone	19
	Appendix B– Site Plan	21
	Appendix C - Tree Protection Plan	22
	Appendix D –Temporary fencing	23

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1. Introduction

1.1 BRIEF

1.1.1 This report has been commissioned by Rebekah Pittard of Capita, 17 New Preston Road, Blackburn, BB2 1AU. We have been instructed to provide a report for the following site: Barnsley College, Carrington Avenue, Barnsley S75 1AT.

1.1.2 The report is required to address the following points of reference:

- To carry out a tree survey of the working areas on site and prepare a report and schedule classifying trees according to their suitability for retention.
- Carry out an Arboricultural Impact Assessment (AIA).
- Provide a Tree Protection Plan (TPP) detailing Root Protection Areas.
- Provide an Arboricultural Method Statement.

1.2 SCOPE OF THE REPORT

1.2.1 The tree positions included on the plans in the Appendices have not been plotted as part of a topographical land survey. These stem locations have been positioned without the use of electronic measuring equipment, using local landmarks as a reference and a tolerance of +/- 1m has been given to allow for measurement inaccuracies.

1.2.2 The trees on the site were surveyed from ground level using the Visual Tree Assessment methodology (*Ref. Body Language of Trees by C. Mattheck*). None of the trees were climbed as part of this survey.

1.2.3 This report details the trees (on the site) that will have an influence on the development. Trees under 75mm in diameter have not been included in this survey (in accordance with BS 5837:2012 section 4.2.4 b). The surveyed trees are listed in the schedule in section 9 of this report.

1.2.4 No invasive decay testing equipment was used as part of this survey.

1.3 RELEVANT BACKGROUND INFORMATION

- 1.3.1 It has not been confirmed if there is a Tree Preservation Order (TPO) in effect on the trees on site or if the site is within a Conservation Area.

1.4 QUALIFICATIONS

- 1.4.1 I have based this report on my site observations and the information provided and I have come to the conclusions in the light of my experience. My qualifications include a Foundation Degree in Arboriculture. In addition I have experience in the utilities arboriculture industry, am a professional member of the Arboricultural Association and maintain an active continuing professional development programme. A detailed list of my Qualifications has been included in Section 7.

2. Data Collection

2.1 SITE VISIT

- 2.1.1 A site visit was carried out by the Author on Monday the 2nd of June 2014. The weather was suitable for undertaking a tree survey being dry and bright. Access to all parts of the site was possible. The extent of the survey area is indicated on the site plan in Appendix B.

2.2 SITE DESCRIPTION

- 2.2.1 The surveyed area is Carrington Avenue Playing Field in Barnsley. It is located approximately 3/4 of a mile North of Barnsley town centre.
- 2.2.2 Carrington Avenue forms the boundary to the West of the site and Honeywell Lane to the South of the site.
- 2.2.3 To the East of the site is a railway line. The properties in the immediate area are mainly residential.

2.3 DATA COLLECTION AND SCHEDULE

2.3.1 The data collected was recorded on pre-printed data collection sheets. The detailed results can be found in the tabulated survey schedule in Section 9. The recorded data categories have been summarised in the list below:

- tree location, measured from known datum points, and plotted on the site plan
- tree number is prefixed by a 'T' for individual trees ('G' for groups of trees and 'H' for hedges)
- tree species
- tree height
- trunk diameter, measured at 1.5m from the surrounding ground level and at the base for multi-stemmed trees
- tree crown spread in the four cardinal directions
- height from existing ground level of the first prominent branch and the direction of growth
- height of the lowest part of the crown above existing ground level
- relative vigour and vitality of the tree
- tree age classification
- the considered amenity value of the tree
- comments on notable conditions, problems, or peculiarities to do with the tree
- tree retention category in accordance with BS5837:2012 section 4.5

2.3.2 The information was manually recorded using the data sheets described.

3. Arboricultural Appraisal

3.1 BS 5837 RETENTION CATEGORIES

- 3.1.1 BS 5837 recommends in clause 4 that trees be evaluated and categorised according to their 'Retention Value'. These values are detailed in the Tree Data Survey Schedule and the pre-development values are summarized below. 19 individual trees, 1 group and 2 hedgerows have been recorded by the surveyor as having the potential to be affected by the proposed development.
- 3.1.2 The trees on the site have mainly established by self-seeding themselves around the playing field edge. A formal hedge and a small group of mature trees is located in the South. The trees were found to be in good condition with evidence of pruning to T1-T9 and T14-T18. A full schedule of the tree stock can be found in Section 9.
- 3.1.3 It is recommended that ivy be removed from tree stems so that future tree inspectors can view stem and branches for defects.
- 3.1.4 T16-T18 and T20 branches were found to be blocking the streetlamps lighting arcs therefore these limbs should be reduced or removed as appropriate .
- 3.1.5 T13 was found to have evidence of structural crack on a scaffold limb while at present there does not appear to be a significant risk of failure it is recommended that this be monitored on a regular basis and the ivy be severed to improve visibility.



Crack to bark on scaffold limb of T13

- 3.1.6 To the East of H10, on the adjacent railway embankment are several sycamore and oak trees; there is a difference in levels between the playing field and the embankment where the trees are located. These trees are unlikely to be affected by any development on the site due to the level change which has not been measured; any RPA/Temporary Protective Fencing for H10 would afford protection for these trees.



Sycamore adjacent to H10 are on adjacent railway site

- 3.1.7 T19 is small self-seeded tree growing through the fence and the removal of this tree is recommended to abate any the likely damage to the fence.. T14-G21 are all growing along the site boundary behind the fence; in the long-term it may be better to either remove these trees or consider moving the fence. T11 is growing close to a boundary fence and felling in the mid to long-term should also be considered for this tree.

4. Arboricultural Impact Assessment

- 4.1.1 The impact assessment is based upon the design proposal supplied which is shown in Appendix B. Note if the finalised proposal is radically different from that previously supplied the impact assessment will need to be reviewed.
- 4.1.2 After studying the proposed layout, it is thought that all trees recorded within the site can be retained (with the exception of T19 which should be removed on the grounds of good Arboricultural management) without a significant impact on tree health. Temporary Protective Fencing (as shown in Appendix D) should be erected as shown on the Tree Protection Plan – the fencing need only be placed around T1-T12. Fencing around T13-G21 is not thought necessary as the trees are growing at the top of an embankment and this will afford the trees ground protection.



Trees along East boundary growing at the top of embankment

- 4.1.3 Access onto the site will be gained through the RPA of H22; this is not thought to be an issue and protective fencing is not proposed for H22.

- 4.1.4 As no trees are being removed, mitigation planting is not proposed. However, additional tree planting along the embankment on the eastern side of the site will provide screening and additional visual interest in the local area.

5. Conclusions

- 5.1 There are 19 individual trees, 1 group and 2 hedgerows recorded on site. Individual trees (T); 1 Category U tree, and 18 Category C trees.
- 5.2 1 Category C group was recorded. Hedges (H); 1 Category C and 1 Category B hedge.
 - 5.2.1 It is thought that none of the recorded trees need to be removed to facilitate the proposal.
 - 5.2.2 Works recommended for all trees should be carried out regardless of whether the proposed development goes ahead or not in the interests of good arboricultural management.
 - 5.2.3 Temporary protective fencing should be erected around the retained trees as shown on the Tree Protection Plan (TPP) in Appendix C.
 - 5.2.4 Tree planting post development will provide a significant enhancement to the scheme and off offset the loss of trees proposed for removal.



Signed by David Holmes on behalf of Capita

6. Recommendations

6.1 MANAGEMENT WORKS RECOMMENDATIONS

6.1.1 The following works are recommended to minimise the risk to the users of the site and to maintain the trees in good Arboricultural management. These works should be carried out regardless of whether the development goes ahead or not.

Tree / Group No	Recommended works	Work Priority
T9	Monitor	5
T13	Sever ivy at the base of tree / monitor	5
T14	Sever ivy at the base of tree	5
T15	Sever ivy at the base of tree	5
T16	Reduce back from streetlamp	4
T17	Reduce back from streetlamp	4
T18	Reduce back from streetlamp	4
T19	Fell	4
T20	Reduce back from streetlamp	4
G21	Monitor	5

6.1.2 Works priority reflects the level of risk posed by the tree and is included to inform the client of which trees require works as a priority. Priority 1 trees present a high risk to site users, priority 5 tree present a low risk.

6.1.3 Taking into account the likely level of use of the site, it is strongly recommended that the trees on the site are monitored on a regular basis, especially after stormy weather, for signs of crown, trunk, and root damage.

6.1.4 All tree work should be carried out to BS3998:2010 *Recommendations for tree work*.

6.1.5 Tree maintenance can be a hazardous profession, so it is important that all operatives have the necessary and relevant training, health and safety and insurance certification

7. Bibliography & Qualifications

7.1 BIBLIOGRAPHY

B.S.5837:2012 *Trees in relation to design, demolition and construction – Recommendations*. BSI Publications.

B.S.3998:2010 *Recommendations for tree work*. BSI Publications

QUALIFICATIONS

Tree Related Qualifications:

- ♦ Professional Member of the Arboricultural Association (M.Arbor.A)
Professional membership from 2008.

- ♦ Foundation Degree in Arboriculture (FdSc Arb)
This is considered to be a competent level of knowledge and education for Arboricultural consultants. Studied at Myerscough College, University of Lancashire, Bilborough. Three year full-time course - *Graduated 2008*.

Other Professional Qualifications

- ♦ Quantified Tree Risk Assessment
Training and Licensing - *November 2008* (updated September 2010 and October 2012 and November 2013)

- ♦ A Practitioners Guide to Visual Tree Analysis
Training and Licensing - *March 2009* (updated October 2012)

8. Tree Data Schedule

EXPLANATORY NOTES FOR TREE DATA SCHEDULE

- The tree locations have not been plotted as part of a land survey/topographical survey. These stem locations have been positioned without the use of electronic measuring equipment. The accuracy given for the tree stem locations is $\pm 1\text{m}$.
- The tree species is given in the common name
- The tree height is measured using geometrical similar triangles methodology, and is given an accuracy of $\pm 2\text{m}$.
- The trunk diameter is measured at 1.5m from the surrounding ground level. The accuracy is given as $\pm 50\text{mm}$.
- The tree crown spread is measured at the four cardinal directions. The accuracy for the measurement is given as $\pm 1\text{m}$
- The height of the first significant branch is given an accuracy of $\pm 0.5\text{m}$
- The height of the lowest branch in the crown is given an accuracy of $\pm 500\text{mm}$
- The Maturity is defined as follows;
 - Y- Young; establishing trees, should be fast growing, primarily in height than spread but only having a limited impact upon the landscape.
 - EM- Early Mature; established young trees should be fast growing, primarily in height than spread but having some impact upon the landscape.
 - M- Mature; well established trees still developing with some vigour but now have filled out, increasing in crown spread. In middle or half of useful life expectancies
 - OM- Over Mature; fully mature with declining vitality and likely to have features that could be regarded as potential faults, such as large ponderous branches and old wounds. Likely also to have high visual amenity value
 - V- Veteran tree which can survive for many years, with health growth continuing although the tree may be of low vitality. Crown size is usually reducing through natural branch loss or tree management. Sites of decay are normally present which may represent a hazard to public or property. These trees have high conservation or historic or amenity value.
- **The physiological condition:** is an assessment of relative vitality of the tree are indicated by Dead; Poor; Fair; and Good. Dead or Moribund growth / dead; Poor = low vigour and declining growth, many dead twigs and branches within the outer crown; Fair = normal growth and twig extension; Good = very good growth extension, normally found in young and young mature specimens.

- **The structural condition:** Is an assessment of the condition of the structural form of the tree which includes the branching system and stem and buttresses. Good; no obvious structural defects; basically a sound tree. Fair; minor or potential incipient defects that may require remedial tree work to reduce the risks to public safety. Poor; defects that are likely to result in actual failure in the medium to long term, not foreseeable in the short term. OD Obvious defects; the tree has already suffered significant level of structural failure and is at risk of collapse in whole or part in the short term.

COMMENTS: Notes the condition, problems, or peculiarities to do with the tree.

LIFE EXPECTANCY: An estimate of the length of time in years that a tree might be expected to continue to make a useful contribution to the locality at an acceptable level of risk (based on an assumption of continued maintenance). <10 = Less than 10 years; 10-20 = 10 to 20 years; 20-40 = 20 to 40 years; 40+ = more than 40 years.

RETENTION CATEGORY: Trees are classed as category U, A, B or C, based on criteria given in BS5837:2012; summary definitions as follow (see BS5837 for further details). Categories A, B and C are further characterised by the use of sub-categories: (1) refers to qualities of the tree of an arboricultural nature, (2) indicates qualities concerned primarily with their situation within the landscape and (3) refers to other values such as those of a cultural, historic or ecological nature. Examples of these qualities for each of the three categories are given below, although these are indicative only.

U UNSUITABLE TREES (●): Defective, poor or negligible specimens, not worthy of retention within a developed site. Trees whose existing value would be lost within 10 years, or which should be removed on grounds of sound Arboricultural management (e.g. trees that will be left unstable by other essential works; poor quality that are trees suppressing better specimens.)

A HIGH RETENTION VALUE (●): Important or valuable trees or groups of trees that are likely to make a substantial contribution to the locality for 40 years or more.

Notably fine specimens; rare or unusual specimens; essential component trees within groups, semi-formal or formal plantings (e.g. dominant trees within an avenue etc.)

Trees, groups or woodlands of particular screening benefit in relation to views into and out of the site; those of notable visual importance (including avenues & other features that may be assessed collectively as groups)

Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees)

B MODERATE VALUE (●): Trees or groups of some importance and likely to make a significant contribution for in excess of 20 years.

Fair quality but not notably fine; good specimens showing some impairment (e.g. remediable defects, minor storm damage or poor past management.)

Numbers of trees, groups or woodlands forming distinct landscape features that are of higher collective value than they would warrant as individuals (e.g. non category A trees within avenues).

Also trees internal to the site that are of little visual impact within the wider locality.

Trees, groups or woodlands with clearly identifiable conservation or other cultural benefits.

C MINOR VALUE (●): Trees or groups of rather low quality, but capable of retention for at least approx. 10 years, e.g. until new planting is established. Also small, young trees (below 15cm diameter) whose loss would be easily mitigated by new planting, or which would be capable of transplanting.

Retainable (for the present), but not trees that represent a significant constraint

Secondary specimens within groups or woodlands whose loss would not greatly diminish their landscape value; trees providing only minor or short term screening benefit

Trees with very limited conservation or other cultural benefit.

ROOT PROTECTION AREA (RPA): This is the area in square metres formed by a circle of radius (the Protection Radius) twelve times the effective stem diameter of the tree. For multi-stemmed trees, trees with two to five stems are calculated by measuring each stem at 1.5m, squaring these dimensions and adding them together to give a compound measurement. Trees with more than five stems are calculated by measuring each stem at 1.5m, a mean average is taken from these dimensions which is squared and then multiplied by the number of stems. The RPA represents the minimum area of soil that the tree requires to support a healthy and effective root-system and is the basis whereby the layout of the Construction Exclusion Zone (CEZ) is determined. This should encompass an area equal to the RPA but its form may be adapted in the light of Arboricultural considerations and pre-existing physical constraints. The CEZ should be protected by sturdy temporary fencing (see BS5837:2012) throughout the entire process of site preparation and construction.

9. Tabulated Tree Data Schedule

Tree / Group No.	Species	Height	Dia @ 1.5m	Crown Spread				First Branch Height/Direction	Crown Clearance	Age Class	Physiological Condition	Structural Condition	Management Recommendations	Remaining Contribution	Retention Category
				N	E	S	W								
T1	Lime (<i>Tilia spp.</i>)	12	480	3	5	3	3	2:E	2	Mature	Good	Good - minor crossing branches / damaged roots / horse chestnut scale	No works required	10-20	C1
T2	Lime	12	300	3	5	3	3	1:E	2	Mature	Fair	Fair - multi-stemmed / included union / exposed & damaged roots / horse chestnut scale	No works required	10-20	C1
T3	Lime	12	380	3	3	4	3	2:N	2	Mature	Good	Good - minor crossing branches / horse chestnut scale	No works required	10-20	C1
T4	Lime	12	460	5	5	3	5	4:E	0	Mature	Good	Good - minor crossing branches / exposed & damaged roots / horse chestnut scale	No works required	10-20	C1
T5	Lime	12	430	5	5	6	3	3:E	0	Mature	Good	Good - minor crossing branches / horse chestnut scale	No works required	10-20	C1
T6	Alder (<i>Alnus spp.</i>)	12	340	3	3	4	4	5:N	2	Early Mature	Good	Fair - cranked stem	No works required	10-20	C1
T7	Ash (<i>Fraxinus excelsior</i>)	12	400	5	5	5	5	3:S	2	Early Mature	Good	Fair - cranked stem / reduced in past	No works required	10-20	C1
T8	Ash	12	470	6	5	5	4	2:N	1	Mature	Good	Fair - minor crossing branches / reduced in past	No works required	10-20	C1
T9	Ash	12	370	5	5	5	6	3:S	1	Early Mature	Good	Fair - cracked & occluded bark / reduced in past	Monitor	10-20	C1
H10	Hawthorn (<i>Crataegus monogyna</i>)	2.5	≤ 200	0.5	0.5	0.5	0.5	0:N	0	Mature	Good	Good - well maintained hedge	No works required	20-40	B2
T11	Lime	10	380	4	5	1	5	3:S	0	Early Mature	Good	Good - close to fence (consider felling in mid-term)	No works required	10-20	C1

Tree / Group No.	Species	Height	Dia @ 1.5m	Crown Spread				First Branch Height/Direction	Crown Clearance	Age Class	Physiological Condition	Structural Condition	Management Recommendations	Remaining Contribution	Retention Category
				N	E	S	W								
T12	Birch (<i>Betula spp.</i>)	10	300	1	5	4	5	3:E	1	Mature	Good	Fair - suppressed by T11 / large pruning wound on East of stem	No works required	10-20	C1
T13	Sycamore (<i>Acer pseudoplatanus</i>)	14	670	7	5	8	7	2:E	4	Mature	Good	Fair - crack in bark on scaffold limb / ivy cover	Sever ivy / monitor	10-20	C1
T14	Ash	16	430	5	6	3	6	2:N	5	Mature	Good	Fair - co-dominant / ivy cover	Sever ivy	10-20	C1
T15	Ash	16	360	4	6	6	5	2:N	5	Mature	Good	Fair - co-dominant / ivy cover	Sever ivy	10-20	C1
T16	Sycamore	12	530	6	5	5	5	2:N	5	Mature	Good	Fair - blocking streetlamp / horse chestnut scale	Reduce back from streetlamp	10-20	C1
T17	Sycamore	11	350	4	4	5	4	1:N	4	Early Mature	Good	Fair - blocking streetlamp / horse chestnut scale	Reduce back from streetlamp	10-20	C1
T18	Sycamore	16	520	7	6	6	7	2:N	5	Mature	Good	Fair - encroaching towards streetlamp / horse chestnut scale	Reduce back from streetlamp	10-20	C1
T19	Sycamore	6	120 e	2	2	2	2	0:N	0	Young	Good	Fair - multi-stemmed / growing through fence / horse chestnut scale	Fell	<10	U
T20	Sycamore	15	320	5	5	4	6	1:N	5	Early Mature	Good	Fair - co-dominant / blocking streetlamp / horse chestnut scale	Reduce back from streetlamp	10-20	C1
G21	Sycamore / Hawthorn	14	≤ 300	1	4	2	4	0:N	0	Early Mature	Good	Fair - co-dominant / horse chestnut scale	Monitor	10-20	C2
H22	Leyland cypress (x Cupressocyparis 'Leylandii')	9	≤ 250	1	0.5	1	0.5	0:N	0	Early Mature	Fair	Fair - planted as formal hedge	No works required	10-20	C2

Appendix A - Development within the root protection zone

A.1 Development within the root protection area

A.1.1 The zone of influence for the rooting area of a tree has been determined using the calculation outlined in Table 2, of section 4.6 of BS5837:2012 Trees in relation to construction – Recommendations. This calculation utilises the diameter of the trunk, at a height of 1.5m from the surrounding ground level; and calculates the Root Protection Area (RPA) by multiplying the diameter by a value of 12; the result is then used to calculate the total area (m²) of the RPA.

A.1.2 The table below shows the RPA for the trees on the site; these have been illustrated on the Tree Protection Plan (TPP) in Appendix C.

A.1.3 Individual trees

Tree Identification Number	Tree Diameter @1.5m (in mm)	RPA Radius (m)	RPA (m ²)
T1	480	6	113
T2	300	3.6	41
T3	380	4.8	72
T4	460	5.4	92
T5	430	5.4	92
T6	340	3.9	48
T7	400	4.8	72
T8	470	5.4	92
T9	370	4.2	55
H10	≤ 200	2.4	N/A
T11	380	4.8	72
T12	300	3.6	41
T13	670	7.8	191
T14	430	5.4	92
T15	360	4.2	55
T16	530	6.6	137
T17	350	4.2	55
T18	520	6	113
T19	120 e	1.2	5

Tree Identification Number	Tree Diameter @1.5m (in mm)	RPA Radius (m)	RPA (m ²)
T20	320	3.6	41
G21	≤ 300	3.6	N/A
H22	≤ 250	3	N/A

A.1.4 These values indicate the soil around the base of the tree to be retained undisturbed. Radius measurements should be taken from the main stem of each tree in the group. This area should be protected with vertical barriers and considered sacrosanct. Signs should be erected on the fencing to indicate that the area is a Construction Exclusion Zone (CEZ).

A.2 Barriers, ground protection and construction within the RPA

A.2.1 Section 7.4 of BS5837:2012 outlines the design of vehicular access in proximity to trees. Any design within this area should be constructed with a no-dig design, to avoid root loss or damage due to excavation.

A.2.2 The surfacing should ideally incorporate a 3D cellular confinement system, which is capable of evenly distributing the weight of traffic regularly accessing the site. The site specific requirements will require the involvement of a structural engineer and an Arboriculturist in order to ensure it is fit for purpose. The driveway hard surfacing should have a permeable, gas-porous finish.

Appendix B – Site Plan

Red line indicates survey area (with overlay of site proposal)



Appendix C - Tree Protection Plan

Drawing number :- "CARRINGTON_AVENUE_TPP_O1_REV1"

(see attached sheet for scaled plan)

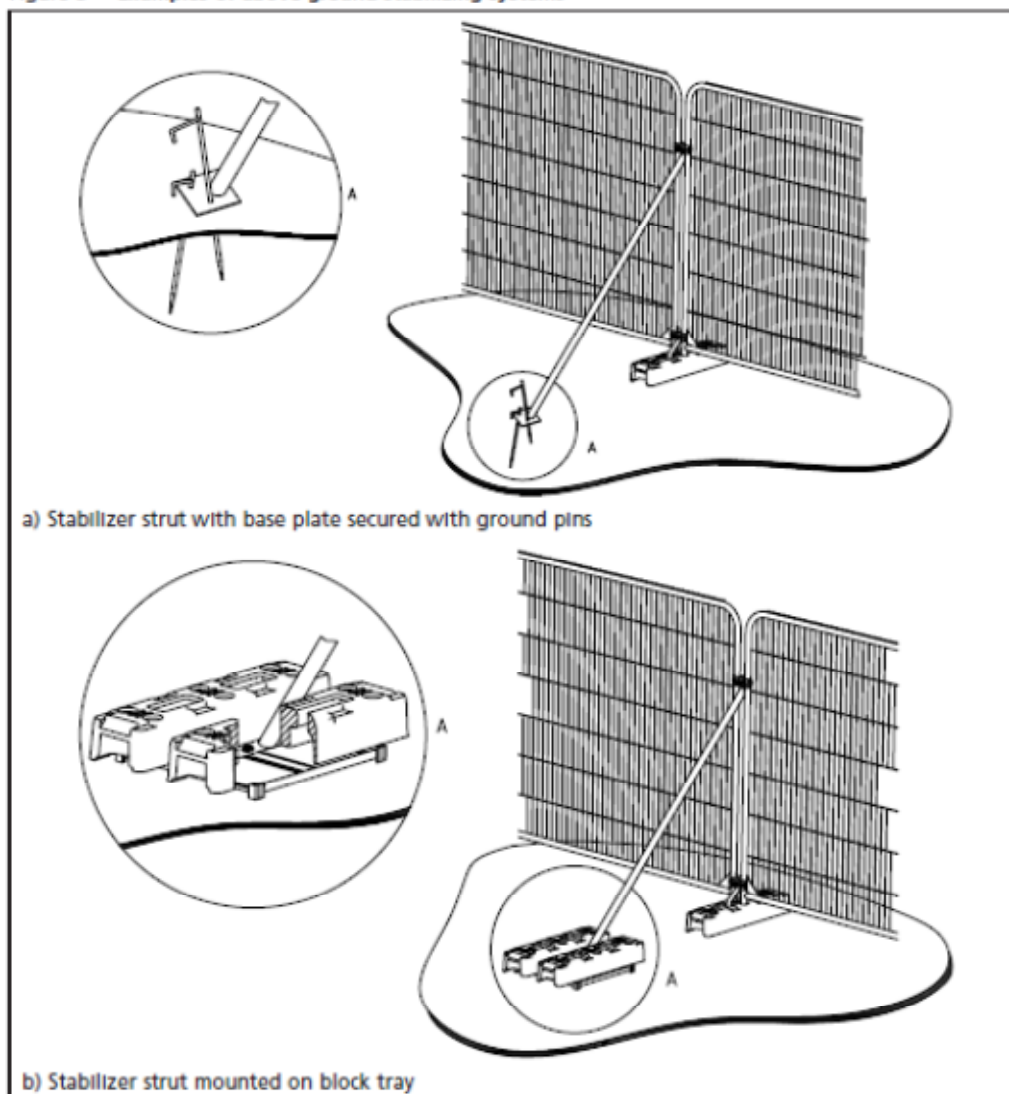


Appendix D –Temporary fencing

BRITISH STANDARD

BS 5837:2012

Figure 3 Examples of above-ground stabilizing systems



Temporary fencing using above ground stabilisation



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