



# SJ Stephens Associates

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## Arboricultural Impact Assessment

- Tree Survey
- Tree Protection Plan
- Arboricultural Method Statement

### At:-

Brunel University  
Kingston Lane  
Hillingdon  
UB8 3PH

### On behalf of:-

Brunel University  
c/o Gray Baines & Shew  
St Thomas House  
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### Prepared by:

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Survey Date: 10<sup>th</sup> December 2015  
Report Date: 23<sup>rd</sup> December 2015  
Project no: 853

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- A Site Plan: drawing no: 853-02**
- B Tree Schedule**
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- D Tree Protection Fencing Detail**

## **1 BACKGROUND**

- 1.1** This Arboricultural Impact Assessment relates to the proposed construction of new car parking spaces, where close to trees. It has been instructed by Gray, Baynes and Shew Architects on behalf of the university.
- 1.2** The tree survey was undertaken, and this report has been prepared, by Simon Stephens MA Oxon, Dip Arb (RFS), MArborA, C Env, MICFor a Registered Consultant with the Arboricultural Association, with over 20 years relevant experience.
- 1.3** This survey and report have been prepared in accordance with recommendations provided in BS 5837:2012, Trees in Relation to Design, Demolition and Construction - Recommendations.
- 1.4** Documentation supplied:
  - Topographical Survey
  - Proposed Site Layout drawings

## **2 SURVEY DETAILS AND SCOPE**

- 2.1** The site survey included trees and shrubs, within influencing distance of the proposed development, with a stem diameter over 75mm at 1.5m height, located within the area shown on the plan included as Appendix A.

**2.2** Tree inspection took place from ground level with the use of binoculars, sounding hammer and metal probe using the Visual Tree Assessment method (Mattheck & Breloer 1994). The presence and condition of bark and stem wounds, cavities, decay, fungal fruiting bodies and any structural defects that could increase the risk of structural failure were noted.

**2.3** Tree details have been added to the plan received which is included as Appendix A. Tree locations have been taken from the topographical survey provided. Where not included on the topographical survey, they have been determined by measuring distances from features shown on the plan, using a laser measuring device. The following information was recorded for each tree, and is shown in the Tree Schedule included as Appendix B:

- **Number:** an identity number for each tree, prefixed with a "T", which cross references locations shown on the plan with the schedule in Appendix B. Where a number of trees, normally of the same species, are located close together and are similar in character and requirements, they have been treated as a Group under a single Number, prefixed with a "G".
- **Species:** common name.
- **Tree height:** approximate height in metres.
- **Stem diameter:** diameter in millimetres, taken at 1.5m above ground. Where there are a number of stems, stem diameters are recorded in the condition column.
- **Branch spread:** approximate spread in metres to N,S,W and E of the trunk. The approximate branch spread is drawn on the plan.
- **Canopy clearance:** approximate height of the canopy above ground. Where a significant, low lateral branch is present, its height and direction of growth is included in the Condition column.
- **Age class:** Young, Semi-mature, Early mature, Mature, Over-mature, Veteran.
- **Physiological Condition:** Good, Fair, Poor, Dead.
- **Condition:** features that affect the safe useful life expectancy and amenity of the tree, including the presence of decay or any physical defect.
- **Management Recommendations:** recommendations to ensure the health and safety of the tree, within the future development.
- **Estimated Remaining Contribution:** <10 years, 10+ years, 20+ years, 40+ years.
- **Category grading:** tree classification taken from BS 5837:2012, Trees in Relation to Construction (see Appendix C for details), as follows:
  - Category U: Unsuitable for retention, trees with less than 10 years life expectancy, normally recommended for removal (Red)
  - Category A: high quality trees, able to make a substantial contribution for at least 40 years. (Green)
  - Category B: moderate quality trees, able to make a significant contribution for at least 20 years. (Blue)
  - Category C: low quality, in adequate condition to remain for at least 10 years, or young trees <150mm stem diameter.(Grey/Uncoloured)

For category A, B and C trees, a subcategory has been allocated, providing information on the reasons for selection of a specific category, as follows:

- Subcategory 1: mainly arboricultural values.
  - Subcategory 2: mainly landscape values.
  - Subcategory 3: mainly cultural values, including conservation.
- Trees have been classified irrespective of the possible proximity to future construction. The BS5837 category is colour coded, as indicated above, on the plan included as Appendix A.
  - **Protection Distance:** the protection distance in metres required to provide the Root Protection Area recommended in BS 5837, assuming a circular area centred on the tree.
  - **Root Protection Area (RPA):** the area in m2, as recommended in BS5837, to provide sufficient rooting area to ensure tree survival and which, in most situations, should be fenced off to prevent root damage from construction activities.

### 3 SURVEY LIMITATIONS

- 3.1 No internal decay devices, or other invasive tools to assess tree condition, were used.
- 3.2 No soil excavation or root inspection was carried out.
- 3.3 This survey has not considered the effect that trees or vegetation may have on the structural integrity of future building through subsidence or heave.
- 3.4 The tree survey has been undertaken principally for planning purposes. Although any obvious structural defects have been noted, a full Tree Hazard Assessment has not been carried out.

### 4 FINDINGS AND PROPOSALS

#### 4.1 Site Overview

- 4.1.1 The proposal is to construct new parking bays adjacent to the Brunel Motorsport building and off Borough Hall Road, where shown on the Tree Protection Plan included as Appendix A.
- 4.1.2 In both cases construction will take place adjacent to existing trees, hence the need for an Arboricultural Impact Assessment.

## 4.2 Tree Work

- 4.2.1 Details of proposed tree works are included in the Tree Schedule included as Appendix B.
- 4.2.2 Two trees are proposed for removal, as detailed in section 5.1 below.
- 4.2.3 All tree work should be undertaken to the standards set out in BS 3998:2010 British Standard Recommendations for Tree Work.

## 4.3 Tree and Root Protection

- 4.3.1 Root Protection Areas are shown for all trees in the tree schedule attached as Appendix B. They are also shown for all retained trees, as circular areas centred on the trunk, on the Tree Protection Plan enclosed as Appendix A. This shows the distance that construction must normally be kept back from a tree, to provide the Root Protection Area recommended in BS 5837.
- 4.3.2 The location of Tree Protection Fencing is shown on the drawing attached as Appendix A. This provides full protection of all Root Protection Areas, other than for:
  - Tree number T5, where No-Dig Construction must be used, as described in section 4.4 below, to protect underlying roots.
  - Tree number T7, where a Ground Protection Area has been defined, and roots must be protected as described in section 4.5 below.
- 4.3.3 Tree Protection Fencing must be from weldmesh panels, at least 2m high, securely fixed, with wire or scaffold clamps, to a rigid framework. This framework must be constructed from scaffold tubes with vertical tubes, at a maximum interval of 3m and driven into the ground at least 0.6m. The structure must be well braced to resist impacts, constructed as per Figure 2 of BS5837:2012, which is reproduced as Appendix D.
- 4.3.4 After erection of Tree Protection Fencing, 2 days notice must be given to the Local Planning Authority before any construction, **including any ground work**, starts on site. Tree Protection Fencing must be maintained and retained for the duration of the works, or until such time as agreed in writing with the Local Planning Authority.
- 4.3.5 Notices must be fixed to the Tree Protection Fencing stating:- “Tree Protection Fencing – No construction activity to take place within this area”.

## 4.4 No-Dig Construction Areas

- 4.4.1 The No-Dig area, shown shaded cyan on the Tree Protection Plan included as Appendix A, must be constructed without excavation apart from the removal of turf/organic matter, which should be carried out by hand. Excavators, dumpers and other site traffic must not be allowed to track on the No-Dig areas until roots are protected by the No-Dig surfacing.
- 4.4.2 Engineering details for sections of No-Dig construction must avoid localised compaction, using both a two dimensional geogrid, and a three dimensional cellular confinement system as integral components of the sub-base. A typical section is shown on the drawing included as Appendix A. As well as being fit for purpose, the design and methodology must protect tree roots, by ensuring the following:-
- topsoil/turf must be removed carefully by hand to a maximum of 75mm, or less if roots are found nearer the surface.
  - following leveling with soil or sand, a permeable, non-woven geotextile membrane, must be laid.
  - a suitable two dimensional geogrid, such the TriAx Geogrid supplied by Tensar International ([www.tensar.co.uk](http://www.tensar.co.uk)). or LBO220 Bi-orientated Geogrid supplied by Geosynthetics Ltd ([www.geosyn.co.uk](http://www.geosyn.co.uk)), must be laid over the entire area and underneath the edging.
  - pressure treated timber edging boards, supported by driven stakes must be used.
  - a suitable cellular confinement system must then be constructed to manufacturers instructions on top of the geogrid. Products that might be considered include Geoweb, supplied by Cooper Clarke Group Ltd (01204 862 222) or Cellweb, supplied by Geosynthetics Ltd (01455 617 139).
  - the cellular confinement system must be filled with clean (no fines), washed angular, 40/20mm, stone to provide load support, while allowing air and moisture to permeate to the root zone.
  - a further permeable, non-woven geotextile membrane, such as TreetexT300, or an alternative approved product which has similar oil trapping qualities, must be laid over the cellular confinement system.
  - a porous, surfacing material, free from contaminants, must then be laid. Either sand bedding and block paving, or gravel, would be suitable.
  - removed turf/topsoil can be used to grade surrounding ground levels.
- 4.4.3 No-Dig construction will result in an increase in levels. This must be fully taken account of in all other aspects of the design. Since the ground slopes gently down from the kerb in this area, this is unlikely to be a problem.

## **4.5 Ground Protection Areas**

- 4.5.1 The Ground Protection Area shown shaded yellow on the Tree Protection Plan, can be used for parking of cars and vans during construction, however lorries must not be permitted to track on this area. No excavation beneath the existing sub-base must be permitted in this area.

## **4.6 General measures**

- 4.6.1 No construction activity whatsoever must be allowed within Root Protection Areas, other than that specifically described above. On no account must these areas be used for routing of underground services, storage of materials or on-site parking.
- 4.6.2 No mixing of cement, or concrete, or storage of fuel must take place within 10m of retained trees, nor in any position where the slope of the ground could lead to contamination of the Root Protection Area.
- 4.6.3 Fires must not be lit in a position where their flames could extend to within 10m of foliage, branches or trunk.
- 4.6.4 Landscape works carried out within Root Protection Areas must be undertaken with great care so as not to damage shallow roots. Tractor mounted rotovators or other heavy mechanical cultivation should not be used within the Root Protection Areas.
- 4.6.5 A copy of the Tree Protection Plan must be kept on site and should be fully understood by the Site Agent.

## **4.7 Bat roosts**

- 4.7.1 The current legislation makes it a criminal offence to disturb, damage or destroy any bat roost or hibernation area. However, neither of the trees recommended for felling are considered suitable for bats to use either for hibernation or temporary roost sites. The lack of cavities, cracks, loose bark or slab ivy makes it unlikely that bats will use the trees, except possibly for foraging for food. Contractors must be reminded of their responsibilities and should contact the relevant authorities if any signs of bats are found.

## **4.8 Birds**

- 4.8.1 The current legislation makes it a criminal offence to disturb nesting birds. The nesting season is generally assumed to be from 1<sup>st</sup> March to 31<sup>st</sup> July, however this can vary depending on species and location. During these months a careful inspection must be made before work commences and works must be postponed if active nests are found.

## **5 ARBORICULTURAL IMPACT ASSESSMENT**

- 5.1 The following trees / tree groups, categorized as per BS5837 (see Appendix C for details), are proposed for removal:
- Category U – unsuitable for retention: T9, a 2.5m poplar sucker with extensive bark damage.
  - Category C – low quality: T3, a 6m maple showing low vigour and with historic basal damage which is likely to lead to decay.
- 5.2 The only tree of any possible significance to be removed is the maple T3. This shows low vigour, with a life expectancy of only 10-20 years.
- 5.3 Protection measures have been specified to protect all retained trees.
- 5.4 Provided the recommendations in this report are followed, the arboricultural impact of these proposals will be minimal.

**Key**

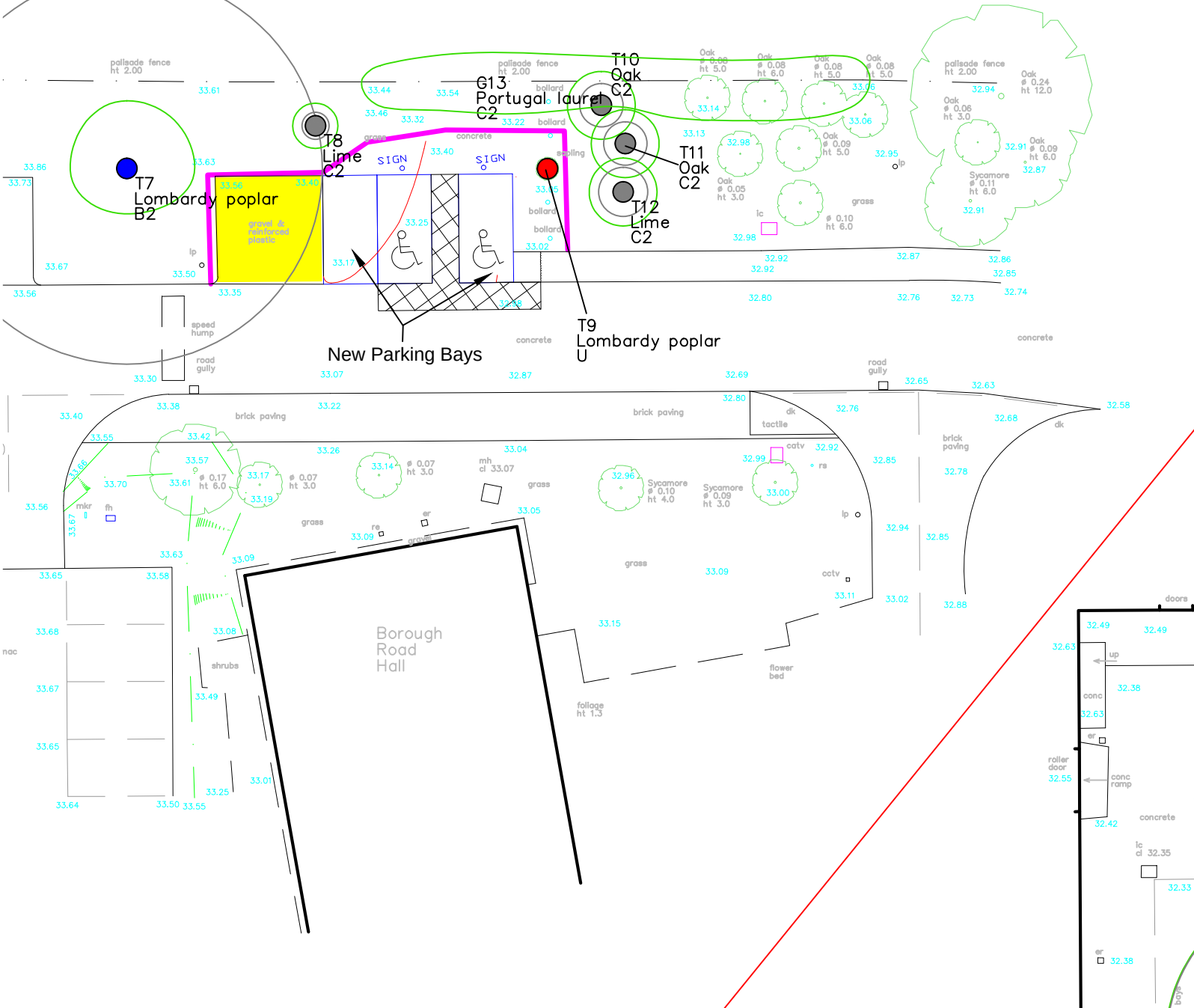
-  Category U
-  Category A
-  Category B
-  Category C
-  Crown spread:  
retained trees
-  Trees For Removal
-  Root Protection Area
-  Tree Protection Fence
-  No Dig Construction
-  Ground Protection Area



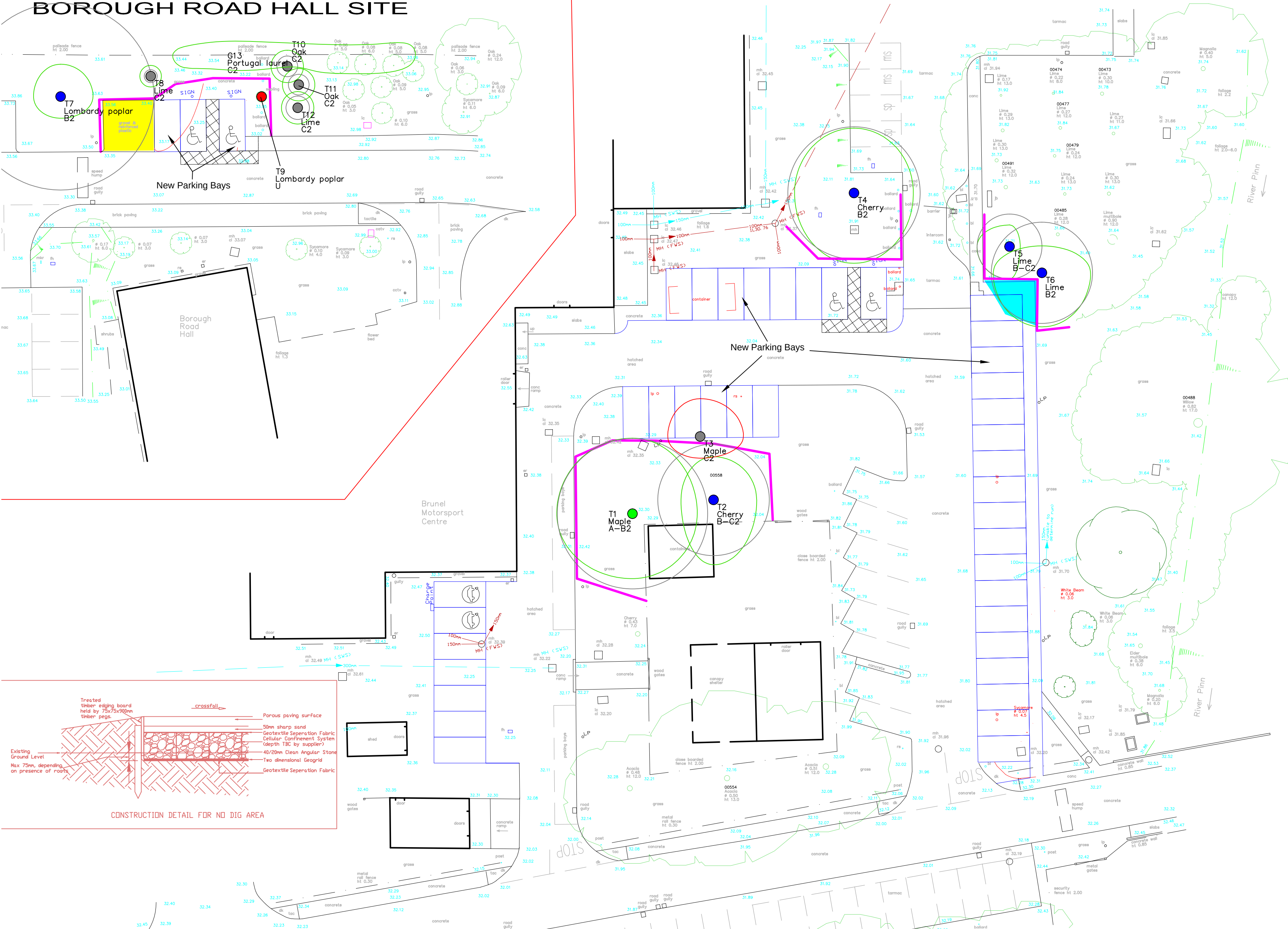
|               |                      |
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| DRAWING TITLE | TREE PROTECTION PLAN |
|---------------|----------------------|

|           |  |
|-----------|--|
| REVISIONS |  |
|-----------|--|

# BOROUGH ROAD HALL SITE



# BRUNEL MOTORSPORT SITE



| Tree/<br>Group<br>No. | Species                     | Height<br>(m) | Stem<br>Diam. at<br>1.5m<br>(mm) | Branch Spread (m) |     |     |     | Canopy<br>Clearance<br>(m) | Age<br>Class    | Observations                                                                                                                                                                  | Management<br>Recommendations            | Estimated<br>Remaining<br>Contribution<br>(years) | BS 5837<br>Category<br>Grading | Protect<br>ion<br>Distnce<br>(m) | Tree<br>Protect.<br>Area<br>(m2) |
|-----------------------|-----------------------------|---------------|----------------------------------|-------------------|-----|-----|-----|----------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------|--------------------------------|----------------------------------|----------------------------------|
|                       |                             |               |                                  | N                 | S   | E   | W   |                            |                 |                                                                                                                                                                               |                                          |                                                   |                                |                                  |                                  |
| T1                    | Maple (Acer<br>saccharinum) | 8.5           | 580                              | 7                 | 6   | 6   | 7   | 2.5                        | Early<br>mature | Main stem bifurcates at 1.6m. Showing good vigour.<br>Low branches have been pruned back. Bark damage to<br>surface roots. Attractive tree.                                   |                                          | >40                                               | A-B2                           | 7.0                              | 152                              |
| T2                    | Cherry                      | 6             | 430                              | 4                 | 6   | 4   | 3   | 2.5                        | Mature          | Ornamental, grafted variety. Beginning to lose vigour.                                                                                                                        |                                          | 10-20                                             | B-C2                           | 5.2                              | 84                               |
| T3                    | Maple (Acer<br>saccharinum) | 6             | 260                              | 3.5               | 2   | 4   | 3   | 1.9                        | Early<br>mature | Historic basal bark damage, causing swelling and likely<br>to lead to basal decay. Only moderate vigour.                                                                      | Remove to construct new<br>parking bays. | 10-20                                             | C2                             | 3.1                              | 31                               |
| T4                    | Cherry                      | 7.5           | 510                              | 6                 | 6.5 | 5.5 | 5.5 | 1.9                        | Mature          | Ornamental, grafted variety. Occasional dead branches.<br>Bark damage to lower lateral to southeast. Beginning to<br>lose vigour, but currently providing good amenity value. |                                          | 10-20                                             | B2                             | 6.1                              | 118                              |
| T5                    | Lime                        | 10            | 250                              | 2                 | 3   | 1   | 3   | 2.5                        | Semi-<br>mature | Drawn up. Minor deadwood. Awkward structure.                                                                                                                                  |                                          | 15-30                                             | B-C2                           | 3.0                              | 28                               |
| T6                    | Lime                        | 13            | 390                              | 2.5               | 5   | 4.5 | 4.5 | 2.4                        | Semi-<br>mature | Major lateral to southeast from 2m. Cavity developing in<br>pruning wound at 4m to south. Minor broken branches.<br>Awkward crown structure.                                  |                                          | 20-40                                             | B2                             | 4.7                              | 69                               |
| T7                    | Lombardy poplar             | 11            | 720                              | 3                 | 2   | 3   | 2.5 | 0.3                        | Early<br>mature | Three main stems from 1.1m - 410, 420 & 420mm.<br>Extensive damage to surface roots, which extend up to<br>carriageway and parking areas. Minor deadwood. Tight<br>forks.     |                                          | 15-30                                             | B2                             | 8.6                              | 234                              |
| T8                    | Lime                        | 3.5           | 50                               | 1                 | 1   | 1   | 1   | 1.7                        | Young           | Good quality young tree.                                                                                                                                                      | Remove stake and tie.                    | >40                                               | C2                             | 0.6                              | 1                                |
| T9                    | Lombardy poplar             | 2.5           | 20                               | 0.3               | 0.3 | 0.3 | 0.3 | 0.2                        | Young           | Sucker growth. Basal damage.                                                                                                                                                  | Remove.                                  | <10                                               | U                              | 0.2                              | 0                                |
| T10                   | Oak                         | 4             | 80                               | 1.5               | 1.5 | 1.5 | 1.5 | 1.7                        | Young           | Good quality young tree.                                                                                                                                                      | Remove stake and tie.                    | >40                                               | C2                             | 1.0                              | 3                                |
| T11                   | Oak                         | 4             | 80                               | 1.5               | 1.5 | 1.5 | 1.5 | 1.7                        | Young           | Good quality young tree.                                                                                                                                                      | Remove stake and tie.                    | >40                                               | C2                             | 1.0                              | 3                                |
| T12                   | Lime                        | 4             | 90                               | 1.5               | 1.5 | 1.5 | 1.5 | 1.8                        | Young           | Good quality young tree.                                                                                                                                                      |                                          | >40                                               | C2                             | 1.1                              | 4                                |
| G13                   | Portugal laurel             | 3             | est 130                          | 0                 | 0   | 0   | 0   | 0.1                        | Early<br>mature | Growing other side of boundary fence. Providing<br>screening.                                                                                                                 |                                          | 15-30                                             | C2                             | 1.6                              | 8                                |

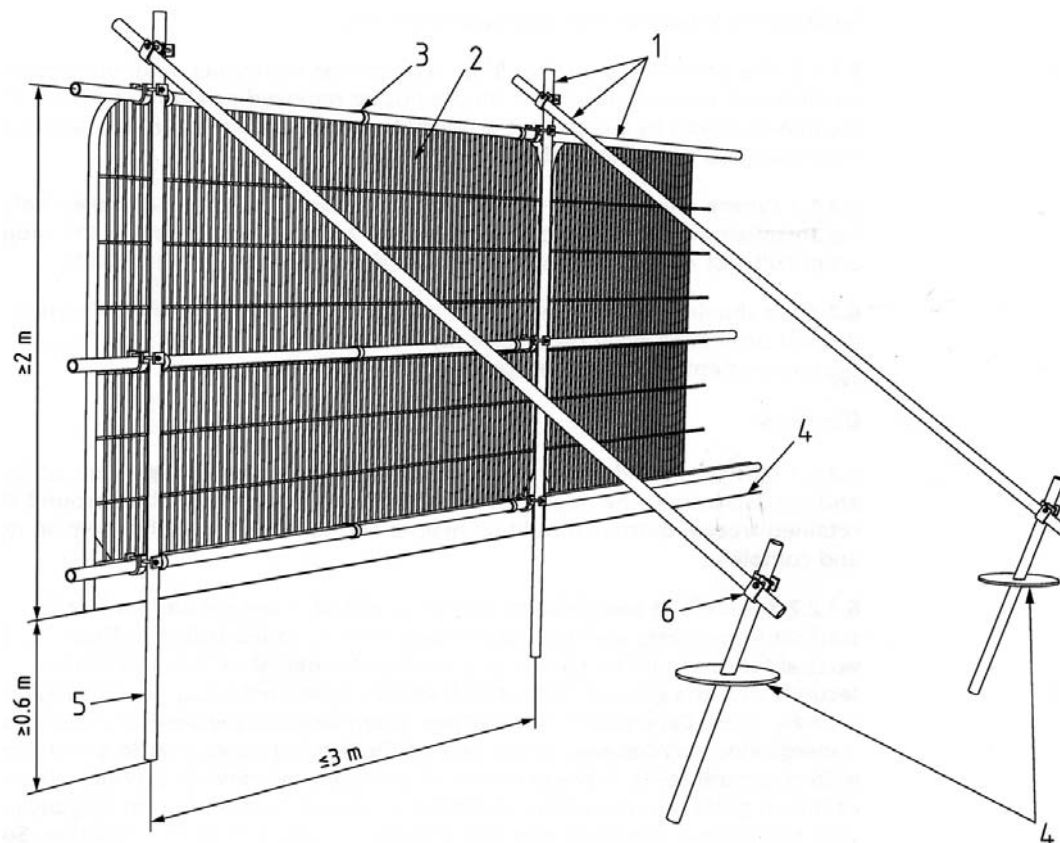
BS 5837:2012, Table 1 Cascade chart for tree quality assessment

| Category and definition                                                                                                                                                   | Criteria (including subcategories where appropriate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Identification on plan                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Trees unsuitable for retention (see Note)</b>                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                   |
| <b>Category U</b><br>Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years | <ul style="list-style-type: none"> <li>Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)</li> <li>Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline</li> <li>Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality</li> </ul> <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p> | See Table 2                                                                                                                                                                                                                                                       |
| <b>Trees to be considered for retention</b>                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                   |
| <b>1 Mainly arboricultural qualities</b>                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                   |
| <b>2 Mainly landscape qualities</b>                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                   |
| <b>3 Mainly cultural values, including conservation</b>                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                   |
| <b>Category A</b><br><b>Trees of high quality</b> with an estimated remaining life expectancy of at least 40 years                                                        | Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)                                                                                                                             |
| <b>Category B</b><br><b>Trees of moderate quality</b> with an estimated remaining life expectancy of at least 20 years                                                    | Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation                                                                                                                                                                                                                                                                                                                                                                                                                | Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality |
| <b>Category C</b><br><b>Trees of low quality</b> with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm       | Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Trees with material conservation or other cultural value                                                                                                                                                                                                          |
|                                                                                                                                                                           | Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Trees with no material conservation or other cultural value                                                                                                                                                                                                       |

Figure 2

**Key**

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



**Examples of above-ground stabilising systems**

Figure 3a

Stabiliser strut with base plate secured with ground pins

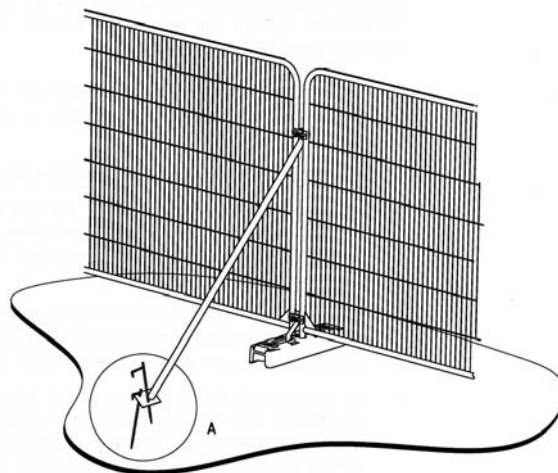
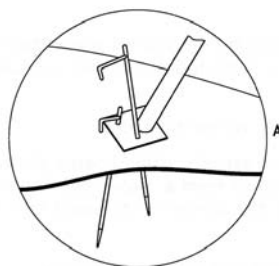


Figure 3b

Stabiliser strut mounted on block tray

