

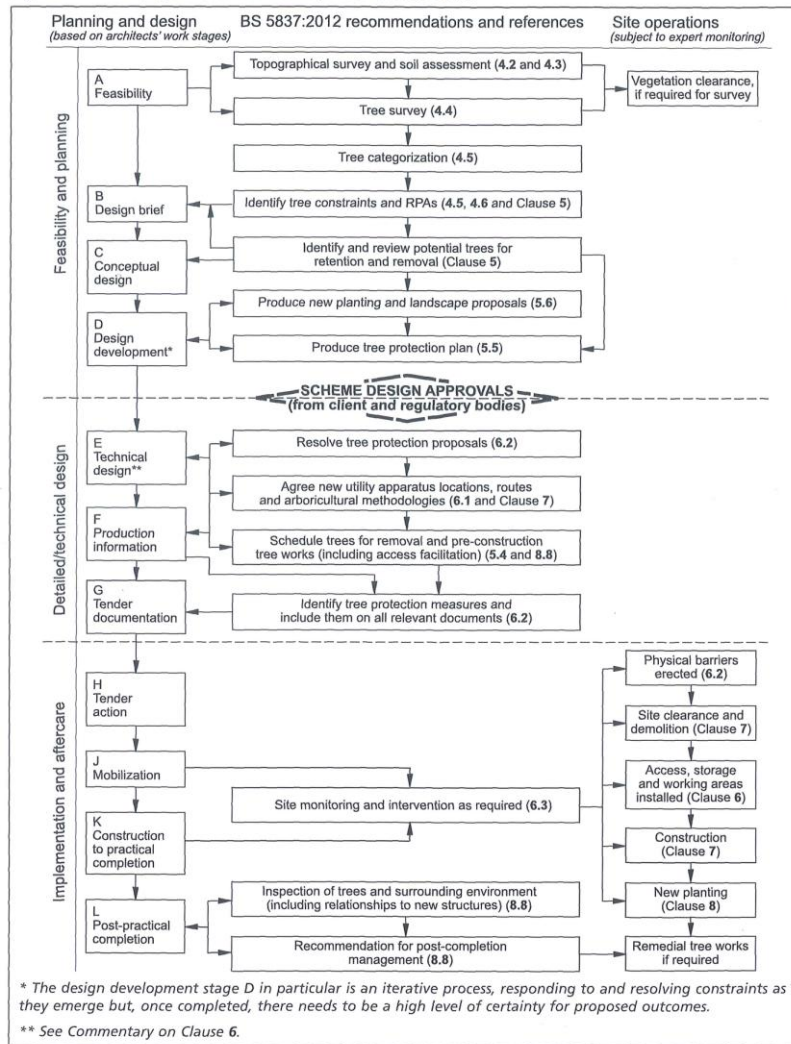


BH 1

Tree Survey Schedule

with Figure 1 Flow Diagram & Tree Survey Notes

Figure 1 The design and construction process and tree care



TREE SURVEY NOTES

These Tree Survey Notes have been prepared in accordance with the recommendations of **British Standard 5837:2012** and they define the criteria for pre –development tree surveys.

- Each tree/group/hedge/shelterbelt/woodland has been allocated a unique number (**No.**), where specifically requested and appropriate fees are agreed small durable numbered metal tags can be applied to each tree/group surveyed.
- The tree species (**Species**) is provided in both English and Latin name formats.
- Height assessments (**Ht**) are estimated in metres. This will be adequate for the majority of cases, but where accurate heights become a critical issue it may be necessary to return to site, as a separately commissioned exercise, to collect accurate measurements with the aid of optical instruments.
- Trunk/stem diameters (**Diam**) are measured in millimetres **at 1.5m above ground level** – where the tree is inaccessible the diameter is estimated as indicated by suffix #
- Radial crown spread assessments (**Brch Sprd**) are estimated in metres from the centre of the trunk/group to each of the four primary points of the compass (**N**-north; **E**-east; **S**-south and **W**-west) in order to achieve a representation of the crown shape which will be shown on the accompanying tree survey plan. These provide a general guide as to the main bulk outline of a tree/groups crown but **are not tape measured dimensions**. These would only be undertaken as part of a separately commissioned exercise, where precise dimensions are critical to the project at hand.
- Both the canopy ground clearance (**GC**) and the height & compass direction of the lowest major branch (**LMB**) are estimated and shown in metres
- An assessment of a tree/groups 'life stage' (**LS**) is made in terms of its site specific maturity as part of the surrounding landscape, taking into account its overall shape and form in that setting, and is recorded thus :-
Y - Young tree/group; **SM** - Semi-Mature tree/group; **EM** - Early-Mature tree/group;
M – Mature tree/group; **OM** - Over – mature tree/group
- Data on the structural condition (**Condition Comments**) of the tree/group is provided to give its visual appearance and any significant health and safety issues.
- Details of any recommended tree works required at the time of survey is given under the heading – **Preliminary Management Recommendations**.
- An estimate of a tree/groups remaining contribution in years (**RC**) is made and is recorded thus :-
0-5; 5-10; 10-20; 20-30; 30-40 or **>40** years.
- The category grading (**Cat**) for each tree/group is assessed according to the criteria provided within **BS5837:2012**. The assessment is made of the tree/group in its current condition and within the

environment encountered bearing in mind its suitability for retention as part of any future proposed development; although the exact layout detail of any specific scheme will not be known at the time of surveying. The trees have been classified into one of four categories and colour coded as BS5837 recommends :- **U** (dark red); **A** (light green); **B** (mid-blue) and **C** (grey). Please note that suffixed numerical sub-categories are also applied for guidance only and do not carry any cumulative or increased value for the tree/group. This colour coding scheme will be applied to all drawings provided.

Table 1 – Cascade chart for tree quality assessment

Category and definition	Criteria			Colour on plan
Trees unsuitable for retention				
Category U 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.	- 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 (i.e. where, for whatever reason the loss of companion shelter cannot be mitigated by pruning) - Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline - 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 NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve.			Dark Red
Trees to be considered for retention				
	Criteria – Subcategories			
	1	2	3	
Category A Trees of high quality 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 particular visual importance as arboricultural and /or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	Light Green
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in the 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	Trees with material conservation or other cultural value	Mid Blue
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	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	Grey



BJH.0577

TREE SURVEY SCHEDULE

Client : Debtorbook Solutions

Site Location : 20 Forest Avenue, Cowplain

Surveyor : Bernie Harverson *M.Arb.*

Date Surveyed : 2nd August 2012

Tree No.	Species	Ht m	Diam mm	Brch Sprd m	GC m	LMB m	LS	Condition Comments	Preliminary Management Recommendations	Rem Con yrs	Cat
1	Pedunculate Oak <i>Quercus robur</i>	18	450	N5 E6 S7 W7	6	5 NE	EM	Base smothered in ivy-epicormics-large diameter deadwood and stubs—storm damage with broken branches and hangers-crown lifted to 6m	Remove ivy-remove major deadwood ,broken branches and hangers	>40	A1 / B1
2	Grey Willow <i>Salix cinerea</i>	9	300 250 200 100	N7 E3 S6 W4	0	0 N	OM	Ivy smothering base, trunk and through crown-multi stemmed at ground level-tight forks with included bark-epicormics-cavities with significant basal decay-crown weighted north and south-low branching habit-poor quality tree-has been pruned back on east side where it overhangs boundary fence	Coppice or remove	5-10	U
3	Hawthorn <i>Crataegus monogyna</i>	6	170	N0 E0 S0 W5	3	2 W	EM	Ivy smothering base, trunk and through crown-root plate lifted and fallen west and is lodged in crown of Tree 4-low crown density-low vigour and vitality-significant dieback	Fell and grub out	0-5	U
4	Ash <i>Fraxinus excelsior</i>	16	250	N2 E3 S2 W1	-	3 E	SM	Epicormics-multi stemmed at 3m above ground level-low crown density-very little live crown remains-low vigour and vitality-significant dieback-large diameter deadwood and stubs	Fell and grind	0-5	U
5	Ash <i>Fraxinus excelsior</i>	16	520	N5 E7 S7 W6	3	4 NE	EM	Large and small diameter deadwood-previously reduced and reshaped-climber growing through crown-good shape and form	Remove major deadwood	>40	B1
6	Pedunculate Oak <i>Quercus robur</i>	18	380	N7 E6 S5 W4	10	10 N	EM	Ivy smothering base, trunk and through crown-large and small diameter deadwood and stubs-storm damage with broken branches-crown lifted to 10m	Sever ivy-remove major deadwood	>40	B1
Grp 1	Pedunculate Oak <i>Quercus robur</i>	18	300 300 240 180	N6 E5 S6 W4	6	6 S	EM	Epicormics-fairly strong ,healthy growth on main trunks-some dieback-large and small diameter deadwood-crown lifted to 6m	Sever ivy-remove all deadwood	>40	B2
7	Ash <i>Fraxinus excelsior</i>	18	380	N7 E6 S2 W3	10	8 N	EM	Low crown density-low vigour and vitality-large diameter deadwood and stubs-dead ivy throughout crown	Remove all deadwood	20-30	C1

8	Ash <i>Fraxinus excelsior</i>	18	360	N3 E3 S5 W5	10	6 S	EM	Ivy smothering base and trunk-epicormics throughout in response to an overall decline-low crown density-low vigour and vitality-significant dieback	Fell and stump grind	5-10	U
Grp 2	Ash <i>Fraxinus excelsior</i>	10 to 12	80 to 150	N2 E3 S2 W1	4	4 NESW	Y	Crown lifted to 4m-poor quality tree-young self sown sapling Ash trees in a linear belt-have been pruned back on west side close to boundary line and crown lifted	No work considered essential at time of survey	10-20	C2
9	Pedunculate Oak <i>Quercus robur</i>	16	500	N3 E5 S5 W1.5	4	4 S	EM	Epicormics throughout-suppressed east-some dieback-small diameter deadwood-crown shape dictated by group pressure-previously heavily topped	Remove all deadwood	30-40	C1
10	Pedunculate Oak <i>Quercus robur</i>	18	390	N7 E4 S1.5 W4	4	1.5 S	EM	Suppressed south-crown shape dictated by group pressure-low crown density-low vigour and vitality-significant dieback-large and small diameter deadwood-cavities in old pruning wounds-very little if any epicormic response to the decline in vigour	Remove all deadwood	10-20	C1
11	Pedunculate Oak <i>Quercus robur</i>	18	650	N4 E5 S7 W6	2	6 S	M	Ivy smothering base-strong epicormic growth on trunk-suppressed north-large and small diameter deadwood-crown shape dictated by group pressure	Remove all deadwood	>40	B1
12	Pedunculate Oak <i>Quercus robur</i>	18	460	N6 E5 S3 W2	5	5 E	EM	Ivy smothering base and trunk-sparse production of epicormics-leans east-low crown density-small and large diameter deadwood-crown shape dictated by group pressure-significant dieback	Remove ivy	10-20	C1
13	English Yew <i>Taxus baccata</i>	9	360	N5 E3 S4 W4	0	2 N	SM	Ivy smothering base-suppressed east-low crown density-minimal new extension growth-crown lifted on south side over gardens-low branching habit	No work considered essential at time of survey	30-40	C1
14	Pedunculate Oak <i>Quercus robur</i>	18	700	N5 E8 S7 W5	2	5 NESW	M	Epicormics are the strongest growth throughout the tree-low crown density-small leaf size-significant dieback-small and large diameter deadwood-previously reduced and reshaped-cavities in old pruning wounds	Remove all deadwood	30-40	B1



BH 2

Tree Root Protection Area Schedule & Plan BJH 01/02

ROOT PROTECTION ZONE/AREA SCHEDULE

Client : Debtorbook Solutions

Site Location : 20 Forest Avenue, Cowplain

Tree No.	Tree Species	Cat	Diam mm	BS5837:2012 Table D1- Radial Protect.Area m	BS5837:2012 Table D1- Polygon Area m ²	Is An Offset Required To Cater For Existing Rooting Pattern Restrictions
1	Pedunculate Oak <i>Quercus robur</i>	A1 / B1	450	5.4	92	NO – this is the dominant tree in this sector of the site and will have established a full and balanced root system
2	Grey Willow <i>Salix cinerea</i>	U	300 250 200 100	n/a	n/a	NO – this tree would be removed for sound arboricultural management reasons regardless of any redevelopment proposals – given that it is undermined by decay
3	Hawthorn <i>Crataegus monogyna</i>	U	170	n/a	n/a	NO – this tree would be removed for sound arboricultural management reasons regardless of any redevelopment proposals
4	Ash <i>Fraxinus excelsior</i>	U	250	n/a	n/a	NO – this tree would be removed for sound arboricultural management reasons regardless of any redevelopment proposals
5	Ash <i>Fraxinus excelsior</i>	B1	520	6.2	122	NO – this is a dominant tree and will have established a full and balanced root system
6	Pedunculate Oak <i>Quercus robur</i>	B1	380	4.6	65	NO – this is a dominant tree and will have established a full and balanced root system
Grp 1	Pedunculate Oak <i>Quercus robur</i>	B2	300 300 240 180	6.2	122	NO – fairly free rooting to all directions
7	Ash <i>Fraxinus excelsior</i>	C1	380	4.6	65	NO – fairly free rooting to all directions
8	Ash <i>Fraxinus excelsior</i>	U	360	n/a	n/a	NO – this tree would be removed for sound arboricultural management reasons regardless of any redevelopment proposals given that it is in a state of terminal decline with a short life expectancy

Grp 2	Ash <i>Fraxinus excelsior</i>	C2	80 to 150	1.8	10	NO – mutual suppression within the line but free rooting to the outer facing edges
9	Pedunculate Oak <i>Quercus robur</i>	C1	500	6.0	113	YES – this tree is in competition with the dominant tree 11 and as a result will tend to root more to the west side
10	Pedunculate Oak <i>Quercus robur</i>	C1	390	4.7	69	YES – this tree is in competition with the dominant tree 11 and as a result will tend to root more to the north side
11	Pedunculate Oak <i>Quercus robur</i>	B1	650	7.8	191	NO – this is a dominant tree and will have established a full and balanced root system
12	Pedunculate Oak <i>Quercus robur</i>	C1	460	5.5	96	YES – this tree is in competition with the dominant tree 11 and as a result will tend to root more to the north side
13	English Yew <i>Taxus baccata</i>	C1	360	4.3	59	YES – this tree is in competition with the dominant tree 14 and as a result will tend to root more to the north and west sides
14	Pedunculate Oak <i>Quercus robur</i>	B1	700	8.4	222	NO – this is a dominant tree and will have established a full and balanced root system



BH 3

Tree Retentions & Removals Plan

BJH 03



BH 4

Tree Protection Plan

BJH 04

Figure 2 Default specification for protective barrier

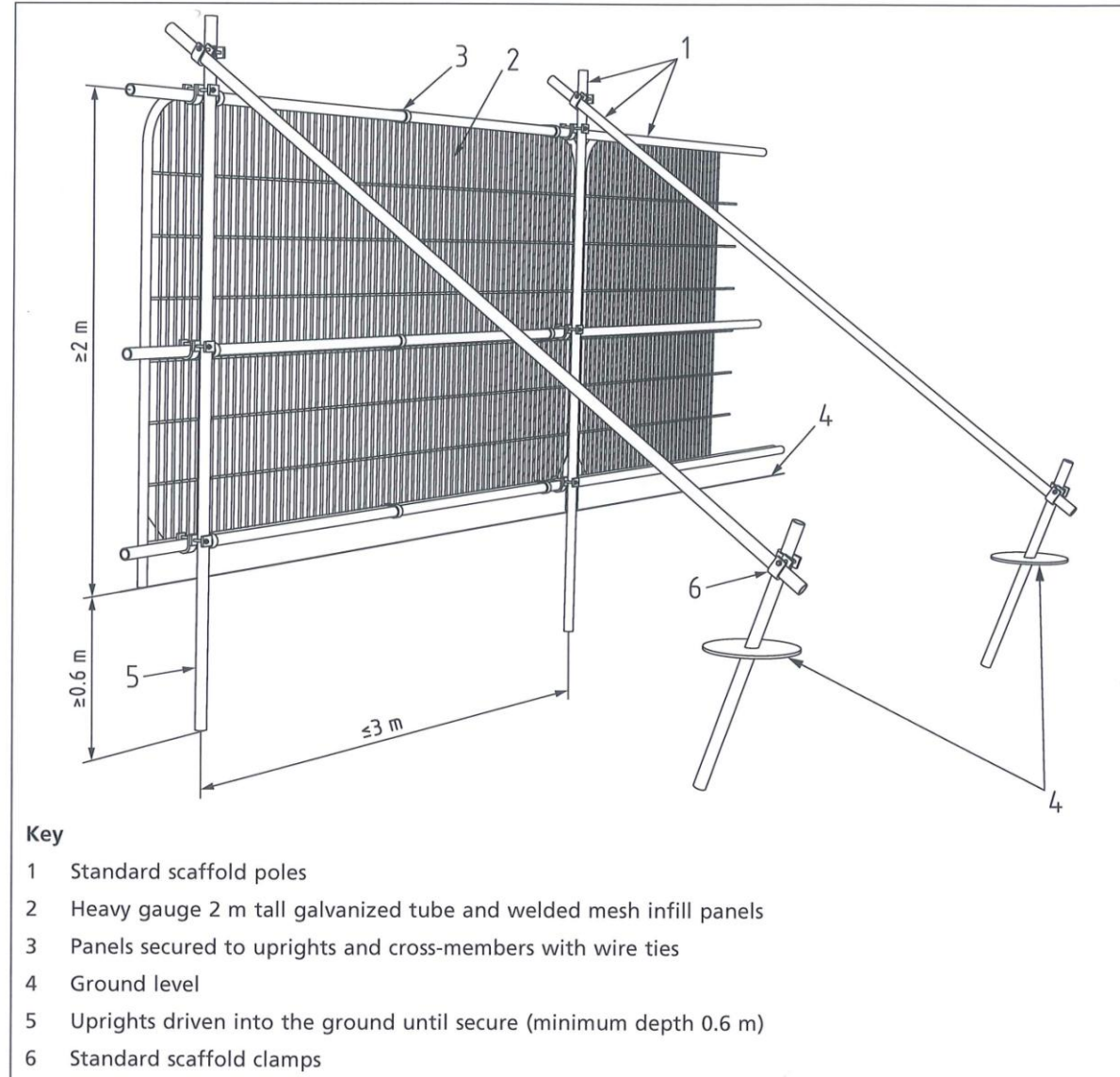
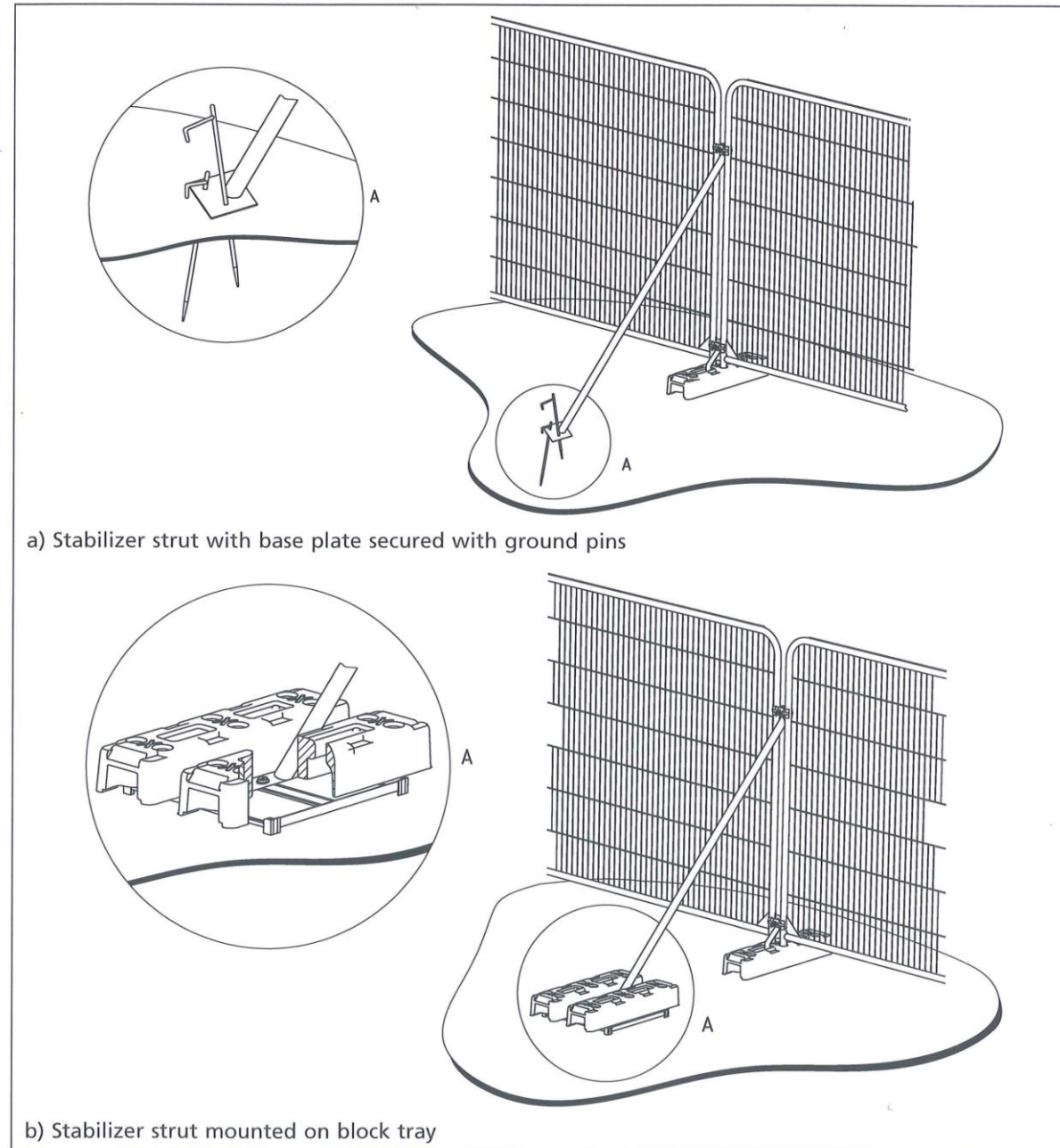


Figure 3 Examples of above-ground stabilizing systems

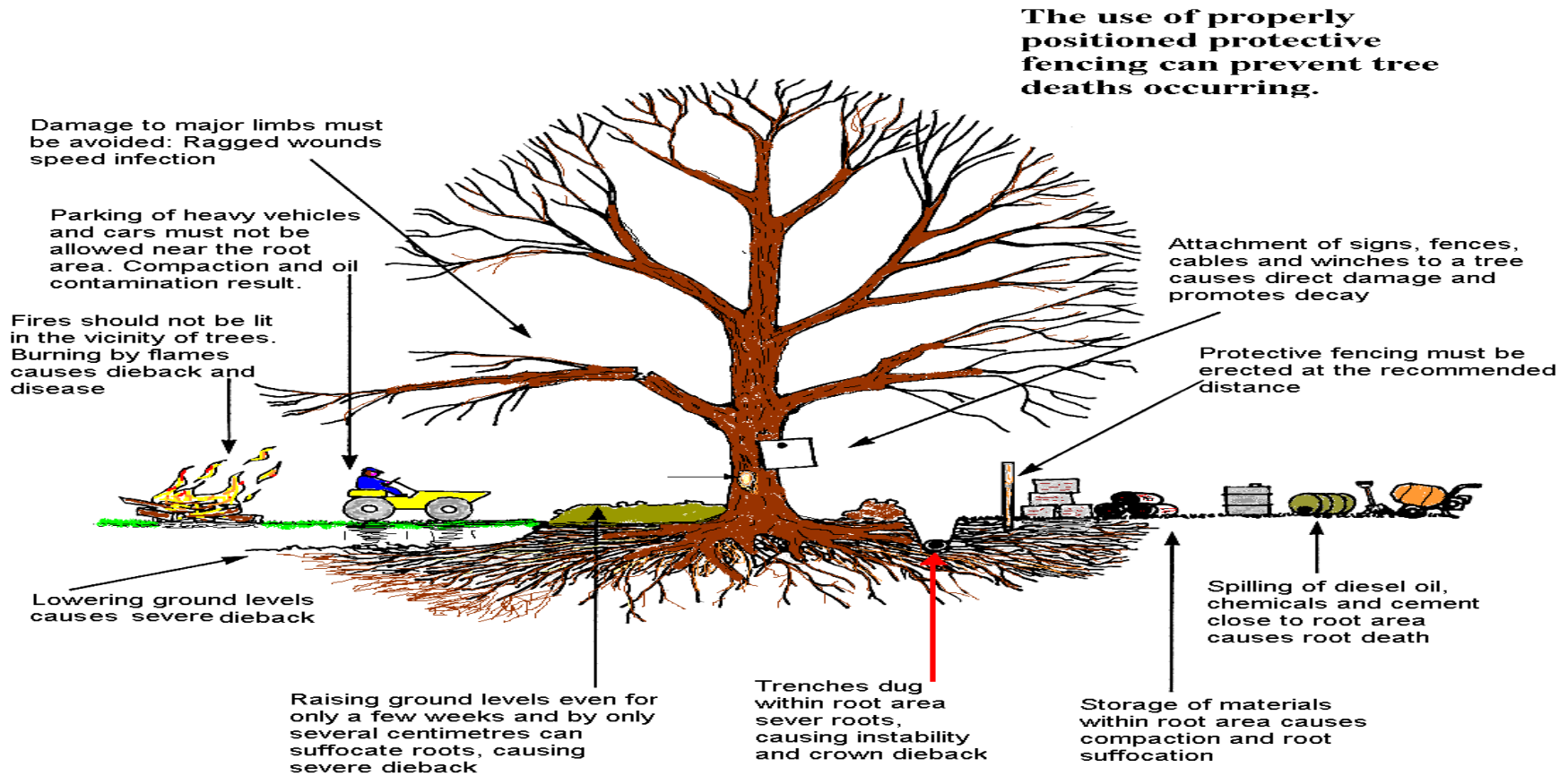


TREE PROTECTION AREA

KEEP OUT

- **NO EXCAVATION OR TRENCHING WORKS PERMITTED**
- **NO STORAGE OF PLANT OR MATERIALS PERMITTED**
- **NO VEHICLE ACCESS PERMITTED**
- **NO FIRE LIGHTING PERMITTED**
- **NO CHEMICAL HANDLING**
- **VEHICLES WORKING CLOSE TO PROTECTIVE FENCING MUST AVOID CONTACT WITH OVERHANG FROM TREE CANOPY**

Common causes of Tree Death



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





BH 5

Tree Works Schedule

TREE WORK SPECIFICATION

Client : Debtorbook Solutions

Site Location : 20 Forest Avenue, Cowplain

Attention is drawn to the fact that some mature trees could provide suitable habitat for bird nesting (ivy and cavities) and bat roosting (ivy, branch cracks and cavities) and this might at certain times of year influence and possibly restrict the form of management which can be applied. Given the legal constraints imposed by the Habitat Regulations and the Wildlife and Countryside Act this may necessitate expert ecological advice being sought before proceeding with recommendations.

No	Species	Tree Works Recommended
1	Pedunculate Oak <i>Quercus robur</i>	- Remove all ivy - Remove storm damaged and broken branches and make sound final cuts in accordance with BS3998 - Remove all dead wood
2	Grey Willow <i>Salix cinerea</i>	Coppice at 350mm above ground
3	Hawthorn <i>Crataegus monogyna</i>	- Fell to ground level - Grind out the stump by machine
4	Ash <i>Fraxinus excelsior</i>	- Fell to ground level - Grind out the stump by machine
5	Ash <i>Fraxinus excelsior</i>	Remove all dead wood
6	Pedunculate Oak <i>Quercus robur</i>	- Sever ivy at ground level - Remove all dead wood
Grp 1	Pedunculate Oak <i>Quercus robur</i>	- Sever ivy at ground level - Remove all dead wood
7	Ash <i>Fraxinus excelsior</i>	Remove all dead wood
8	Ash <i>Fraxinus excelsior</i>	- Fell to ground level - Grind out the stump by machine
Grp 2	Ash <i>Fraxinus excelsior</i>	Thin out the total number of trees to leave only the better shaped ones to grow on
9	Pedunculate Oak <i>Quercus robur</i>	Remove all dead wood

10	Pedunculate Oak <i>Quercus robur</i>	Remove all dead wood
11	Pedunculate Oak <i>Quercus robur</i>	Remove all dead wood
12	Pedunculate Oak <i>Quercus robur</i>	Remove all ivy
13	English Yew <i>Taxus baccata</i>	Remove all dead wood
14	Pedunculate Oak <i>Quercus robur</i>	Remove all dead wood



BH 6

NJUG 10 Extract HJ Concepts Plans:

- 12-885-PL02 -1:200 @ A1
- Plot 2 RC Grd Beam Section
- 12 - 885 - Trial Hole Excavations Report – Oct 2012 - as carried out by Phil Hamblin of HJ Concepts
 - 12 – 885 - PL01B – 1:500/1:1250 – Sight Line Plan/Contractors Plan/ Site Location Plan

Extract taken from NJUG 10

NJUG 10 - NATIONAL JOINT UTILITIES GROUP

2. HOW ROOTS ARE DAMAGED

2.1 Contrary to popular belief, the root system of a tree is not a mirror image of the branches, nor is there usually a ‘tap root’. The majority of the root system of any tree is in the surface 600mm of soil, extending radially in any direction for distances frequently in excess of the tree’s height. Excavation or other works within this area are liable to damage roots.

The root system

2.2 The base of the trunk typically flares out in buttresses, with these extending into the main lateral structural roots. These rapidly subdivide into the mass of smaller roots which serve to anchor the tree into the soil, and to conduct water and nutrients. Even a short distance (3m) from a large mature tree, most roots will be less than 10mm in diameter, but these may extend to well beyond the branch spread of the tree. A mass of fine roots, less than 1mm diameter, develop off all parts of this root system. These fine roots absorb the water and nutrients which are essential for the growth of the tree.

2.3 The main structural roots (close to the trunk) develop as the tree grows in response to the need for the tree to have physical stability. Beyond these major roots, root growth is influenced by the availability in the soil of water, air and nutrients. The cultivation of soil provides ideal conditions for root growth. Services are often cooler than surrounding soil, encouraging moisture within the soil to condense on the surface, thereby encouraging roots to grow close to the service. For all these reasons, root growth is often most prolific within the backfilled trench and in the soil around the services. The variability of soil conditions and the presence of obstacles to root growth results in a very variable and unpredictable distribution of the roots within the general guidance in para 2.1.

Types of damage

2.4 Root systems can be damaged by:-

- The severance of a root, for example by trenching, which will destroy all parts of the root beyond that point. Even roots less than 10mm diameter may be serving the fine roots over a wide area. The larger the root severed, the greater the impact on the tree.
- Damage to the bark on the root. The bark protects the root from decay, and is also essential for further root growth. It is loosely attached and easily damaged. If damage to the bark extends around the whole circumference, the root beyond that point will be killed.
- Compaction of the soil. Compaction which is avoidable may occur from storage of material or passage of heavy equipment over the roots. This can restrict or even prevent gaseous diffusion through the soil, and thereby asphyxiate the roots. The roots must have oxygen for survival, growth and effective functioning.
- Alterations in soil level. Lowering the level will strip out the mass of roots near the surface. Raising levels will have the same effect as soil compaction.
- Incorrect application of herbicide.
- Spillage of oils or other harmful materials.

2.5 If roots are damaged:-

1. close to the trunk, the anchorage and stability of the tree can be adversely affected.
2. anywhere along their length, all of the fine roots which they serve will be destroyed.

Damage to the fine roots by severance of a main root, or by compaction or alteration in levels, will prevent these fine roots from absorbing the water and nutrients which are essential for the well-being and growth of the tree. The effects of damage from different causes, for instance by successive excavations for different services, or by excavation in one part and compaction in another part of the system, will be cumulative.

2.6 If the root system is damaged, new roots must develop to sustain the tree. These may develop from damaged root or by increased growth of other parts of the system. It may take years to replace all the lost roots. Vigorous young trees are the most likely to be capable of rapid root regeneration, but mature trees find it very difficult to recover from major root damage, if at all. While roots may regenerate, they will not necessarily provide their original anchorage.

2.7 Trees with damage may not show any immediate symptoms. If the root system is capable of rapid regeneration the tree may recover without any noticeable ill-effects, but usually the symptoms will take several years to develop. Such symptoms may range from only minor branch dieback to deterioration and ultimate death of the tree, dependant on the severity of damage and the ability of the roots to regenerate.

2.8 There is frequently a need for operational land (e.g. substations) to be kept clear of weed growth for safety and as a fire precaution. Herbicides provide an efficient method of killing both herbaceous and woody weeds. There are several types of herbicide with different modes of action and persistence. The most attractive chemicals are those that can be applied to the ground, usually as a granule, and which remain active in the soil for long periods. The wide-ranging root system of a tree may extend into the operational land from adjoining properties, and may absorb some types of herbicides which have been applied to the ground. Material absorbed in one part of the root system can kill the whole tree.

2.9 Other materials which can leach into the soil can also damage the root system. For instance, oil spilled into the soil is broken down by soil bacteria which deplete the soil of oxygen and so asphyxiate the roots. Other materials may have a direct toxic effect on roots.

HOW TO AVOID DAMAGE TO TREES

4.1 This section gives general guidance on methods of work to minimise damage to trees which should be adopted by utilities. The local authority (or for privately owned trees, the owner or his advisor), should be informed about planned work at an early stage prior to commencement.

4.2 Wherever trees are present, precautions should be taken to minimise damage to the root system. As the shape of the root system is unpredictable, there should be careful control and supervision of any excavation, particularly if this involves digging through the surface 600mm where the majority of roots develop.

4.3 The precautions advocated in this section are applicable to any excavations or other works occurring within a distance from the tree equal to 4 times the circumference of the trunk (circumference measured around the trunk at a height of 1.5m above ground level; distance measured from the centre of trunk to nearest part of any excavation or other work). This area around the trunk is referred to as “the precautionary area” hereafter.

4.4 Although, ideally, services should be diverted or re-aligned outside the precautionary area, it is recognised that this will not always be practicable. Where works are required for the laying or maintenance of any service within the precautionary area, there are various techniques to minimise the damage. The appropriate method of laying will depend on the circumstances, such as:

- scope of the works (one off repair, or part of an extensive operation)
- degree of urgency (for restoration of supplies)
- soil conditions
- amenity value of tree
- cost

Acceptable techniques in order of preference are:-

1. **Trenchless**
2. Broken trench – hand dug
3. Continuous trench – hand dug

Excavation of open trenches by machine is totally unacceptable within the precautionary area.

4.5 Trenchless

4.5.1 Wherever possible trenchless techniques should be used. The pit excavations for starting and receiving the machinery should be located outside the precautionary area.

4.5.2 IN order to avoid damage to roots by the **mole**, it is recommended that the depth of run should be below 600mm. Techniques involving external lubrication of the mole with materials other than water (e.g. oil, bentonite) should be avoided, unless precautions are taken to ensure that there is no contamination of the soil within 600mm of the surface within the precautionary area.

4.6 Broken Trench

4.6.1 This technique combines hand dug trench sections with trenchless techniques. If excavation is unavoidable, it should be limited to practical access and installation around/below the roots. The trench is excavated by hand with precautions taken as for continuous trench below. Open sections of the trench should only belong enough to allow access for linking to the next section. The length of sections will be determined by local conditions, especially soil texture and cohesiveness, as well as the practical needs for access. In all cases the open sections should be kept as short as possible.

4.7 Continuous Trench

4.7.1 The object of the exercise is to use manual excavation so as to retain as many roots as possible, bearing in mind the need for working space, access to the service in question and room to install the new service. Hand digging needs to be undertaken with great care and for this reason is likely to require closer supervision than normal operations and an understanding by all operatives and staff as to exactly what is expected.

4.7.2 After careful removal of the hard surface material, digging should proceed with hand tools. All roots greater than 25mm diameter should be retained and worked around. Where clumps of smaller roots (including fibrous roots) are found these should also be retained. During the excavation great care should be taken to minimise damage to retained roots, including the bark around the roots. Roots with a diameter in excess of 25mm must not be severed without the advice of the owner of the tree or the local authority arboriculturist, who should respond within one working day. If severance is unavoidable, roots must be cut back using a sharp tool (as listed below), leaving the smallest wound. Suggested tools required: fork, breaker bar, secateurs, handsaw (folding, silky or bow saw), post hole shoveller and hand fork and trowel.

4.8 Backfilling

4.8.1 Any reinstatement must comply with the requirements of street works in Great Britain must comply with the requirements of the code of practice approved under the New Roads and Street Works Act 1991 (Specification for the Reinstatement of Openings in Highways). Without prejudice to the requirements of this code as to the specification of materials to be used and the standards of workmanship to be observed, backfilling of any excavation should be carefully carried to avoid direct damage to the retained roots and excessive compaction of the soil around them.

4.8.2 The backfill should, where possible, include the placement of an inert granular material mixed with top soil or sharp sand (not builders sand) around the retained roots. This should allow the soil to be compacted for resurfacing without damage to the roots, and should secure a local aerated zone enabling the root to survive in the longer term.

4.8.3 Backfilling outside the highway limits should be carried out using the excavated soil. This should not be compacted but lightly “tamped” and usually left slightly proud of the surrounding surface to allow natural settlement. Other materials should not be incorporated into the backfill.

4.8.4 Fine roots are vulnerable to desiccation once they are exposed to the air. Larger roots have a bark layer which provides some protection against desiccation and temperature change. The greatest risk to these roots occurs when there are rapid fluctuations in air temperature around them, e.g. winter diurnal temperatures. It is important, therefore, to protect exposed roots where a trench is to be left open overnight when there is a risk of frost. In winter, before leaving the site at the end of the day, the exposed roots should be wrapped with dry sacking. This sacking must be removed before the trench is backfilled.

4.10 Special Considerations when planning service routes

4.10.1 The potential for future conflict with trees can be reduced at the stage of initial planning approval by the appropriate alignment of services and the provisions for future tree and shrub planting. Appropriate and separate space should be provided for each. Local authorities should liaise with developers.

4.10.2 If planning requirements and site constraints dictate that trees (existing or to be planted) and services share the same area, consideration should be given to increasing the depth of services, if possible to a minimum of 600mm, and to laying the service in ducts which will resist root penetration but allow replacements to be laid without extensive excavation. As this may incur additional costs, allowance must be made for these costs and the responsibility for meeting them at the planning stage.

4.10.3 When laying new services or replacements, to avoid risk of future direct damage, allowance should be made for future root growth.

4.10.4 Services laid in clay or peat should be constructed to tolerate movements associated with swelling or shrinking of the subsoil cause by root activity. Special precautions for differential movement should be incorporated where services join rigid structures founded at a different depth to the service.



BH 7

Qualifications & Experience

QUALIFICATIONS AND EXPERIENCE

- My name is Bernie Harverson and I am a self employed independent arboricultural consultant in private practice. I take instructions primarily in the South of England but also on occasions work nationwide and abroad and have offices at : –
3 Foxcombe Cottages, South Harting, West Sussex GU31 5PL and also at Cedar Court, 5 College Street, Petersfield GU31 4AE
- I hold the following arboricultural qualification - **Master of Arboriculture** (Royal Forestry Society – 1976)
- I have over **forty** years of practical and managerial experience in the arboricultural industry including periods in both the public and private sectors.
- My Local Government sector experience comprises one year as a tree surgeon with Brighton Parks and nine years spent in Arboricultural Officer posts with both Westminster City Council and Portsmouth City Council
- My past practical experience in the private sector includes two years at Tilhill Forest Nursery and over ten years for various companies as a Climbing Arborist/Tree Surgeon.
- Managerial work in the private sector includes two years as manager of Beechings tree surgery company and twelve years with CBA Trees as an Arboricultural Consultant.
- As an independent self employed Arboricultural Consultant I now provide a comprehensive range of services including :-
tree surveys, appraisals, assessments and inspections with particular reference to planning and development and tree safety audits with a service offered as a climber to undertake full climbing inspections to better understand the condition of a given tree before prescribing a management strategy.
 - I also undertake litigation work appearing as an Expert Witness in Court Actions and at Planning Appeals, Hearings and Public Local Inquiries.

Bernie Harverson M.Arb.

3 foxcombe cottages • south harting • west sussex • gu31 5pl
tel: 01730 825297 • mob: 07875 520881 • email: bernie.harverson@virgin.net • VAT Reg No. 881 5056 16