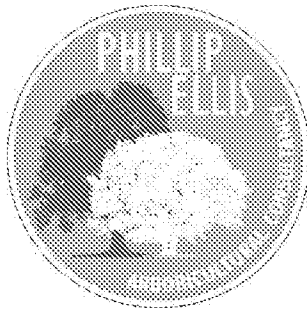




Tree Care Consultant

Phillip J. Ellis MI Hort, Tech Arbor A

ARBORICULTURAL REPORT AND STATEMENT IN RELATION TO DEVELOPMENT PROPOSALS BS5837: 2012

REF: UPDR/122/17

CLIENT: Mr & Mrs Mr K Fish

Location: 1 Upper West Drive, Ferring, West Sussex. BN12 5RB

INSPECTION DATE: 14th November 2017

Report by: Phillip Ellis

Pages: 19

Instructions Received: Phillip Ellis, Tree Care Consultancy has been instructed by to undertake a tree survey and site inspection and provide an Arboricultural Report in support of planning application FG/162/17.

Documents Supplied: Architects plan of proposed structure.

Summary:

The proposal is to demolish existing double garage and construct one property.

The statements in this Report do not take account of the effects of extremes of climate, vandalism or accident, whether physical, chemical or fire Phillip Ellis cannot therefore accept any liability in connection with these factors, nor where prescribed work is not carried out in a correct and professional manner in accordance with current good practice. The authority of this Report ceases at any stated time limit within it, or if none stated after two years from the date of the survey or when any site conditions change, or pruning or other works unspecified in the Report are carried out to, or affecting, the subject tree(s), whichever is the sooner.

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Please note that any abbreviations introduced in (brackets) are used throughout this report



"Elstead", 61 Alinora Avenue, Goring by Sea, Worthing, West Sussex, BN12 1LR.



UPDR/122/17

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Plans attached:

Tree Protection Plan **TPP/UPDR/122/17**

1.0 Purpose and Scope of the Report.

- 1.1 Phillip Ellis Tree Care Consultancy has been instructed by Mr Carl Moore architect for the proposal to undertake a tree survey and inspection of the trees at support planning application FG/162/17 to demolish double garage and replace with one dwelling. The survey is to BS5837:2012 to advise on the condition of the existing trees and their suitability for retention and a Tree Protection Plan (**TTP**) and Arboricultural Method Statement (**AMS**) to minimise damage to the retained tree, promoting their longevity.
- 1.2 The Report is concerned only with Arboricultural aspects of the site and the one tree on the site would be affected without protection during and after construction.

2.0 Site Description and Notes.

- 2.1 The site is a private house in the village of Ferring located on the south coast between the towns Worthing and Littlehampton accessed from the A259. The trees on the site are protected by a Tree Preservation Order **TPO/FG/2/12** by Arun District Council that means that any trees within the site would require consent from planning department before any work can be carried out whether it be pruning of any kind or removal. Dead, dying or dangerous trees may be removed having given 5 days written notice.
- 2.2 The existing garden is laid out mainly to lawn with a hedge bounding the site of varying quality.



Fig 1 view of existing property within red line

3.0 Geology

- 3.1 The Geology of the site is described by the British Geological Society, Bedrock Chalk and the superficial layer is Clay, silt and sand. Foundation design and depth will need to take account of soil type and NHBC standards in chapter 4.2 can be referred to for guidance. The soil type will have a ph (alkalinity) of around 7 to 7.5 and is suited to support a wide range of trees and shrubs.

4.0 Results of the Tree Survey and constraints.

- 4.1 The full tree data sheet for the one tree may be found in Appendix **A**. The categorisation of trees may be a contentious issue but by using the guidelines in BS5837:2012 a uniform approach may be adopted. The trees have been categorised as shown in the table below.
- 4.2 There is only one tree to be removed a poor-quality declining Horse Chestnut. The Sycamore tree will require protection during construction and Heras fence is normally recommended.

5.0 Existing Hedges

There is a Privet hedge round most of the site with some dead tree stumps on the north side of the garage.

6.0 Arboricultural Implications Assessment

- 6.1 The primary criterion in arboricultural terms is the retention of as many trees as is practicable. Quite apart from the requirement to retain some of the existing character, the presence of trees is generally accepted as being beneficial to the environment. The following is an assessment of the effects of the proposed development on existing trees and the future landscape. Full details of recommended tree works are provided within the tree details in appendix **B**.
- 6.2 Root Protection Area (**RPA**) of the tree will put constraints on the new building and any proposed foundations dug may affect the health of the tree. I understand that the intention is to use piles and a suspended slab, to limit the impact on the existing tree roots. This area is shaded brown on Tree Protection Plan.
- 6.3 Root protection measure will be required as the **RPA** of the Sycamore tree covers almost the entire site entire garden and I suggest foundations be beams and suspended slab involving minor excavation that I understand is already proposed. Before carrying out any excavations after demolition of garage I would recommend digging trial holes by hand to establish depth and presence of roots to establish foundations required.
- 6.4 I am recommending that areas being worked over the **RPA** where fencing is not possible be protected with Heavy duty metal, plastic sheets or Heavy plyboard, coloured brown on the Tree Protection Plan.

7.0 Tree Protection Plan.

- 7.1 The full Tree Protection Plan **TPP/UPDR/122/17** is attached to this report.
- 7.2 Tree protection fencing is recommended to be of the "Heras" type and set out as shown on the TPP as a continuous red line. Once in place it should be regarded as "sacrosanct" and not be moved or altered without authorisation. Warning notices are to be placed on the fencing to remind site staff.
- 7.4 All personnel on site shall be made aware of the **TPP** and understand its importance prior to any on site activities.
- 7.5 The storage of materials, chemicals or use of fires or machinery shall not take place within the protected fenced area.

8.0 Arboricultural Method Statement (AMS)

8.1 To take account of all operations including access that are proposed that may come within the RPA and canopy of any retained trees taking a precautionary approach appropriate to the proposals on this site. AMS will need to be updated after the final design stage to take account of design.

8.2 Factors that need to be further considered are likely to be.

- a) Access to site, only possible from Upper West Drive.
- b) Intensity of construction activity whether it may cause damage to trees and root protection area.
- c) Car parking, likely to be outside the site on roads.
- d) Phasing of works, may compromise trees at some point
- e) Location of temporary and permanent apparatus including service runs that whenever possible be installed outside of the tree RPA's.
- f) Impact any landscape works may have on tree root systems and little disturbance is recommended i.e. no digging deeper than 150mm to avoid major roots.
- g) Space for storage of materials, cannot be stored within RPA of tree. Mixing cement and concrete, how it will be prevented from contaminating the soil.

8.3 Preliminary Works

- a) Install tree protection barriers as shown on the Tree Protection Plan **WH/TPP/119/17**. Heras type fencing is recommended to protect stem. It is not possible to protect the entire RPA with a fence due to being able to access site. Therefore, ground protection is required to protect the roots from compaction.
- b) Carry out any recommended tree pruning required and any crown lifting or tying back branches to allow clearance for construction.
- c) Details of a system of arboricultural site monitoring and supervision for the duration of the works. BS 5837 now makes a clear requirement for arboricultural supervision during all stages of development.
- d) It may be necessary to use heavy equipment possibly a crane to lift in sections from the road.

8.4 Construction works

- a) Install tree protection barrier as shown on the Tree Protection Plan **WH/TPP/119/17**. Heras type fencing is usually recommended.
- b) Carry out any recommended tree pruning required and any crown lifting or tying back branches to allow clearance for construction.
- c) demolition of building and base, must not involve excavation below existing slab or tarmac surface, refer to appendix E.
- d) Any work over RPA is best protected with heavy sheets of metal plastic or heavy-duty ply board to reduce compaction of ground.

- e) Details of a system of arboricultural site monitoring and supervision for the duration of the works. BS 5837 now makes a clear requirement for arboricultural supervision during all stages of development.
- f) It may be necessary to use heavy equipment possibly a crane to lift in sections.
- g) Site huts must not be placed over **RPA** of trees but can be used as a barrier to protect **RPA's**.
- h) In the event of any work required over Root Protection Area of trees without ground protection to be carried out by hand not by machinery. Any exposed roots shall be wrapped or covered to prevent desiccation, removed prior to backfilling. Roots smaller than 25mm diameter may be cut back using secateurs or hand saw.
- i) Any damage to the trees during construction must to be reported and assessed by an arboriculturalist immediately.
- k) Arboricultural site monitoring and supervision for the duration of the works should be agreed at the commencement of the works whether a requirement or not.

8.5 On completion of all the work ensure all building debris is removed and ground repaired where any damage has occurred to grass. Inspect all trees and note any damage requiring attention.

- a) In the event of any work required over Root Protection Area of trees to be carried out by hand not by machinery. Any exposed roots shall be wrapped or covered to prevent desiccation, removed prior to backfilling. Roots smaller than 25mm diameter may be cut back using secateurs or hand saw.
- b) Any damage to the trees during construction to be reported and assessed by an arboriculturalist immediately.
- c) Arboricultural site monitoring and supervision for the duration of the works should be agreed at the commencement of the works whether a requirement or not.

8.6 List of contacts and detail of relevant parties that shall include:

- Client
- Arboricultural Consultant
- Architect
- Structural engineer
- Planning consultant
- Arun District Council Tree Officer
- Arun District Council Planning Case Officer

8.7 The full Arboricultural Method Statement (**AMS**) may be found in Appendix C.

9.0 New planting and landscape design

9.1 Any new planting plan may need to be created once final plans have been accepted with tree and shrub planting around the site, however being a small garden there is little scope for planting.

10.0 Arboricultural Supervision

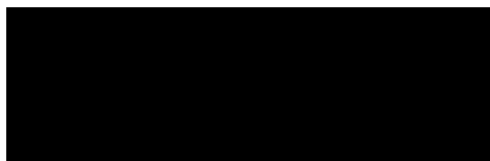
- 10.1 The installation of tree protection measures should be supervised by an appropriately experienced Arboriculturist who should be appointed to monitor the observance of those measures for the duration of the development. The requirement for such supervision or not should be agreed before work commences between client and the Planning Case Officer.
- 10.2 The Arboriculturist should directly supervise any works that should be undertaken within **RPAs**. These include the removal of any hard surfacing, installation of any underground services and the construction of any new footpaths or hard surfaces.
- 10.3 It will be important that the arboriculturalist inspects tree protection during the works in view of proximity of trees to the construction and of the parking bays over tree **RPA's**.
- 10.4 The Arboriculturist should be informed immediately of any accidental damage to the trees and will make written recommendations to rectify damage.

11.0 Recommendations and Conclusions

The proposal has been assessed to BS5837:2012 standards. The use of beam foundations and raised slab instead of conventional foundations will eliminate impact on roots as confirmed with architect. To ensure the soil does not dry next to the tree after completion it is recommended that the rainwater gutter, drains into soakaways near to the tree to ensure ground does not dry out.

A copy of the **AMS** and **TPP** provided in this Report should be freely available on site and all site operatives made aware of their purpose and contents. The information and warning signs should be freely available and erected prior to any on site activities.

In conclusion, by using the information and guidelines contained within this Report, there are no Arboricultural reasons to object to this proposal.



Phillip J. Ellis MI Hort. Cert Tech (Arb A)

Dated: 16th November 2017

Photographs



Fig 1 View of site looking north



Fig 2 view of site looking south



Fig 3 Sycamore



Fig 4 Horse Chestnut



Fig 5 Garage to be demolished



Fig 6 Front of garage facing road

Appendix A - Tree Survey Data

Common Name	Maturity	Height (m)	Stem Diameter mm	Crown Spread (m)				Life Expectancy	Physical Condition	BS Category	Condition comments	Recommended work
				N	E	S	W					
Sycamore	Over Mature	9	770	4	4	5	4	10 to 20 yrs	Fair	C (2)	Pruning wounds, minor deadwood in crown and leans to East. Evidence of tree previously pollarded at least 30 years ago.	No action
Horse Chestnut	Semi mature	7	280	2	2	2	2	<10yrs	Poor	U	In decline due to presence of bacterial canker of stem and leaf miner and blight, common with this species.	Fell and remove stump. Replant with 4m high tree, species to be agreed

The tree works should be carried out to an appropriate standard and works should be carried out to a minimum standard and is "Tree Work" BSI 3998: 2010 and contractor's staff should also have appropriate craft certificates of competency.

Appendix B - Root protection areas of retained trees

Common name	Stem diameter (mm)	Radius (M)	RPA (M2)
Sycamore	1070	12.8	518

Appendix C

Arboricultural Method Statement (AMS)

Proposal to demolish existing Garage and construct a dwelling

Pre-Construction Measures:

- 1.0 All operatives working on site shall be made aware and comply with the recommendations of the Tree Protection Plan and how to avoid damage to the tree structure and the root system prior to any commencement of onsite operations. The leaflets in appendix F should be made freely available to site operatives.
- 2.0 Site huts and facilities will be positioned outside of the **RPA** of trees to cause no harm to the protected trees.
- 3.0 No construction vehicles, materials, or other items deemed to be injurious to the trees may be stored within the RPA of the trees shown on the Tree Protection Plan.
- 4.0 No excavating machinery may be operated within the **RPA** without protective measures and the specific approval of the supervising Arboricultural representative. Ground protection such as Ground guard multi track or similar is to be laid over area of RPA shaded blue on the TPP to protect roots and compaction of ground. Ground protection to remain in place for the entire construction phase.
- 5.0 Tree protective measures shall be put in place prior to any other site activities. These protective measures remain in place during demolition and completion of construction phase

Preliminary Works:

- 6.0 Install tree protection measures as per the TPP plan or as agreed on site with Arboriculturalist.
- 6.1 Undertake pruning works if recommended.
- 7.0 Demolition of garage and base, refer to appendix E.
- 8.0 Construction phase as per contractor's method statement taking into account protection measures for the tree within this report.

8.0 Completion of the Works.

- 8.0 Upon completion of the project, the removal of the ground protection may only be undertaken with the approval of the supervising Arboriculturalist. Damage to the trees or incursions into the RPA will be noted and recorded to the relevant authorities.

Root-Spanning Foundations**Principles of Pile and Beam Foundation Design in Root Protection Areas**

1. **Piles** – the installation, be the piles driven or augured, will require some form of protection against ground compaction caused by plant and general pedestrian activity in Root Protection Areas. This is usually achieved with a piling mat of some form of load-bearing material (e.g. road planings) rolled onto geotextile membrane, which in turn should be laid over a woodchip mulch to dissipate ground loading and provide a visual demarcation to the existing ground level when the mat is taken up. Whether the mat needs to be taken up after the operation will depend on circumstances, but it is usually good practice to do so.

The other factor is headroom. Clearly some judgement of clearance to trees is required. However, it is not always desirable to prune branches to create the required clearance and as an alternative this can be achieved by tying them back to deflect them. Again, this is a matter of judgement on site and may require a specific choice of piling rig.

The position of piles should as far as is possible be determined by the need to minimise intrusion into a Root Protection Area. This may have implications for the design of the building. Particularly when a long ground beam is the only solution.

The main loss of root mass from pile installation is the pile cap, as this usually has to be under the ground surface level. Calculations as to the area of roots lost must include a "plume" of loss roots extending away from the tree from each pile cap to the edge of the Root Protection Area. The Root Protection Area needs to be increased by the same aggregated area of the plumes.

2. **Beams** – referred to as ground beams. Normally a ground beam will be designed to have its top edge more or less level with the ground. The principle of root protection is the recognition that the majority of the assimilative root mass is shallow and so where a beam crosses a Root Protection Area it must not be any deeper than can be accommodated in an excavation of an absolute maximum of 10 centimetres in depth. This allows for minor ground level undulations and positive contact with the ground to provide a barrier to rodents, although air must be allowed to circulate if there is a void underneath.

Where the soil is shrinkable there may be a need for a compressible zone beneath the beam, in accordance with the guidance in NHBC Standards, Chapter 4.2. That all roots might be severed to this depth is usually unacceptable. An acceptable method is to use some form of expanded polystyrene as the compressible material that can be cut or inserted between roots. The "trench" is opened using either compressed air or manual digging so that roots are not severed. An assessment of the exposed roots can then be made to determine a sensible degree of pruning. This must strike the correct balance between retaining as much root material as possible whilst allowing the compressible material to be structurally coherent.

The cross-section of a root-spanning ground beam should be "squat" with a width greater than its height. This reduces the extent to which the building is raised, with emphasis upon internal finished floor levels, external access levels (particularly fire escapes) and even roof apex height where this may be a material design factor.

The other factor with a root-spanning ground beam that protrudes above ground level is its architectural or cosmetic appearance. It is possible to attach some form of bonded finish but it is also practical to cast or weld a ledge extending outwards at ground level to support facing brickwork, brick slips or other material. Building up a sloping shoulder of soil may only be possible in exceptional circumstances. Ducted rainwater to the underneath may also be necessary if the building covers a significant proportion of the Root Protection Area.

Appendix E

Method Statement for the removal of hard surfacing and buildings near to trees

[RPA refers to the Root Protection Area as specified in the Report]

1. The uptake of the existing surfacing and buildings should be carried out from outside the RPA whenever possible and from within the footprint of the existing surfacing or building where within the RPA of a tree.
2. The excavation of the material must not extend into the soil underneath. In practical terms the bucket of an excavator must be used so that the teeth are horizontal so that any disturbance of the underlying soil is kept to an absolute minimum. Where the surfacing is very thin and/or roots are very near the surface, the digging should be done manually.
3. The rubble must not be stockpiled within the RPA of the tree and must be exported without crossing the RPA.
4. Due care and planning must be taken to ensure that the operational arcs of excavators do not damage the crowns of retained trees.
5. Where new surfacing is to be installed, if the depth of the old surface is insufficient, the wearing surface may need to be higher than existing in order to accommodate the appropriate thickness. There may be a requirement for a geo-textile membrane to be laid on the soil surface, but this is an engineering matter dependent upon soil type. The separation is beneficial for root development.
6. Where the old surface is taken up and not replaced, the infill should be of good quality topsoil laid no less than 30mm above existing levels to allow for settlement.

Appendix F Fencing

Extract from British Standard 5837: 2012 Trees in relation to design, demolition and construction - Recommendations

Figure 2.

Indicated framework support as the usual method of support for steel mesh panels ('Heras'). Some variation can be employed if appropriate, such as support by wooden posts (75mm x 75mm x 2.75m) dug or concreted into the ground (dry mix concrete contained within a plastic bag), or if there is no pressure of access a lighter form of netting on driven stakes.

Default specification for Tree Protection Barrier

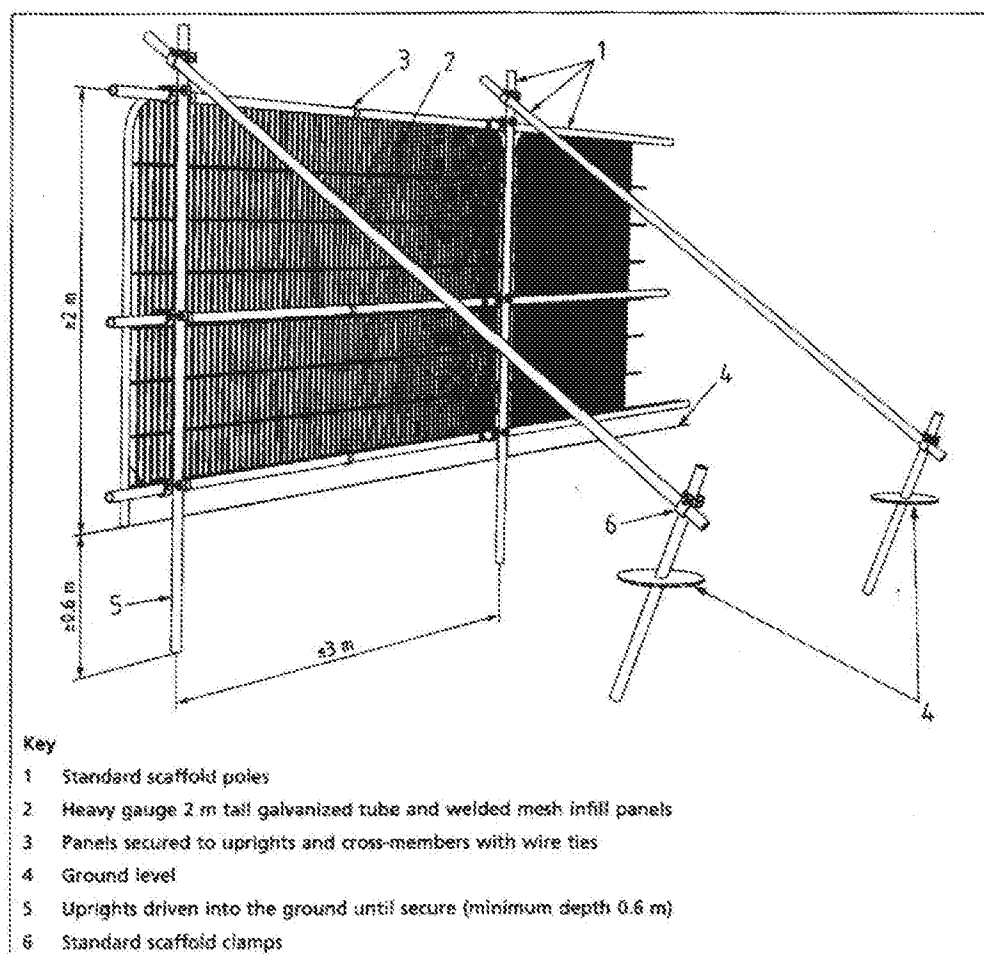
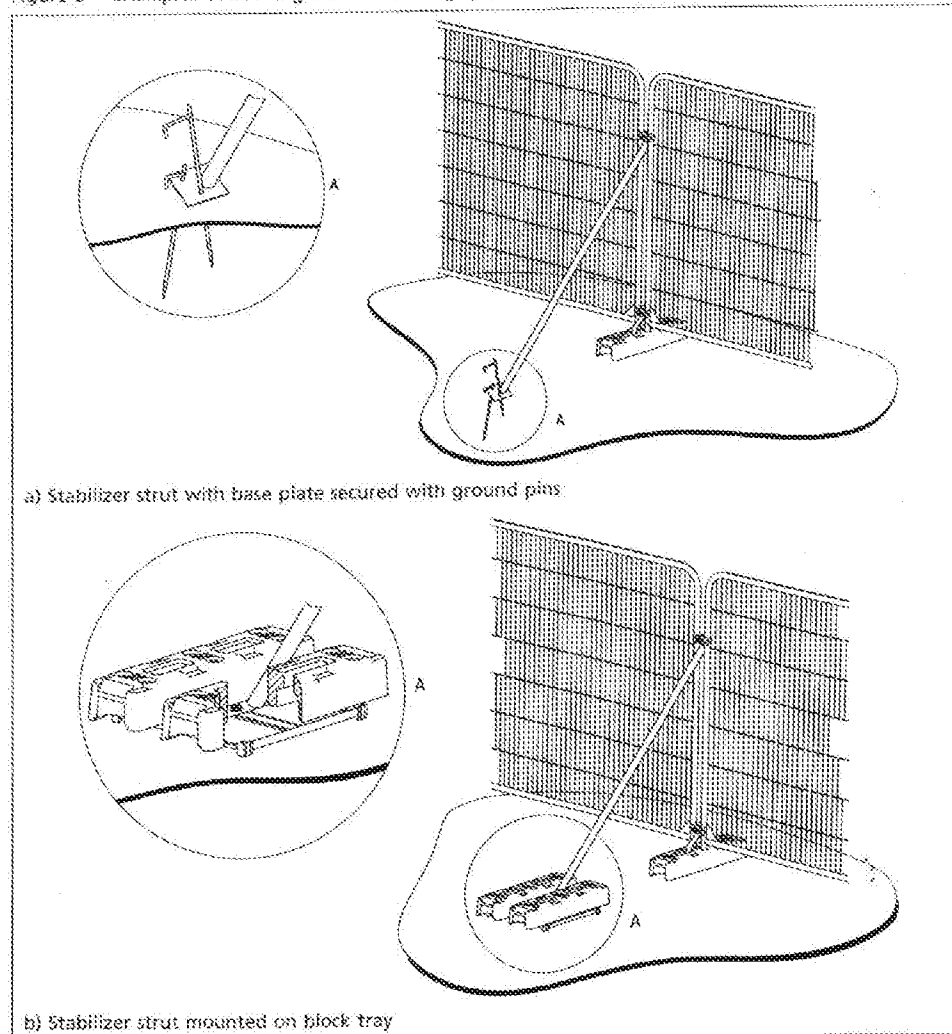
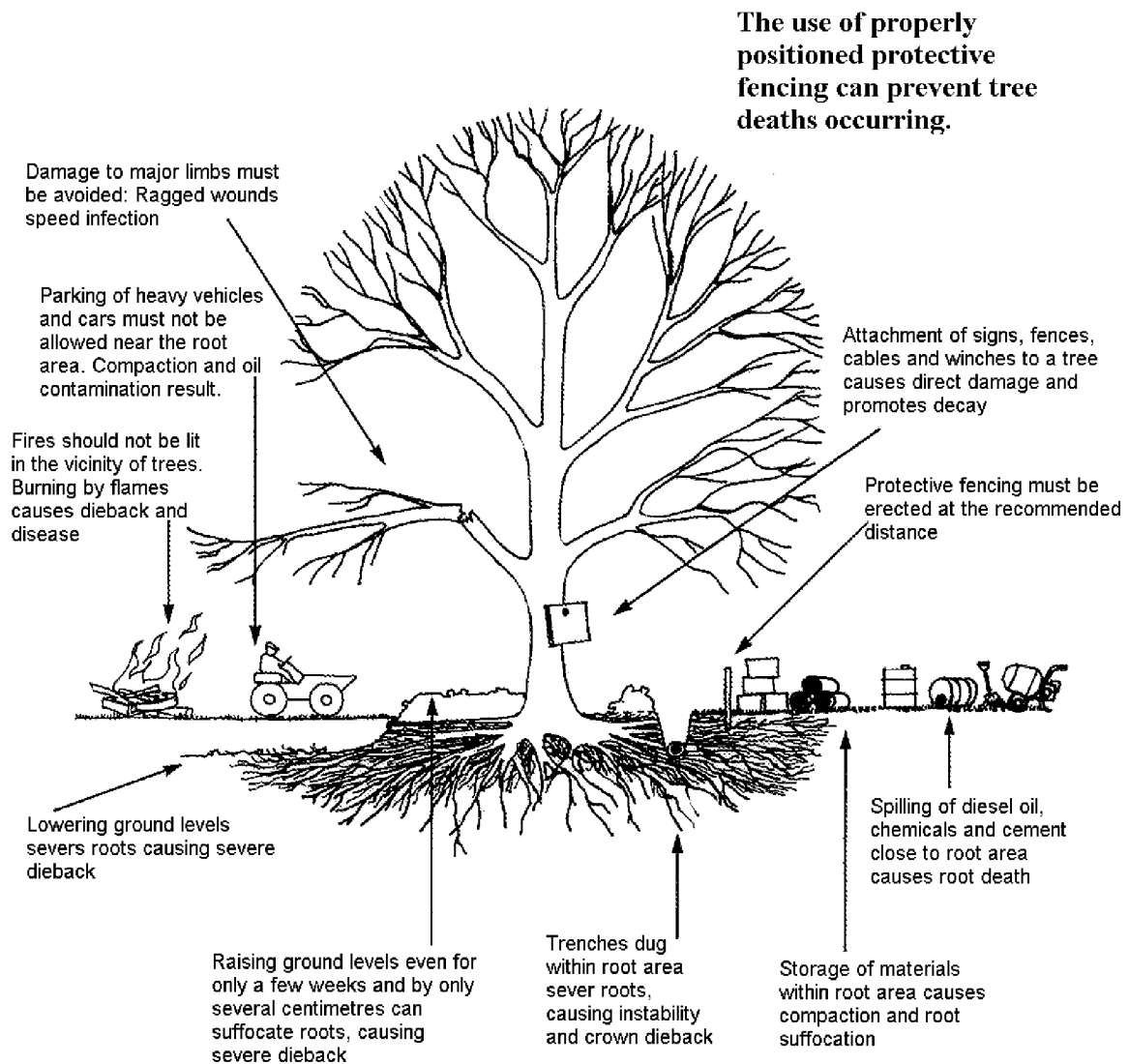


Figure 3 Examples of above-ground stabilizing systems



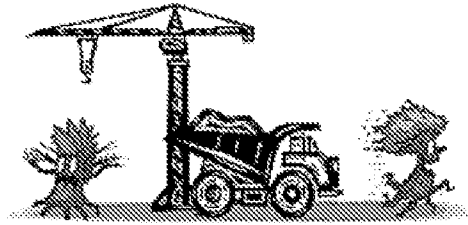
Common causes of Tree Death



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

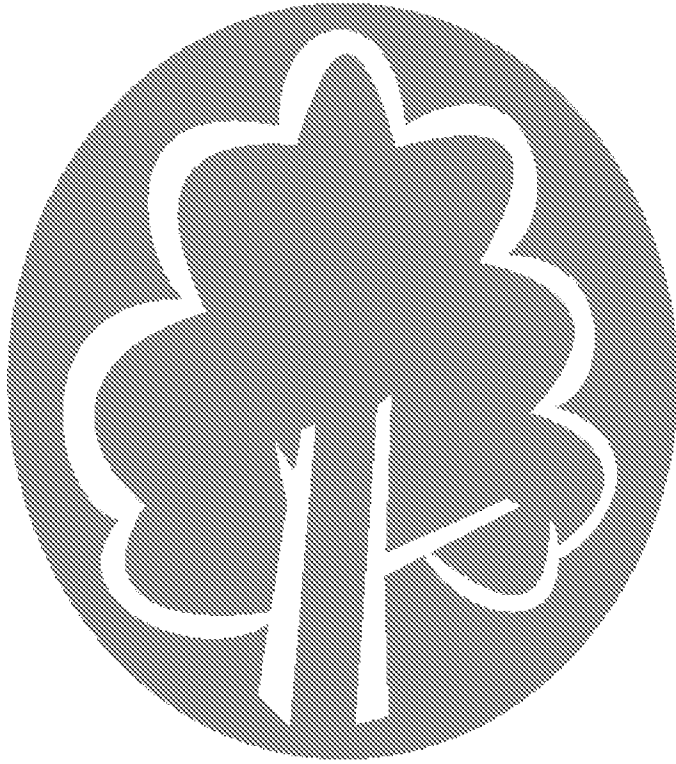


Construction and Trees



Why Is Fencing Erected Around Trees?

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



**PROTECTIVE FENCING. THIS
FENCING MUST BE
MAINTAINED IN ACCORDANCE
WITH THE APPROVED PLANS
AND DRAWINGS FOR THIS
DEVELOPMENT.**



**TREE PROTECTION AREA
KEEP OUT !**

**(TOWN & COUNTRY PLANNING ACT 1990)
TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY
PLANNING CONDITIONS AND/OR ARE THE SUBJECT OF A
TREE PRESERVATION ORDER
CONTRAVENTION OF A TREE PRESERVATION ORDER
LEAD TO CRIMINAL PROSECUTION**

**ANY INCURSION INTO THE PROTECTED AREA
WITHOUT THE WRITTEN PERMISSION OF THE
PLANNING AUTHORITY**