Quaife Woodlands AR/3357c/jq

# Arboricultural Survey and Planning Integration Report

at

# Brook House and Springfield Garden Centre, Cranbrook Road, Hawkhurst, Kent. TN18 5EE

30th October, 2017

# C O N T E N T S

*Arboricultural and Woodland Consultants*

# Quaife Woodlands

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## ARBORICULTURAL REPORT

| | | |
|---|---|---|
| **LOCATION** | Brook House and Springfield Garden Centre, Cranbrook Road, Hawkhurst, Kent. TN18 5EE | **REF:** **AR/3357c/jq** |
| **CLIENT** | Esquire Developments Ltd., Studio 3, The Old Laundry, Green Street Green Road, Longfield, Kent DA2 8EB | **DATE OF REPORT** 30th October, 2017 |
| **REPORT PREPARED BY** | J. Quaife, AA Registered Consultant Dip.Arb.(RFS), F.Arbor.A, CEnv. | **DATE(S) OF INSPECTION** 25th June, 3rd August, 2015 6th September, 2017 |
| **SURVEY INSPECTOR(S)** | J. Quaife, AA Registered Consultant Dip.Arb.(RFS), F.Arbor.A, CEnv. | **SHEET No.** 1 of 10 |

| | |
|---|---|
| **LOCAL AUTHORITY** | Tunbridge Wells Borough Council |
| **CONTACT** | Arboricultural Officer Mr D. Docker |

*Please note that abbreviations introduced in* [square brackets] *are used throughout the report.*

**INSTRUCTIONS**

**Issued by – Mr P. Paulding, on behalf of Esquire Developments Ltd., address as above.**

**TERMS OF REFERENCE – To survey the subject trees to assess their general condition and to provide a planning integration statement for the REVISED proposed development that safeguards the long term well being of the retained trees in a sustainable manner.**



**Summary**

This is a revision of the original proposal and subsequent amendment, and now provides 25 apartments in two blocks which is a preferred option for residential provision by TWBC. The existing office building is to be demolished and the new entrance drive is to have a modified line, and the existing drive entrance is also to be retained. The existing bus stop to the south of the new entrance is to be improved..

The southern part of the site contains a band of trees which forms a part of a larger woodland category Tree Preservation Order and there are other self-seeded trees in the northern part of the site. Unlike standard tree surveys I have not recorded individual trees because virtually all of those within the TPO are retained, and of the others which are minor specimens, those with screening value have been retained. As a consequence the arboricultural landscape impact will be neutral and the proposal will be private and secluded in a distinctly arboreal setting.

The protection of retained trees can be effected in accordance with current standards and guidance, and there are no matters of post development pressure upon trees that could not be managed with routine maintenance.

The proposal is sustainable in arboricultural terms.

**Documents Supplied**

- Hook Survey Partnership Topographical Survey Plan ref: S15/4742/01 dated May 2015
- Clague Architects Proposed Layout Plan ref: 22335A/SK100C revision A dated September 2017
- KB Ecology, Preliminary Ecological Appraisal, ref: 2015/06/03 dated 18th June, 2015
- Tunbridge Wells Borough Council Tree Preservation Order No.35/2002

**Scope of Survey**

1.1 The survey is concerned with the arboricultural aspects of the site only.

1.2 The statutory protection status of the trees on site is that they are all protected by a woodland category Tree Preservation Order [TPO] W1. The TPO extends from Cranbrook Road westward and the subject site includes less than half the area, as shown at Appendix C.

1.3 I had preliminary contact with Mr Docker to establish the extent to which the Council would wish to maintain the TPO. Subsequently the design team met with planners, a highways officer and the arboricultural officer at the TWBC offices on the 23rd August last year to formulate the previous scheme to this one. This proposal has been changed toi better accord with the Council's residential provision targets.

1.4 The trees were inspected on the basis of the Visual Tree Assessment method expounded by Mattheck and Breloer (The body language of trees, DoE booklet Research for Amenity Trees No. 4, 1994).

1.5 I did not record a schedule of trees as the survey was undertaken in the terms of the woodland TPO and very few within it are to be removed, along with a few small specimens to provide space for the required bus stop enhancement. The other trees which are to be removed are not protected and are all minor specimens. The Root Protection Areas of the retained trees are based primarily on crown footprints with allowances for existing structures and hard surfacing (see paragraph 8.3 below). The Tree Protection Measures are in accordance with British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations [BS5837].

1.6 Pruning works will be required to be in accordance with British Standard 3998:2010 Tree work - Recommendations [BS3998].

1.7 Reference is made to the National House Building Council Standards, 2014, chapter 4.2, Building near trees [NHBC].

1.8 This report does not cover the arrangements that may be required in connection with the laying or removal of underground services.

1.9 This report does not set out the working specifications of tree protection measures and engineering and design features, but provides enough detail in principle to demonstrate the feasibility of the scheme.

**Survey Method**

2.1 The survey was conducted from ground level with the aid of binoculars.

2.2 No tissue samples were taken nor was any internal investigation of the subject trees undertaken.

2.3 No soil samples were taken.

2.4 The crown diameters were estimated by pacing or visually where access was difficult.

2.5 The positions of the subject trees are plotted at Appendix B derived from the supplied topographical plan as adjusted from my site visit. Please note that the attached plan is for indicative purposes only.

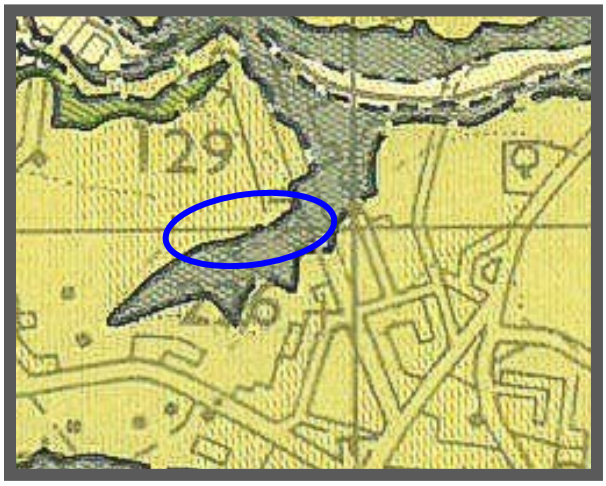
**The Site**

3.1 With reference to Appendix A the site is in the northern part of Hawkhurst and is situated on the western side of Cranbrook Road. The site entrance is at the northern end of the road frontage and serves the Springfield Industrial Estate, a veterinary practice and a roofing supplies depot. Brook House is an office premises.

3.2 The site is divided by the drive which curves to the south-west and around the southern side of the buildings, and curving north to the roofing supplies depot. The area south of the drive has various trees with understory growth, beyond which is a small stream in a cutting. (There is an abandoned, derelict boat straddling the stream). The zone along the road frontage has been cleared of scrub and is currently open.

3.3 The site slopes down from the northern boundary to the south and to the north-east of Brook House is a zone of sapling trees which appear to be self-sown. To the west of Brook House is an area of open grass with natural regeneration encroachment.

3.4 The site is ringed in blue on this extract reproduced from the Geological Survey Drift Map, Sheet 304, Tenterden (by permission of the British Geological Survey ©NERC. All rights reserved). The indicated soil parent material shown green is Wadhurst Clay and the yellow area is Tunbridge Wells Sand.




*C08/105-CSL British Geological Survey.*
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3.5 The precise accuracy of the boundary between the two soil types is difficult to apply to the topographical survey, although the impression is that the small brook may be the divider.

3.6 Clay is shrinkable and susceptible to compaction which is harmful to tree roots, whereas the sandy soil is more forgiving. For the purposes of this project to err on the side of caution I have assumed the soil to be clay-based

**Ecology Informative**

4.1 Bats are protected under the Wildlife & Countryside Act 1981 and subsequent legislation and The Conservation of Habitats and Species Regulations 2010 and it is an offence to deliberately or recklessly disturb them or damage their roosts. Trees should be inspected before any works commence and if the presence of bats is suspected advice will need to be sought from the Natural England Bat Line on 0845 1300228. Further advice on bats is available from The Bat Conservation Trust (020 7627 2629).

4.2 Tree work should as far as is possible avoid the bird nesting season, which officially (natural England) is from February until August, although the busiest time is from 1st March until 31st July.

4.3 Please also be aware that ecology is governed principally by;

- the Wildlife and Countryside Act 1981 (as amended by the CRoW Act 2000),
- the Conservation of Habitats and Species Regulations 2010,
- the Wild Mammals (Protection) Act 1996, and
- the Natural Environment and Rural Communities (NERC) Act 2006.

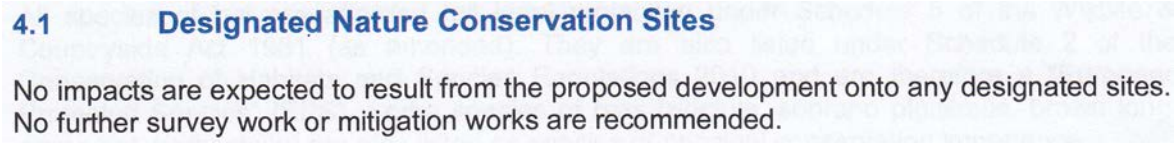
**Subject Trees**

5.1 I have not recorded the individual subject trees because only some of the understorey south of the drive is to be removed leaving all the trees, and the other trees to be removed north of the drive are of no material landscape value. Additionally a few small trees are to be removed to create space for the bus stop enhancement. The comparison between existing and proposed layouts in terms of tree retention is shown at Appendices A and B.

5.2 The species mix of the subject trees is oak, ash, willow, beech, rowan, birch and hazel, with understory species of similar species. The trees north of the drive have grown largely through opportunism. The trees in the band south of the drive are protected as woodland, but they are first generation riparian growth and as yet have few characteristics of long-established woodland.

5.3 Overall the trees are in reasonable condition other than some over-mature coppice willows within the band of trees south of the drive. This band of trees is part of the TPO which is a single woodland category, W1. I have included a copy of the TPO Plan at Appendix C along with a reconciliation of the eastern part of it containing the subject site. The only tree of individual significance is the oak, south of Brook House, annotated at Appendices A and B.

5.4 The KB Ecology Phase 1 ecological survey does not identify any ecological value that needs to be accommodated in respect of Designated Conservation Sites, as set out at paragraph 4.1 which I have reproduced (scanned) below.



**4.1 Designated Nature Conservation Sites**

No impacts are expected to result from the proposed development onto any designated sites. No further survey work or mitigation works are recommended.

5.5 The report cites the potential habitats for various wildlife species, but there is only one tree which is identified. This is a Goat willow (named as an ash in the report) which is labeled at Appendices A and B, and has two small branch loss cavities on the main stem (arrowed). The photograph included in the report is indistinct and so I have included the photograph which I took (right). The cavities are shallow and exposed to squirrels and in my opinion I doubt that they are significant, and I could see no evidence of their use by bats.

(I attended the three-day course run by the Bat Conservation Trust and am familiar enough with the BS8596 Bat Micro-guide to recognise potential bat roosts.)

5.6 None of the subject trees presents any significant risk, although some would benefit from some remedial tree surgery to remove dead wood or minor defects as a matter of routine maintenance not directly associated with the proposal. In the band of trees south of the drive there are two major coppice willows both of which are near collapse and the prescription for action will need to be agreed with the Council's Arboricultural Officer. The agreed work has no direct relationship to the proposal and is not material to it, but is a matter of prudent management.

**The Proposal**

6.1 The proposal is set out at Appendix C and is to demolish the existing building and construct 25 apartments, 6 in one block and the remainder in a second block. A total of 30 parking spaces are provided. The existing turning head (**A** at Appendix B) will be taken up and a new turning head for refuse lorries, emergency services and postal vans will be constructed (**B** at Appendix B) further to the west.

6.2 The existing entrance and drive is to be retained for the use of the other premises. A new drive is to be constructed about half-way along the road frontage and will run slightly to the south of the existing drive and with a slightly modified route at the western end..

6.3 The improvement of the bus stop was agreed with TWBC so as to provide for future increased usage. This involves converting the grass verge to a hard-surface platform (design life of 120 years). This will extend west of the road over land that falls away, and will require a natural slope (**C** at Appendix B). Consequently the area required will be in excess of the hard surface footprint.

6.4 There is a prospect of this surface having to be enlarged in the future and to that end we agreed that the clearance of trees should allow for this. Notwithstanding this, new trees are to be planted even though some may have to be removed subsequently.

**Arboricultural Landscape Integration**

7.1 The primary landscape design intention is to retain the woodland TPO that band of trees and to that end only two subject trees within the TPO are to be removed, apart from those in the vicinity of the improved bus stop.

7.2 The unprotected trees to be removed elsewhere on the site are all minor specimens within built footprints and too numerous in the proposed gardens. However, there is a group of trees to be retained to the rear the larger block (**D** at Appendix B), which will provide screening to the industrial area.

7.3 The repositioning of the drive will require the removal of understory species, but this will not compromise the screening afforded to the south, and only two of the plotted trees will be removed, but both these are small insignificant specimens.

7.4 There are no indicative proposals for tree and shrub planting as part of the proposal, but the use of such planting to provide visual softening of the built form and strategic screening of certain sight lines is part of the landscape design concept and this can be left to a condition. This would include treatment of the road frontage, although an indigenous species hedge would be one of the appropriate options.

7.5 At the TWBC meeting we agreed that a specimen tree should be planted in the front garden of a unit which is no longer planned. However although the area north of the main entrance is to be a green space, a landmark tree would still be appropriate and it should be a species that has prominence. Mr Docker and I are content to agree the species and precise position by condition but I have indicated the approximate position of it at Appendix B.

7.6 In summary, the loss of those trees to be removed will not detract from the landscape and will not have a detrimental visual impact upon the character and appearance of the area.

7.7 In the band of trees south of the drive there are two major coppice willows both of which are near collapse and the prescription for action will need to be agreed with the Council's Arboricultural Officer, although they could be coppiced. There will be some need for minor pruning in respect of headroom over the drive but as this is in the interior of the site it will not be easily discernible from without and will not diminish the landscape presence of the trees.

**Post Development Pressure**

8.1 The concept of post development pressure is not that routine maintenance work to maintain clearances and the proportionality of trees is unacceptable. The term should more accurately be one of irresistible post development pressure where the spatial or physical relationship of a retained tree to a structure or feature demands pruning or removal that is inappropriate, but to which the local planning authority could not reasonably refuse consent.

8.2 The spatial relationship of the two proposed buildings with the retained trees is generous with group D to the north of the larger block and the trees to the south of it on the other side of the new drive have sufficient separation to minimise any conflicts.

8.3 Accordingly, neither of the buildings is close enough to trees to warrant the inclusion of features to ease the maintenance arising from leaf and detritus fall, however given the soil type the foundation design of the larger building may need to incorporate NHBC recommendations.

8.4 The conservation of the arboreal character of the site will lend an air of privacy and seclusion, and taken as a whole there will be a distinct "sense of place" and identity.

8.5 In consideration of these matters, there will be no appreciable post development pressure, and certainly none that would oblige the Council to give consent to inappropriate tree works. In fact there is every expectation that the retained trees will be valued as a major landscape asset.

**Tree Protection Measures**

9.1 The BS5837 gives a Root Protection Area [RPA] for a retained tree by reference to Section 4.6 in the BS. The RPA is an estimation of the area of the root system that would need to be retained to sustain the condition of the tree if all the other roots outside it were to be severed. The RPA represents a smaller proportion, (on average only a third), of a tree's root system and consequently whilst the RPA is particularly important to ensure that there are no adverse effects upon stability, if an encroachment does not reduce the overall assimilative function of the root system significantly it is unlikely to cause harm. However, as with any factor relating to trees each individual situation must be justified in site-specific terms.

9.2 The RPA is usually described as a circle with a radius (Root Protection Area Radius [RPR]) of the prescribed distance within which no unspecified activity should occur, though the shape and position of the RPA can be modified by an arboriculturist to meet individual site conditions according to the probable distribution of the tree roots. Intrusion into the RPA can take place only where the ground is adequately protected in accordance with the requirements of Section 6.2.3 of BS5837 or where work is carried out to an agreed design and working method.

9.3 As I explain in paragraph 1.5 above, I have not calculated the RPAs, but have relied upon the plotted crown footprints. This is a departure from BS5837 which I am content with for the following reasons:

i) All the subject trees are in groups and the RPAs will as a consequence be intermingled and determined by the larger trees, with little distinction of the smaller trees.

ii) The retained trees to the rear of the larger building are on land which which slopes upwards to the north and the combined RPAs will be protected by TPF (see paragraph 9.5 below).

iii) The natural limitation of the RPAs of the trees in the TPO is the northern edge of the existing drive. The timing and method of uptake of the existing drive, the construction method of the new drive and more general protection means that the trees will be satisfactorily protected on the basis of their combined RPAs.

9.4 **RPA Encroachment** The only RPA encroachments are with the trees south of the drive and the slight incursion at the north-western corner of the larger building, and the applied methodologies to safeguard them are set out in section 9.8 below.

9.5 **Tree Protection Fencing** The combined zones of RPAs form the Construction Exclusion Zone [CEZ] and will be protected by a Tree Protection Fence [TPF] comprising steel mesh panels of 1.8 metres in height ('Heras'). Where positioned at the north-western corner of the larger building these panels will be mounted on a scaffolding frame as shown at Figure 2 of BS5837 (Appendix D). Where the TPF is not likely to be under pressure from construction activity along the southern edge of the new drive the panels can be supported in a lighter manner as shown at Figure 3 of BS5837 (Appendix E).

9.6 The TPF is to be erected before any work commences on site, is to remain in situ undamaged for the duration of all work or each phase, and only to be removed once all work is completed. The only exception is the completion of soft landscaping, but if any excavations however minor, are to be carried out as part of soft landscaping within RPAs, an arboricultural assessment must be carried out beforehand and any additional arboricultural protection measures incorporated. The TPFs are to carry waterproof warning notices denying access within the CEZ.

9.7 The demolition and surface uptake can be contained within the TPF for construction and so no alteration of its position will be necessary. Where existing hard surfacing to be removed is within an RPA (**A** at Appendix B) the working method at Appendix F will be used.

9.8 **Ground Protection** There is one zone at the north-western corner of the larger building which requires ground protection in accordance with the specification at Appendix G.

9.9 Where scaffolding is to be erected in this RPA zone it is necessary to place the feet directly onto the ground to achieve a stable working structure. The collective footprint of the scaffolding feet on the soil will represent a minor proportion of the RPA and will not be a significant factor in terms of ground compaction.

9.10 **New Surfacing** The proposed new drive will encroach into the combined RPAs of the trees to the south and will be constructed using a No-Dig method, the principles of which are set out at Appendix H.. It will be installed initially as part of the new access road as it constitutes a tree protection measure. These areas are indicated with hatching at Appendix B:

9.11 **General Matters** The surface water run-off and soil drainage have not been studied. However, due to the site topography and soil type, I do not foresee any detrimental effects on the trees in hydrological terms as a result of this development.

9.12 I have not been advised of the underground service routes, but it seems logical to suppose that they will connect to existing service runs, or if new routes are to be installed they can avoid RPAs. Clearly if any underground service routes should need to enter an RPA, the provisions of BS5837 and NJUG 4 should be employed and if necessary, further arboricultural advice sought.

9.13 Where existing or proposed drains pass within the root system of a tree (not just the RPA), technical advice must be sought to assess the root-tightness of joints. Modern compression joints do not reliably prevent root ingress and it may be necessary to upgrade them.

9.14 The hard landscaping operations are part of the construction works and although they will be carried out within the construction phase tree protection measures, they will have no significant impact upon retained trees.

9.15 The protection of the trees will also include recognition of other types of potentially damaging activities, such as the storage of materials (and other substances likely to be toxic to plants), parking, site-building requirements, and the use and parking of plant. Particular care and planning is necessary to accommodate the operational arcs of excavation and lifting machinery, including their loads, especially large building components such as beams and roof trusses. Operations like these have the potential to cause incidental damage and logistical planning is essential to avoid conflicts.

9.16 One of the main tree protection considerations will be the logistical management of the site. The access and available storage space is limited and careful materials handling and storage, vehicle and plant access, and personnel accommodation and welfare will need attentive planning.

**Conclusions**

10.1 I have not recorded a schedule of trees as all those which are protected will be retained (apart from two). The other unprotected trees to be removed are of minor landscape significance. The retained group provides useful screening to the industrial site. As a consequence the developed site will have the arboreal character conserved, and will be secluded with a distinct “sense of place”.

10.2 This further-revised scheme has been formulated in discussion with TWBC and the arboricultural aspects which have been agreed in principle are included, subject to the approval of this report.

10.3 The retention of all the significant trees means that the arboricultural landscape impact of the proposal will be neutral. There is some minor scope for new tree and shrub planting in residential scale.

10.4 The retained trees do not cause any significant conflicts in terms of construction activities, nor will any significant issues of post development pressure be likely to emerge that could not be managed with routine maintenance.

10.5 The retained trees will all be protected in accordance with current standards and guidance, including particular with logistical planning.

10.6 For trees to be sustainable within a development proposal they must be compatible with their surroundings, not just in terms of long-term spatial relationship but also in respect of minimising any potential conflicts to matters of routine maintenance. This proposal achieves this objective.

10.7 I have taken account of the information given to me and my own observations on site and I am satisfied that this scheme is arboriculturally sound and that the long-term well-being of the retained trees will be safeguarded in a sustainable manner.

**Recommendations**

11.1 The successful integration of the proposal with retained trees will need to take account of the following points:

i) Plan of underground service routes.

ii) Implementation of the tree protection measures and methods set out in this Report.

iii) Site logistics plan to include storage, plant parking/stationing, materials handling.

iv) Site supervision – Following and induction meeting conducted by the project arboriculturist with all those involved in attendance, an individual, e.g. the Site Agent, will be nominated to be responsible for all arboricultural matters on site. This person must:

a) be present on site for the majority of the time,
b) be aware of the arboricultural responsibilities,
c) have the authority to stop any work that is causing, or has the potential to cause harm to any tree,
d) be responsible for ensuring that <u>all</u> site operatives are aware of their responsibilities toward trees on site and the consequences of any failure to observe those responsibilities,
e) make immediate contact with the local authority and/or the project arboriculturist in the event of any tree related problems occurring, whether actual or potential.

11.2 As a matter of course these points will be resolved in consultation with and subject to the approval of the planning authority through their Arboricultural Officer.

11.3 The sequence of works should be as follows:

i) initial tree works – tree removal and pruning
ii) installation of TPF
iii) demolition and site clearance
iv) uptake of the existing drive
v) installation of underground services
vi) construction of new drive and other hard surfaces
vii) main construction, including hard landscaping
viii) removal of TPF
ix) soft landscaping including tree and shrub planting

**Quaife Woodlands** **Arboricultural Survey AR/3357b/jq**

**Brook House, Cranbrook Road, Hawkhurst, Kent, TN18 5EE**

Site Plan - Existing Layout

Scale 1:400 approximately @ A3

June/August, 2015
September, 2017

0 10 20 30 40 metres

*Scaling accuracy is sufficient for planning purposes but this drawing should not be used for construction*

*This plan is drawn in colour so monochrome reproduction may be unreliable*

# Appendix A

- Existing Tree
- Site Boundary
- Existing Building
- Existing Vehicular Surfacing

NORTH

SPRINGFIELD INDUSTRIAL ESTATE

MILBOURNE EQUINE

ELECTRICITY SUB-STATION

CINQUE PORTS VETERINARY SURGERY

CYPRESS HEDGE to 3.2m

BROOK HOUSE

BROOK HOUSE

WILLOW

CYPRESS HEDGE to 2.5m

OAK

BROOKSIDE

THE HOLLOW

CRANBROOK ROAD

BUS STOP

**Quaife Woodlands** **Arboricultural Survey AR/3357c/jq**

**Brook House, Cranbrook Road, Hawkhurst, Kent, TN18 5EE**

Site Plan - Proposed Layout with Tree Protection Measures

Scale 1:400 approximately @ A3 30th October, 2017

0 10 20 30 40 metres

*Scaling accuracy is sufficient for planning purposes but this drawing should not be used for construction*

*This plan is drawn in colour so monochrome reproduction may be unreliable*

NORTH

SPRINGFIELD INDUSTRIAL ESTATE

D

7 - 25

1 - 6

CYPRESS HEDGE to 3.2m

PARKING

PARKING

PARKING

PARKING

PARKING

ELECTRICITY SUB-STATION

ENTRANCE GREEN

CRANBROOK ROAD

EXISTING ACCESS ROAD

NEW ACCESS ROAD AND PARKING

WILLOW
Report para 5.5

CYPRESS HEDGE to 2.5m

PARKING

TURNING

B

PARKING

A

OAK

PARKING

PARKING

PARKING

C

BUS STOP

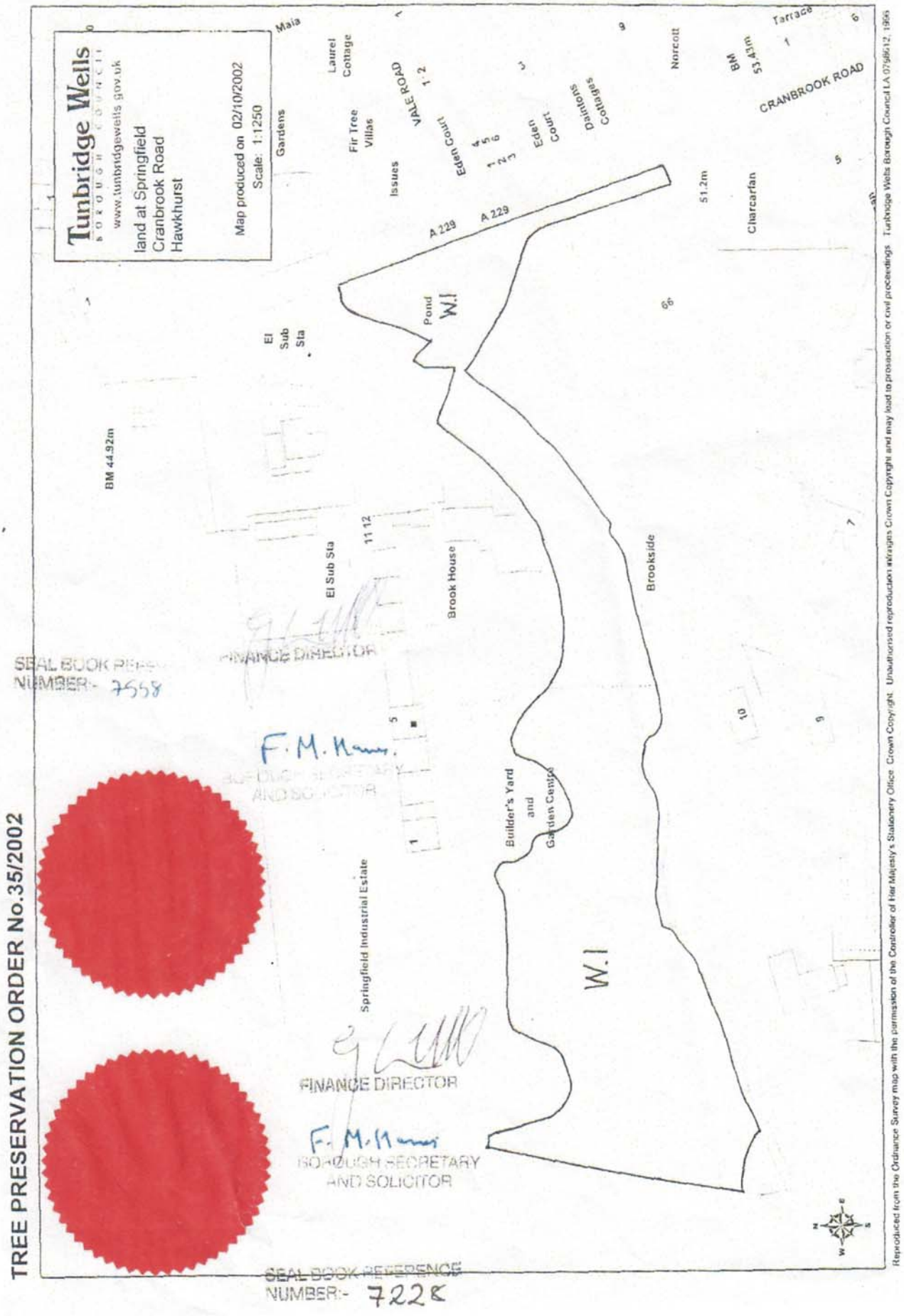
BROOKSIDE

THE HOLLOW

## Appendix B

- Retained Tree
- Removed Tree
- Root Protection Areas adjusted to site features
- Tree Protection Fence
- Construction Exclusion Zone
- Ground Protection
- Existing Building
- Existing Hard Surfacing
- No-Dig Surfacing
- A B C Sections referred to in the report
- Site Boundary
- Replanting Zone on natural gradient
- Specimen Tree

## Plan of the TPO from the First Schedule



**Reconciliation of the eastern part of the TPO with the Subject Site**
**Brook House and Springfield Garden Centre, Cranbrook Road, Hawkhurst TN18 5EE**

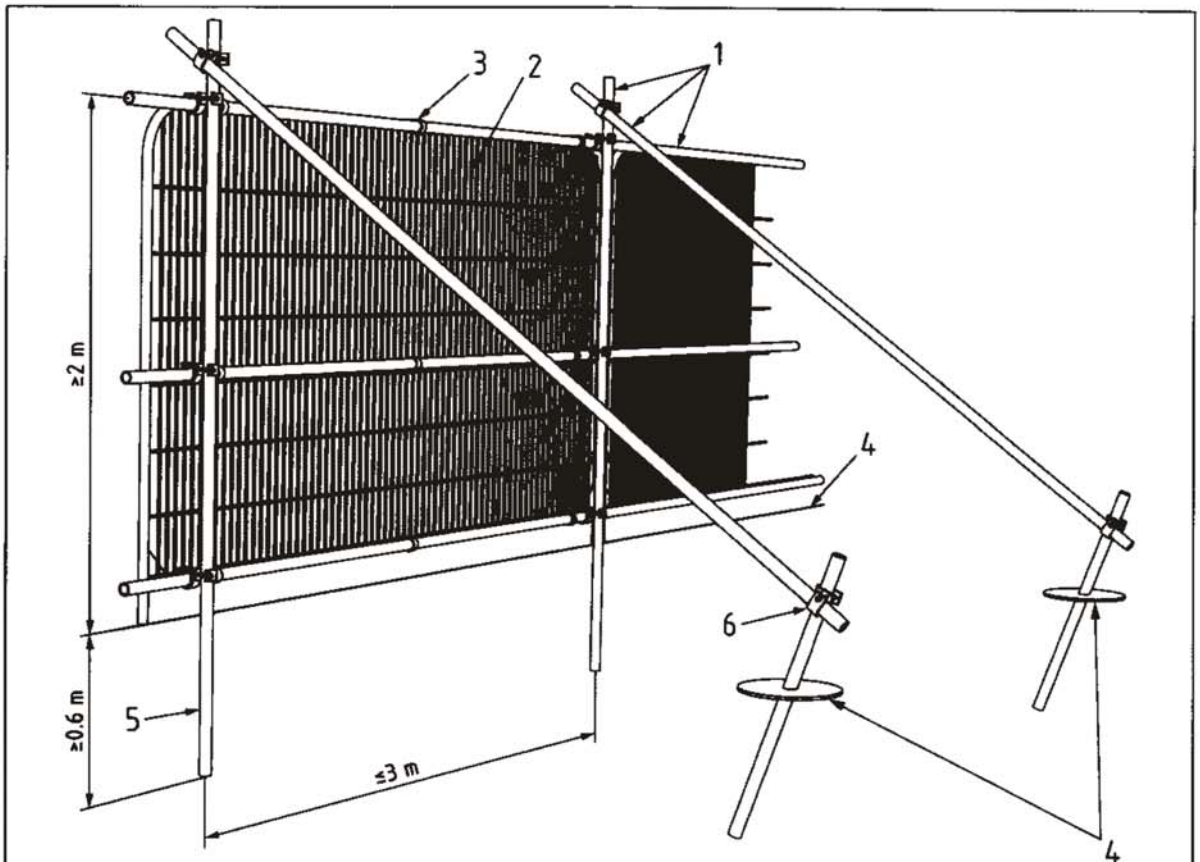
Blue - TPO
Hatching - subject site

NORTH

# Appendix D

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

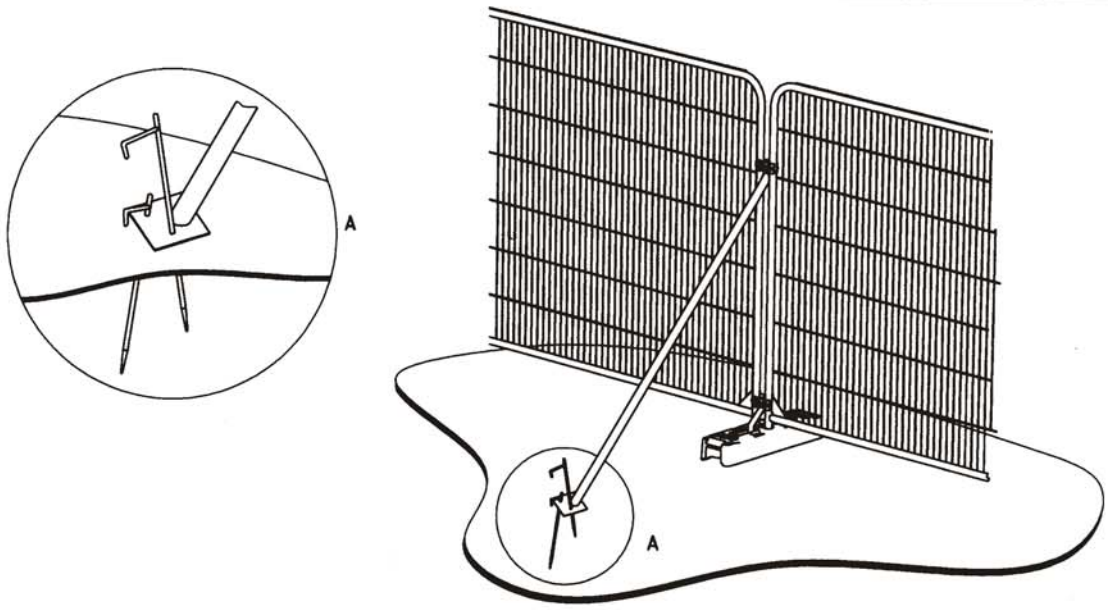
Figure 2. **Default specification for Tree Protection Barrier**
Indicated framework support as the usual method of support for steel mesh panels ('Heras'). Some variation can be employed if appropriate, such as support by wooden posts (75mm x 75mm x 2.75m) dug or concreted into the ground (dry mix concrete contained within a plastic bag), or if there is no pressure of access a lighter form of netting on driven stakes.



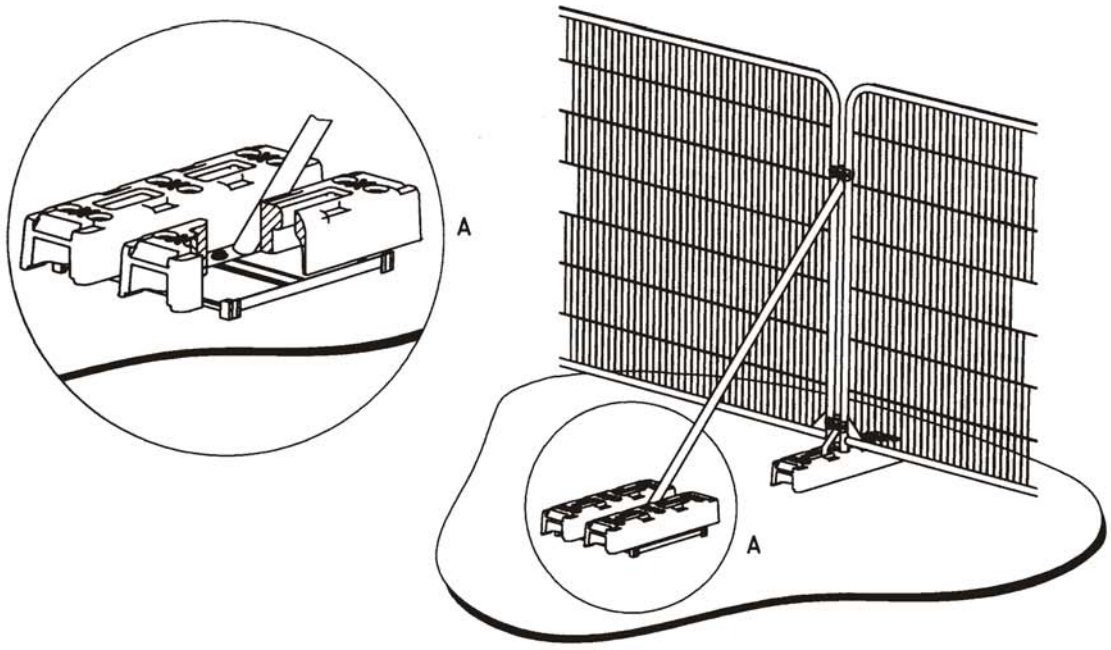

**Key**

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized 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

Figure 3 **Examples of above-ground stabilizing systems**




a) Stabilizer strut with base plate secured with ground pins




b) Stabilizer strut mounted on block tray

# Appendix F

## Method Statement for the uptake 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 the 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 without compaction.

# Appendix G

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

## Ground Protection

**6.2.3.3** New temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

*NOTE The ground protection might comprise one of the following:*

a) *for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;*

b) *for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;*

c) *for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.*

**6.2.3.4** The locations of and design for temporary ground protection should be shown on the tree protection plan and detailed within the arboricultural method statement (see **6.1**).

**6.2.3.5** In all cases, the objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.

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## Scaffolding

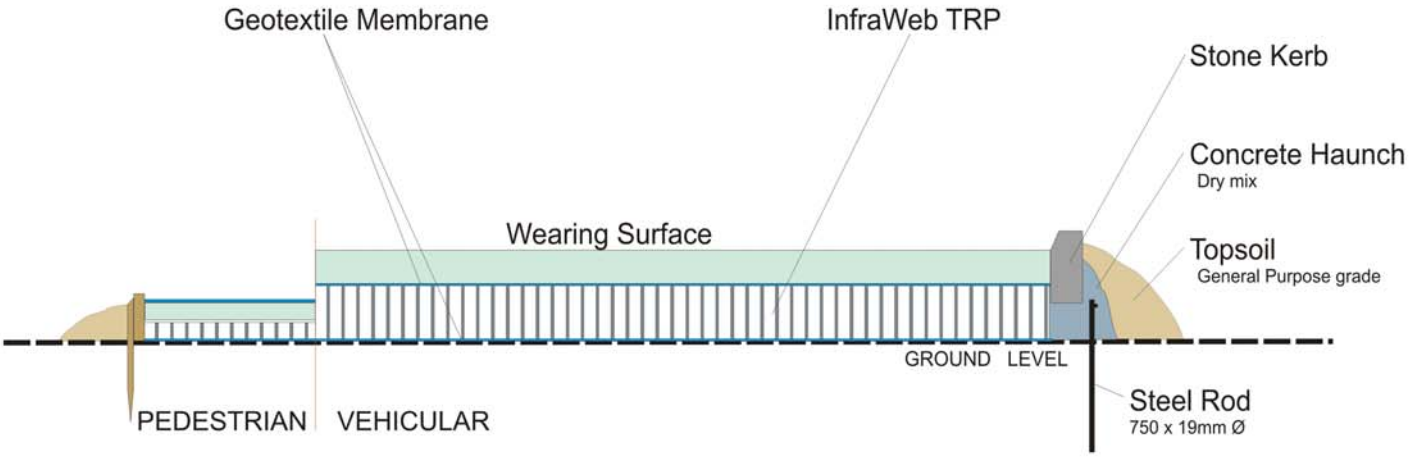
Where scaffolding is to be erected within an RPA of a retained tree, it may be necessary to place the feet directly onto the ground to achieve a stable working structure.
The collective footprint of the scaffolding footings on the soil will represent a minor proportion of the RPA and will not be a significant factor in terms of ground compaction.

## Principles of No-Dig Surfacing Construction Method within a Root Protection Area [RPA] (based on Arboricultural Practice Note 12 [APN12] and BS5837)

The construction works should progress in the following order;

- Kill ground vegetation using a systemic herbicide and gather dead organic material. Care must be taken to select (by reading the product label) a herbicide that will not affect the roots of retained trees and vegetation. This must be carried out by an appropriately trained operative.
- Remove major protrusions such as rocks and stumps (stumps should be ground out to minimise ground disturbance). Fill significant hollows with sharp sand.
- Lay a geotextile membrane directly onto the soil over the whole of the parking area or drive.
- Edging to the surfacing will be as detailed on page 3.
- Lay the Three Dimensional Cellular Confinement System [TDCCS] (e.g. InfraWeb TRP by InfraGreen Ltd, page 2 or similar). The specification will be prepared by an engineer.
- Cover the TDCCS with a no fines aggregate infill. This will be installed progressively so that machinery only moves on the laid sub-base. The aggregate will not tipped straight onto the TDCCS.
- Compact the sub-base to ensure binding with the TDCCS and to minimise future rutting of the surface.
- Lay a geotextile membrane directly onto the sub-base over the parking area or drive.
- In any event but certainly if the proportion of RPA covered by No-Dig surfacing is more than 20%, the surfacing must be permeable. This can be achieved with brick paviours on a dry bed and grouted with kiln-dried sand, or porous or perforated asphalt or concrete.

**Schematic Diagram of a No-Dig Surface**



# Technical Data Sheet

## InfraWeb TRP

Creating Green **Infrastructure**

**InfraWeb TRP** tree root protection system is a 3 dimensional cellular confinement system used to construct vehicular access roads, parking areas etc around the RPA of existing trees. The system is manufactured in accordance with the original U.S. Army Engineers Corps specification and conforms to the requirements of BS5837 and APN12.
The system is available in five depths 50mm, 75mm, 100mm, 150mm and 200mm.

## Product Specifications

| PROPERTY | TEST METHOD | UNIT | VALUE | | | | |
|---|---|---|---|---|---|---|---|
| Density | ASTM D1505 | $gr/cm^3$ | 0.950±0.015 | | | | |
| Wall thickness (textured) | ASTM D5199 | mm | min 1.25±0.15<br>min 1.25±0.15 | | | | |
| Carbon black content - (For black only). | | % | 2.0±0.5 | | | | |
| Durability<br>To be covered within 1 month after installation. | Durability assessment report 338/2005 | | Predicted to be durable for a minimum of 25 years in natural soils with 4<pH<9 and soil temperature = 25°C. | | | | |
| ESCR | ASTM 1693 | hrs | >3000 | | | | |
| Unit Height | | mm | 50 | 75 | 100 | 150 | 200 |
| Seam Tensile Peel strength | ASTM 4437 | N/cm | >750 | >1130 | >1500 | >2250 | >3000 |
| Minimum Strength Value | EN ISO 13426-1 Method A: Tensile Shear Test | kN/junction | 0.90 | 1.35 | 1.80 | 2.70 | 3.60 |
| | | kN/m | 3.60 | 5.40 | 7.20 | 10.80 | 14.40 |
| | EN ISO 13426-1 Method B: Tensile Shear Test | kN/junction | 0.75 | 1.13 | 1.50 | 2.25 | 3.00 |
| | | kN/m | 3.00 | 4.50 | 6.00 | 9.00 | 12.00 |
| Cell Walls | | | Textured and perforated (11% ± 2%) | | | | |
| No. of cells | | $\#/m^2$ | 34.3 | | | | |
| Diagonal Length | | cm | 24.2 | | | | |
| Cell Area | | $cm^2$ | 356 | | | | |
| Distance between welds | | mm | 292 | | | | |
| Expanded Unit Width | | m | 2.42 | | | | |
| Expanded Unit Length * | | m | 8.7 | | | 4.4 | |
| Coverage * | | $m^2$ | 21.0 | | | 10.5 | |
| Unit Weight * | | kg | 11.8 | 17.7 | 23.5 | 17.7 | 23.5 |

* Other length and coverage available upon request. (Length, width and coverage dimensions are for square cells)

## Applications

- Tree root protection

## Benefits

- No dig solution
- Reduces compaction of subsoil around tree roots
- Reduces subbase thickness
- Allows clean angular stone to be used within the cells
- Dissipates vertical loads
- Allows air and moisture transfer
- Can support any type of vehicle loading

www.infragreen-solutions.com

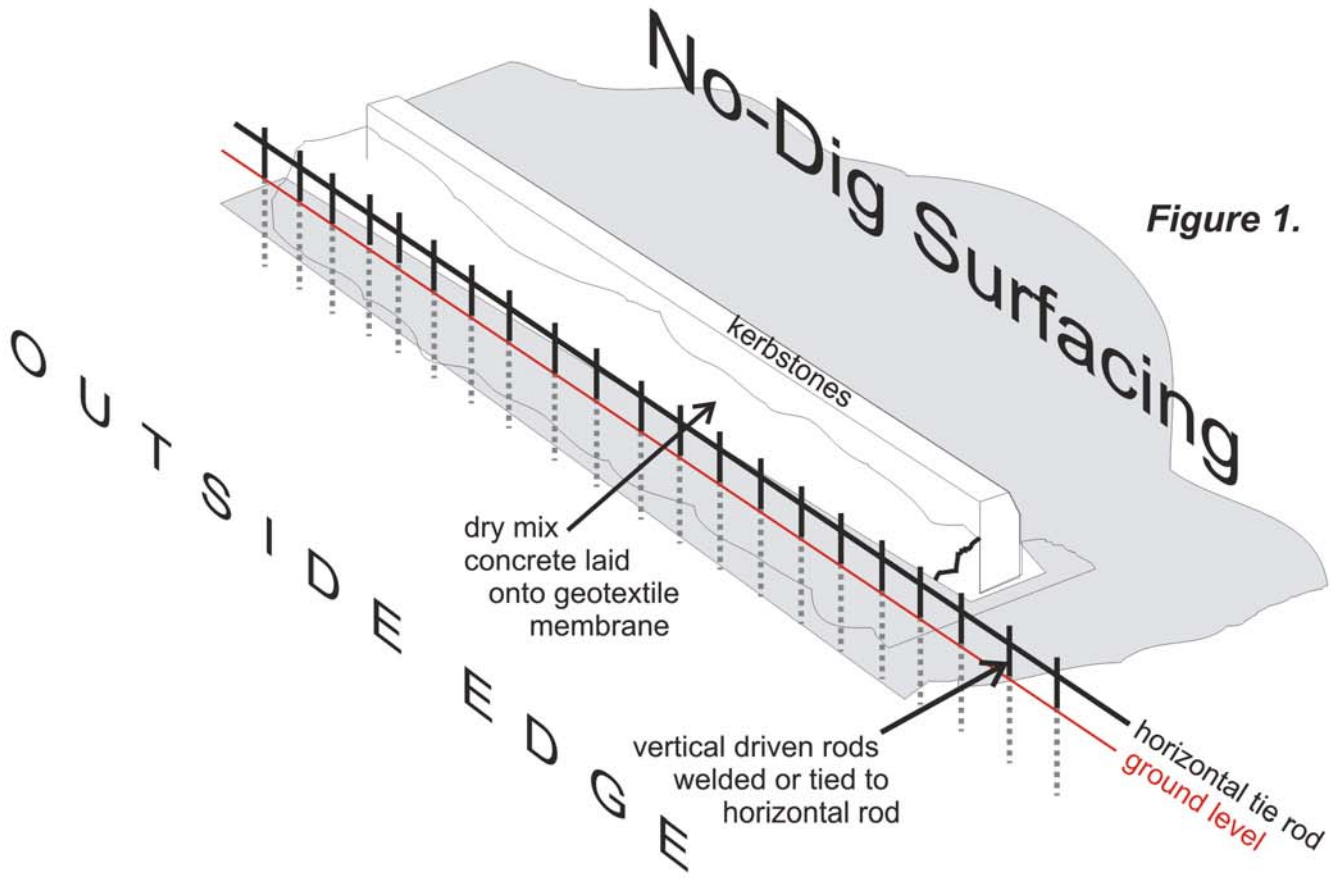



***Figure 1.***

**No-Dig Surfacing edge retention details**

***PLEASE NOTE THAT THIS FIGURE IS FOR GUIDANCE IN PRINCIPLE ONLY AND CAN BE APPLIED TO SMALLER STONE EDGING KERBS, BUT THE SPECIFICATION MIST BE DEVISED BY AN ENGINEER***