

LAND OFF HORNDEAN ROAD EMSWORTH

ARBORICULTURAL IMPACT ASSESSMENT & METHOD STATEMENT



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Date:	27/03/2017
Ref:	BELL21129aia-ams
Revision:	A: 10.04.2017

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1.0 Executive Summary

- 1.1. Bellway Homes instructed ACD Environmental in March 2017 to prepare the following impact assessment to accompany a reserved matters application pursuant to the outline consent APP/14/00547, of which condition 21 relates directly to trees.
- 1.2. The proposal is to build a number of residential dwellings, as per the outline consent, the layout of which can be seen on the appended Tree Protection Plan.
- 1.3. Trees to be removed are as per the outline consent proposals (appended).
- 1.4. Tree protection varies in three small areas. None of which are significant. Some no-dig surfacing is proposed as a result.
- 1.5. The relationship between the building and retained trees is sustainable and is not likely to result in any pressure to prune requests from future occupants.
- 1.6. The arboricultural method statement and tree protection plan include details of all tree protection measures required.
- 1.7. The tree protection must be erected after tree removals and surgery but before any demolition or construction contractor enter the site, and before any soil stripping takes place.
- 1.8. There will be no changes in levels, service routeing, machine activity, storage of materials or site hut positioning within areas to be protected, and the protective fencing shall remain in position for the duration of the construction process.

2.0 Introduction

- 2.1. Bellway Homes instructed ACD Environmental in March 2017 to prepare the following impact assessment to accompany a reserved matters application pursuant to the outline consent APP/14/00547, of which condition 21 relates directly to trees:

No development shall commence until a revised Arboricultural Impact Assessment and Method Statement relevant to any reserved matters layout has submitted to and agreed in writing by the Local Planning Authority. The proposed works shall be carried in accordance with the approved details.

Reason: to ensure the trees are not adversely affected by the construction of the development and having due regard to Policy DM8 of the Havant Borough Local Plan (Core Strategy) which forms part of the Development Plan and National Planning Policy Framework, March 2012.

- 2.2. Following the recommendations of the British Standard¹, this report includes the necessary information to support the planning application and demonstrate that the impact, both direct and indirect, of the proposed development within the site, has been assessed and where appropriate, mitigation and tree protection proposed.
- 2.3. The implementation of the protection methods recommended within this report is critical for ensuring the retained trees are successfully protected through the construction process and must be implemented prior to any work on the site.
- 2.4. This assessment is based on the supplied layout drawings and historical tree survey data submitted with the original outline application (by Bernie Harverson, dated April 2014- appended for reference).
- 2.5. The controlling authority is Havant Borough Council.
- 2.6. This assessment considers the impact of the development on the constraints posed by the retained trees (both beneath ground: the root protection area (RPA), and above ground: the canopy).

¹ BS5837:2012 *Trees in relation to design, demolition and construction- Recommendations*, London: British Standards Institute

- 2.7. Direct impact from development comes in six main forms: 1) Surface installation within RPAs, 2) Root loss from excavation for foundations, drainage and other utilities within RPAs, 3) Soil stripping, removal and level changes within RPAs, 4) Excessive access facilitation pruning to retained trees, 5) Soil compaction from storage and vehicle movements within RPAs, 6) Soil contamination.
- 2.8. Indirect impact can come from changes to the site hydrology, future pressure to prune or fell, failure of trees exposed by removal of neighbouring trees, and other environmental changes which can take several years to manifest.
- 2.9. The RPA for each tree represents a minimum area in m² that should be left undisturbed around each retained tree. This is initially represented by a circle or polygon but is often adjusted to account for constraints to root growth within the site (primarily highways and buildings). It is, therefore, important to ensure the protection of trees both above and below ground. Recommendations are provided in the British Standard as to the protection of existing trees before, during and after development. This is achieved by ensuring the tree protection plan and arboricultural method statement are implemented before any commencement on site.

3.0 Arboricultural Impact Assessment

- 3.1. The proposal is to build a number of residential dwellings, as per the outline consent, the layout of which can be seen on the appended Tree Protection Plan.
- 3.2. In terms of arboricultural impact, it is accepted that the tree protection plan and arboricultural impact assessment submitted with the outline application, although indicative, were acceptable in general terms. Whilst the majority of the tree protection areas shown on the ACD Tree Protection Plan (appended) follow those outline documents, changes are proposed as follows:

Tree No.	Species	RPA encroachment	Mitigation
T1	Oak	Vehicular surface and unit 35 within RPA	No-dig surface to be used for surface. Unit encroachment is $20.5\text{m}^2 = 3\%$ of overall 648m^2 RPA. This is deemed minor and acceptable.
T8	Oak	Vehicular surface within RPA	No-dig surface to be used
T9	Poplar	Vehicular surface within RPA	None- Category U tree of poor quality and therefore limited safe useful life expectancy.

- 3.3. Tree removals are as per the outline application (details appended)
- 3.4. Given the above minor changes to the outline arboricultural strategy, this (appended) layout is deemed acceptable.

4.0 Arboricultural Method Statement

TO BE READ IN CONJUNCTION WITH THE APPENDED TREE PROTECTION PLAN REF: BELL21129-03

4.1. Phasing of operations & site supervision

4.1.1. The tree protection and other arboricultural works must be carried out in the following order:

	Operation	Present	Notes
1	Tree removals	Tree contractor	See Tree Protection Plan for trees to be removed
2	Protection barriers erected	Fencing contractor	See Tree Protection Plan for position and type of barriers
3	Pre-start meeting	ACD, site manager, groundwork, foreman, demolition foreman	To 'sign-off' protection prior to any plant activity, demolition & groundworks on site
4	No-dig surface installation	ACD, groundwork contractor, site manager	Groundwork staff to receive toolbox-talk from project arboriculturist. See method statement
5	Removal of protection barriers and landscape work	ACD, landscape contractor, site manager	See method statement

4.1.2. Supervision is required should any unplanned access and/or work be required in the construction exclusion zone.

4.1.3. Supervision will require the arboriculturist to be present throughout the task, to ensure all the arboricultural objectives are met. If the task is to take a long period of time, provided the arboriculturist is satisfied, and after an initial 'tool-box talk', the supervision may be reduced to telephone contact between the site foreman/contractor and arboriculturist.

4.2. Construction exclusions zone

4.2.1. Barriers and/or ground protection must be used to protect all retained trees before any machinery or materials are brought onto the site, and before any demolition, development or stripping of soil commences.

4.2.2. Where all activity can be excluded from the RPA, vertical barriers must be erected to create the construction exclusion zone (CEZ). The default position of which is shown on the appended Tree Protection Plan.

4.2.3. Where, due to site constraints, construction activity cannot be fully or permanently excluded from all, or part of a tree's RPA, appropriate ground protection can be installed.

4.2.4. It is the responsibility of everyone engaged in the construction process to respect the tree protection measures and observe the necessary precautions within and adjacent to them.

4.2.5. Inside the exclusion zone, the following shall apply:

- No mechanical excavation whatsoever.
- No excavation by any other means without arboricultural site supervision.
- No hand digging without a written method statement having first been approved by the project arboriculturist.
- No lowering of levels for any purpose (except removal of grass sward using hand tools).
- No storage of plant or materials.
- No storage or handling of any chemical including cement washings.
- No vehicular access.
- No fire lighting.

4.2.6. In addition to the above, further precautions are necessary adjacent to trees:

- No substances injurious to tree health, including fuels, oil, bitumen, cement (including cement washings), builders sand, concrete mixing

and other chemicals shall be stored or used within or directly adjacent to the protection area of retained trees.

- No fire shall be lit such that flames come within 5m of tree foliage.

4.3. Tree protection barriers

4.3.1. The construction exclusion zone will be protected as per the appended tree protection plan that shows the default alignment of the tree protection barriers, to be installed prior to any of the following taking place:

- Archaeology
- Demolition
- Plant and material delivery
- Soil stripping
- Utility installation
- Construction works
- Landscaping

4.3.2. Stages of installation of barriers:

- 1) Hand clearance of any vegetation to allow clear working access.
- 2) Setting out of node points
- 3) Barriers erected
- 4) Site meeting with project arboriculturist to 'sign-off' tree protection fencing.
- 5) Site accessible to demolition/construction traffic

4.3.3. Once erected, all barriers will be regarded as sacrosanct, and will not be removed or altered without prior recommendation by the project arboriculturist and approval of the local planning authority.

4.3.4. The default barrier construction is suitable for areas of high-intensity development and shall comprise of interlocking weld-mesh panels, well braced to resist impacts by attachment to a scaffold framework that is set firmly into the ground. A detailed specification can be found on the TPP.

4.3.5. The images below are alternative barrier designs that have been successfully used on site and that ACD are happy to support if a variation from the default style is required. If such a variation is necessary, the approval of the project arboriculturist will be obtained prior to any implementation on site.

4.3.6. Once barriers and/or ground protection have protected the exclusion zone, construction work can commence.

4.3.7. All weather notices should be erected on the barriers (for example see figure below).



Tree protection sign (download from <http://www.acdenvironmental.co.uk>)



Weld-mesh panels on scaffold uprights



Weld-mesh panels on wooden posts



Chain-link on angle-iron uprights

4.4. Ground protection

4.4.1. If required (or as shown on the appended tree protection plan), ground protection is to be installed as follows. It must be capable of supporting the expected loads and avoiding rutting, compaction and damage to the soil: as advised in section 6.2.3 of the British Standard.

4.4.2. Stages of ground protection installation:

- 1) No plant machinery to be used in the area of ground protection for whatever reason
- 2) Dismantle primary TPF and re-erect in secondary location as shown on TPP (if required) OR erect fencing to protect any newly exposed CEZ not to be covered by ground protection.
- 3) Any shrubs, saplings or trees to be removed, are to be cut or ground out to just below ground level rather than grubbed or winched out, which can damage roots of retained trees.
- 4) Lay woven geotextile over existing ground surface by hand

- 5) Cover the area with compressible layer, woodchip, for example, using hand tools only
- 6) Cover compressible layer with side butting scaffold boards or plywood boards
- 7) Confirm surface is acceptable for use with project arboriculturist
- 8) Area ready for construction access

4.4.3. Any scaffolding required within the area will be erected with the uprights placed on spreader boards.

4.4.4. The boarding will be left in place until the construction works are finished.

4.4.5. A single thickness of boarding laid on the soil surface will provide sufficient protection for pedestrian loads. However, for wheeled or tracked construction traffic movements within the RPA, ground protection will involve the use of temporary cellular confinement systems, reinforced concrete slabs or track-board systems details of which are to be specified by the project engineer and approved for use by the project arboriculturist and local authority before construction commences.

4.4.6. Track-boards can be sourced from Trakmats Europe Ltd, 0845 6435388, www.trakmatseurope.com, or groundguards.com

4.4.7. There is to be no excavation within ground protection area whatsoever. This includes installation of services and associated utilities.



Scaffold board pedestrian ground protection



Vehicular ground protection trackway

4.5. Site storage, parking, welfare facilities, etc.

4.5.1. The site will require provision for; site storage, contractor parking, welfare facilities, temporary services/drainage, material drop off points, etc.

4.5.2. It is acceptable to place site cabins and walkways within the CEZ provided they are installed sensitively:

- Cabins must be placed on sleepers (or similar) to spread the load, avoiding point loading and associated soil compaction.
- The delivery of cabins should ensure that any unloading via 'hi-ab' crane can be carried out without impact on the crowns of retained trees.
- Walkways, if required, should be installed as per the ground protection specification.
- Any utilities for site compounds must be run above ground. For example, WC foul pipes/drainage and temporary electrical connections.

4.5.3. It is imperative that if cabins and walkways are installed, that fencing is erected to limit access to the protected areas. If amendments are made, the project arboriculturist should sign off the proposals prior to their implementation.

4.5.4. Contractor parking and storage areas should be sited outside the CEZ.

4.6. Tree surgery and removal

4.6.1. All trees to be retained are indicated on the TPP.

4.6.2. If any surgery work is proposed, details will be submitted to, and approved by, the council, before being carried out.

4.6.3. All work will be carried out in accordance with BS3998² industry best practice and in line with any works already agreed with the council.

4.6.4. The tree surgeon shall ideally be chosen from The Arboricultural Association's Approved Contractor list. All work shall be undertaken at the appropriate time and with the consent and approval of the site agent.

4.6.5. The statutory protection^{3 4} will be adhered to. If further advice is required, particularly if bats are discovered during tree work, it will be obtained from Natural England or other competent persons and recommendations adhered to.

4.6.6. The stumps of any trees removed from within the Construction Exclusion Zone or the RPAs of retained trees will be either cut flush to ground level and left in situ or ground out using a stump grinder. They will not be winched out.

4.6.7. All operations shall be carefully carried out to avoid damage to the trees being treated or neighbouring trees. No trees to be retained shall be used for anchorage or winching purposes.

² BS3998:2010- *Recommendations for Tree Work*. London: British Standards Institute

³ *Wildlife and Countryside Act*. (1981) London: HMSO.

⁴ *Countryside and Rights of Way Act*. (2000) London: HMSO.

4.7. Soft landscaping

4.7.1. All landscaping and associated ground preparation within exclusion zones will be carried out sensitively to ensure root damage is minimised as much as is practicable.

4.7.2. At no time is any heavy plant to be used within any protected area.

4.7.3. Removal of existing vegetation (including turf) will be carried out with hand tools only.

4.7.4. Should the soil be compacted or have a poor structure that may hinder the development of any new planting, soil decompaction techniques may be used upon consultation with the project arboriculturist.

4.7.5. Tree protection barriers may be removed to allow access and then replaced as required/per approved documents (in liaison with the arboricultural clerk of works)

4.7.6. Levels (high spots) will not be reduced or excavated in any way. Use good quality topsoil to level any low-lying areas and hollows, and provide a fine tilth to lay turf on. This imported soil must not result in a level increase of more than 100mm in any area.

4.7.7. Import materials by hand in wheelbarrow or using a digger sited outside the sensitive area.

4.7.8. Any excavation for planting pits must be dug using hand tools only.

4.7.9. No works will be carried out within any protected areas if the soil moisture is at a level likely to allow compaction to occur.

4.8. Installation of underground services

4.8.1. Mechanical trenching for the installation of underground apparatus and drainage severs any roots present and can change the local soil hydrology in a way that adversely affects the health of the tree. For this reason, particular care should be taken in the routeing and methods of installation of all underground apparatus. Wherever possible, apparatus should be routed outside RPAs. Where this is not possible, it is preferable to keep apparatus together in common ducts. Inspection chambers should be sited outside the RPA.

4.8.2. Where underground apparatus is to pass within the RPA, detailed plans showing the proposed routeing should be drawn up in conjunction with the project arboriculturist. In such cases, trenchless insertion methods should be used: Microtunnelling, Surface-launched directional drilling, Pipe ramming or Impact moling (see BS5837:2012 Table 3), with entry and retrieval pits being sited outside the RPA. Provided that roots can be retained and protected, excavation using hand-held tools might be acceptable for shallow service runs. If this is the case, the following methodology must be followed:

4.8.3. Stages for installing services by hand within tree protection areas:

No plant machinery to be used in the area for whatever reason

- 1) Contact project arboriculturist to hold pre-start site meeting and 'toolbox' talk before starting work.
- 2) Remove just enough tree protection fencing to allow access to area and facilitate trenching.
- 3) Remove any surface vegetation or existing hard surfaces using hand tools.
- 4) Using an air-pick excavate the trench, keeping to minimum dimensions required.
- 5) Roots occurring in clumps of 25 mm diameter and over are encountered they will be retained and kept damp by covering with hessian (re-wetted as required). If required, these should be severed

only following consultation with an arboriculturist; as such roots might be essential to the tree's health and stability.

- 6) Feed in services.
- 7) Backfill trench with 200-300mm depth of excavated soil, or a mixture of excavated and imported topsoil to BS3882 (BSI, 2007), firming down with heels.
- 8) Repeat step 7 until trench is filled.
- 9) Re-erect tree protection fencing as per approved plan.

4.8.4. The method of excavation above, for trenching within RPAs, is using air excavation. This tool utilises compressed air to remove soil from around tree roots causing minimal damage and can be run off a typical site compressor. ACD can provide details of contractors supplying air excavation services if required.

4.8.5. Alternatively, trenchless technology, such as thrust boring can be used in some instances and is particularly effective as it can pass directly under the tree, at a depth which is likely to avoid almost all impact on roots of the subject tree. As no access/thrust pits will be located within the RPAs of the subject trees, the need for arboricultural supervision is limited.

4.8.6. Reference can be made to NJUG Vol 4⁵ for guidance, but any approach must be approved by the project arboriculturist and brought to the attention of the local authority tree officer.

⁵ National Joint Utilities Group. (2010). *Volume 4: NJUG Guidelines For The Planning, Installation And Maintenance Of Utility Apparatus In Proximity To Trees (Issue 2) – Operatives Handbook*. NJUG.

4.9. Demolition close to trees

4.9.1. All TPF to be installed as per approved Tree Protection Plan prior to any plant arriving on site.

4.9.2. Sensitive demolition will occur under supervision from the project arboriculturist

4.9.3. Stages of demolition within tree protection areas:

- 1) No plant machinery to be sited on any exposed rooting area
- 2) Dismantle any fencing to allow work to proceed
- 3) Buildings to be folded in on themselves
- 4) Removal debris by hand or with plant machinery not located on any exposed rooting area.
- 5) Floor to be broken up with had held breaker and pieces removed by hand. Slab floor can be lifted carefully by machinery if appropriate
- 6) Underlying ground levels to be retained. No excavation to occur
- 7) Any exposed roots and surrounding newly exposed areas to be covered with up to 100mm of topsoil, from elsewhere on site, or imported topsoil to BS3882⁶. Soil may be placed in area by plant but must be spread by hand.
- 8) Tree protection fencing to be erected in final position as shown on plan

4.9.4. No reduction in levels of the underlying soil surface will occur.

4.9.5. At no point are any heavy machinery permitted within the RPA.

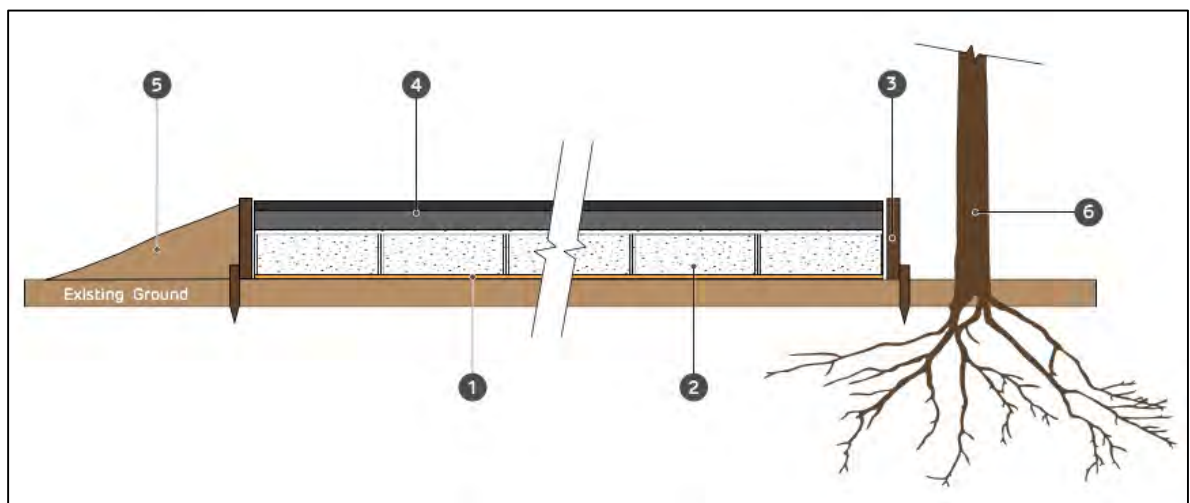
4.9.6. Contamination of the soil by fuel and lubricant leaks must be avoided at all cost. If such a situation arises the project arboriculturist must be notified to assess the situation and prescribe remedial measures.

⁶ BS3882:2007- *Specification for topsoil and requirements for use*. London: British Standards Institute.

4.10. Installation of 'no-dig' surface

4.10.1. To ensure that tree roots, within the ground under this proposed surface, continue to survive during and after construction a cellular confinement system (CCS) such a ProtectaWeb⁷ of 75-200mm depth is to be used.

4.10.2. The following example CCS spec is courtesy of Weckin Products and shows an asphalt finish. Other surfaces can be used, and similar CCS are available from other suppliers.



- 1 Root-tex 30 geotextile
- 2 70-200mm deep ProtectaWeb tree root protection system infilled with 4/20 clean angular stone to BS EN 13242 / EN 12620
- 3 Treated timber edging (or other edging detail acceptable)
- 4 Asphalt surface to engineer's details
- 5 Soil graded to edging (if required)
- 6 Existing tree

4.10.3. Stages for Installation of the cellular confinement surface:

- 1) Contact project arboriculturist to hold pre-start site meeting and 'toolbox' talk before starting work
- 2) Dismantle TPF and re-erect in secondary location as shown on TPP
- 3) Remove existing vegetation by using a specific herbicide (as advised by a specialist) or manual removal with hand tools only. Agreed

⁷ Wrekin Products, www.wrekinproducts.com, 01543 440440.

removal of shrubs, saplings or trees, within the protected areas of retained trees are to be cut or ground out to just below ground level rather than grubbed or winched out, which can damage roots of retained trees.

- 4) Retain all original ground levels after vegetation removal. No excavation whatsoever.
- 5) Remove any existing hard surfaces (paving, tarmac etc.) Hand tools should be used if possible. If machinery is required for this operation, it must be used only on existing surfaces or outside the protection areas and tree canopies (approval from project arboriculturist must be sought before using machinery). The sub base of existing surfaces or foundations should be left in situ where possible to avoid unnecessary root disturbance and provide a base for the new surface.
- 6) Install a non-woven geotextile (such as Root-tex 30) directly over soil grade level (levelled where necessary, by non-compacted washed sand) and fix in place.
- 7) Lay the cellular system over the geotextile, which is secured open under tension during the infill process with steel staples or wooden pegs.
- 8) Install kerbs and edgings directly on top of existing soil grade level. For light structures, a treated peg and board may be acceptable. For more substantial structures, railway sleepers, haunched concrete with road pins, drilled kerbstones, gabions or cast in situ kerbs will be appropriate.
- 9) Fill the cellular system ensuring any machinery works only on already filled areas. Typical infill consists of no fines angular granular material 20-40mm, which will remain uncompacted.
- 10) Cover with a non-woven geotextile (Root-tex 30 or similar).
- 11) Install porous wearing surface.

4.10.4. Any variation to the above specification must meet the following design criteria for low-invasive surfaces to provide the conditions for continued tree survival and growth:

- Maintain oxygen diffusion through new surface to rooting area (5-12% by volume⁸)
- Maintain sufficient passage of water to the rooting area (12-40% by volume⁹)
- Avoid compaction by maintaining a soil structure sufficient to sustain root growth (soil bulk density below 1.4g/cc¹⁰).

4.10.5. Site analysis of the soil type and its structural characteristics will be required prior to determining the specific depth of products to be adopted for example, footpaths normally require a depth of 75mm and, 100mm to 200mm depths are used for residential driveways, while greater depths may be required for the passage of heavier traffic such as for construction access and delivery vehicles.

4.10.6. If ground levels are to be raised more than 150mm this should be achieved by the use of a granular material, which does not inhibit vertical gaseous diffusion. For example no-fines gravel, washed aggregate, structural soil (min. 20% sand content) or cobbles.

⁸ Smith, R. J. (2006). *Tree Roots in the Built Environment*. HSO

⁹ Coder, D. K. (2000). *Tree Root Growth Requirements*. University of Georgia

¹⁰ Harris, C. M. (2004). *Arboriculture, Tree Management of Shade Trees and Vines*.

4.11. Installation of boundary fencing within protected areas

4.11.1. Stages for installing wooden fence posts:

No plant machinery to be used in the area for whatever reason

- 1) Contact project arboriculturist to hold pre-start site meeting and 'toolbox' talk before starting work.
- 2) Remove TPF to allow access to area.
- 3) Dig postholes using hand tools, avoiding damage to the protective bark covering larger roots. Roots smaller than 25mm diameter may be pruned back using either secateurs or a hand saw, leaving a clean cut.
- 4) Damage or severance of roots above 25mm diameter must be avoided. If roots of this size are discovered, the hole should be relocated. If there are a large number of such roots it may be necessary to relocate the hole by half a fence panels length and adjust the fence panels accordingly.
- 5) Line hole with non-porous lining, for example, durable polyethene bag.
- 6) Insert post and fill post-hole with concrete to just below ground level.
- 7) Trim polyethene to ground level and fill with clean topsoil.

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27 March 2017

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Appendix 1: Tree Survey Data

Bernie Harverson April 2014

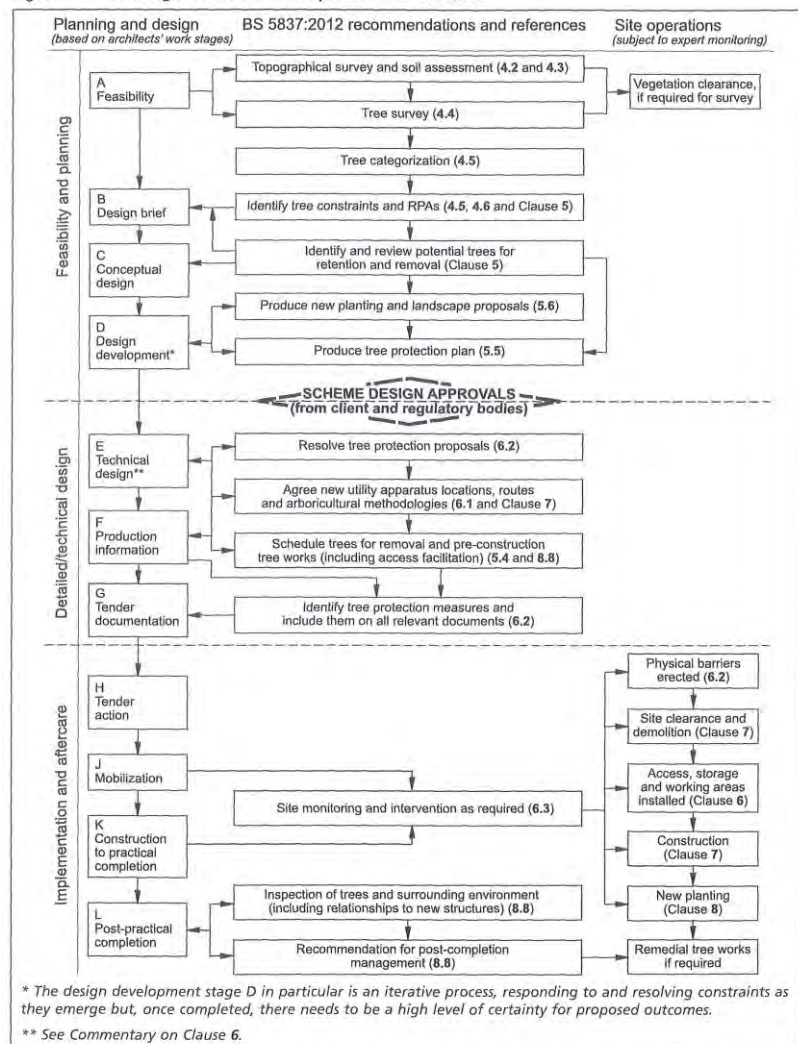


BH 1

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



0656.bjh.Apr14

TREE SURVEY SCHEDULE

Client : Terra Firma Consultancy

Site Location : Land off Horndean Road, Emsworth

Surveyor : Bernie Harverson *M.Arb.*

Date Surveyed : 31st July 2013

Tree No.	Species	Ht m	Diam mm	Brch Sprd m	GC m	LMB m	LS	Condition Comments	Preliminary Management Recommendations	Rem Con yrs	Cat
Hedge 1	Hawthorn <i>Crataegus monogyna</i>	2 to 2.5	Av 60	N1 E1 S1 W1	0	0 nesw	EM	Good shape and form – flail maintained	No works required at this time	>40	A2
Hedge 2	Hawthorn <i>Crataegus monogyna</i>	1	Av 30	N0.5 E0.5 S0.5 W0.5	0	0 nesw	SM	Low boundary hedge-formal clipped form-brambles growing through it-densely in places	No works required at this time	>40	B2
1	Pedunculate Oak <i>Quercus robur</i>	18	1200	N8 E10 S12 W8	3	3 nesw	M	Ivy smothering base and trunk-small and large diameter deadwood and stubs-good shape and form	No works required at this time	>40	A1
Copse 1	Oak (<i>Quercus</i>) Elm (<i>Ulmus</i>) Hawthorn (<i>Crataegus</i>) Grey Willow (<i>Salix</i>) Holly (<i>Ilex</i>) Apple (<i>Malus</i>)	6 to 12	100 to 350 x 3	N4 E4 S4 W4	0	0 nesw	Y to EM	Band of trees and under storey surrounding a pond-large Willows around perimeter are 350 x 3 size	No works required at this time	>40	A2
2	Pedunculate Oak <i>Quercus robur</i>	15	950	N7 E5 S12 W8	4	2.5 nesw	M	Ivy smothering base and trunk-suppressed east side-crown weighted to the south with arching lean in that direction-cavities on south side but no depth or active decay	No works required at this time	>40	B1
3	Pedunculate Oak <i>Quercus robur</i>	13	950	N6 E6 S10 W6	4	4 nesw	M	Ivy smothering base, trunk and through crown-dieback-becoming stag headed-small and large diameter deadwood and stubs-decay and cavities in old pruning wounds-a habitat tree	Sever ivy	30-40	B1 / C1
4	Pedunculate Oak <i>Quercus robur</i>	16	800	N10 E8 S10 W12	2.5	2.5w	EM	Ivy smothering base ,trunk and through crown-small and large diameter deadwood-fair shape and form	No works required at this time	>40	A1
5	Pedunculate Oak <i>Quercus robur</i>	8	370	N3 E3 S3 W3	4	4 nesw	Y	Ivy smothering base, trunk and through crown and dominating tree-crown lifted to 4m	No works required at this time	>40	B1

6	Pedunculate Oak <i>Quercus robur</i>	6	180	N3 E3 S1.5 W1.5	1.5	1.5n	Y	Flat pruned on east and west sides	No works required at this time	>40	B1
7	Hawthorn <i>Crataegus monogyna</i>	4	150 x 4	N2 E1.5 S2 W1	1	1w	EM	Die back-small diameter deadwood-flat pruned on west side	No works required at this time	10-20	C1
8	Pedunculate Oak <i>Quercus robur</i>	12	950	N8 E8 S8 W8	3	3s	M	Small and large diameter deadwood and stubs-some very large open jagged wounds-crown lifted over field-previously heavily topped-decay and cavities in old pruning wounds-woodpecker holes noted	No works required at this time	>40	B1
Group 1	Bay Laurel (<i>Laurus</i>)	3	250 x 2	N3 E0 S3 W0.5	0	0 nesw	SM	Pruned flat to the wall of the building-trimmed as a tailored hedge	No works required at this time	20-30	C2
Group 2	Elderberry (<i>Sambucus</i>) Wych Elm (<i>Ulmus</i>) Hawthorn (<i>Crataegus</i>) Plum (<i>Prunus</i>) Ivy	4 to 6	Av 300 #	N3 E3 S3 W3	0	0 nesw	Y to SM	Ivy smothering base, trunk and through crown-linear belt of merged crown trees	No works required at this time	20-30	C2
Group 3	Horse Chestnuts (<i>Aesculus</i>) & Common Alder (<i>Alnus</i>)	14 to 18	Largest HChest 600 400 #	N8 E- S- W-	4	3 nesw	EM to M	Unable to access as trees are off site-crown shape dictated by group pressure-merged crowns-large diameter deadwood and stubs-linear boundary belt of trees	No works required at this time	>40	A2 / B2
Hedge 3	Hawthorn <i>Crataegus monogyna</i> (+other species mix)	1.2 to 1.5	Av 60	N0.3 E- S0.3 W-	0	0 nesw	EM	Ragged hedge with gaps – has recently been cut back on north side	No works required at this time	20-30	C2
9	Hybrid Black Poplar <i>Populus euroamericana</i>	25	1000 #	N15 E15 S12 W8	4	4 nesw	M	Unable to access tree is off site-small and large diameter deadwood and stubs-significant hollowing and decay with weak point of attachment for the three primary spires which make up the crown-high potential for structural collapse	Advise owner to pollard or fell	0-5	U
Group 4	Horse Chestnuts (<i>Aesculus</i>) x 5 Hybrid Poplar (<i>Populus</i>) x 1 Alder (<i>Alnus</i>) x 1	12 to 16	Av 450 350 #	N6 E- S- W-	4	3 nesw	SM to EM	Unable to access-off site trees-crown shape dictated by group pressure-merged crowns-small and large diameter deadwood and stubs-crown lifted to 4m over field-decay and cavities in old pruning wounds-linear boundary screen of trees-leaf miner prevalent throughout-bacterial canker also noted	No works required at this time	20-30	C2
10	Pedunculate Oak <i>Quercus robur</i>	8	900	N4 E3 S5 W3	1.5	2 nesw	M	Ivy smothering base and trunk-hollow-decay-decay in cavities-has suffered crown collapse in the past and is now a “totem pole” with regrowth arising from it	No works required at this time	10-20	C1

11	Pedunculate Oak <i>Quercus robur</i>	13	900	N6 E11 S11 W5	1.5	3 nesw	M	Large diameter deadwood and stubs-storm damage-fair shape and form	No works required at this time	>40	A1 / B1
12	Pedunculate Oak <i>Quercus robur</i>	12	1200	N8 E8 S8 W8	4	4 nesw	M	Low crown density-low vigour and vitality-significant dieback-large diameter deadwood and stubs throughout-stag headed-significant amount of <i>Ganoderma</i> fungal brackets all around base of tree	Fell and grub out	5-10	U
13	Pedunculate Oak <i>Quercus robur</i>	12	1100	N7 E10 S10 W7	3	4 nesw	M	Stubs and storm damage-crown lifted-large diameter branch removed from east side-previously heavily topped-decay and cavities in old pruning wounds-small leaf size and lower crown density than T11(possibly hybridised with Turkey Oak)	No works required at this time	>40	B1 / C1
14	Pedunculate Oak <i>Quercus robur</i>	9	800	N8 E10 S6 W4	3	3 nesw	M	Ivy smothering base and trunk-small and large diameter deadwood and stubs-contains some very large dead branches	Remove major deadwood only for safety reasons	>40	B1
Group 5	Pedunculate Oak (<i>Quercus</i>) x 3	14 to 16	600 #	N-E-S-W8	4	3 nesw	EM	Unable to access-off site trees-small and large diameter deadwood and stubs-small leaf size(possibly hybridised with Turkey Oak)	No works required at this time	>40	A2
15	Pedunculate Oak <i>Quercus robur</i>	13	500 #	N11 E8 S11 W7	4	3s	EM	Unable to access as tree is in a ditch-base smothered with ivy-large diameter deadwood and stubs-decay in old pruning wounds-has shed one of its main leaders which remains lodged in the lower crown	Tidy storm damage, broken branches and hangers	>40	B1
16	Pedunculate Oak <i>Quercus robur</i>	10	500 #	N8 E6 S10 W6	3	3s	EM	Unable to access as tree is in a ditch-ivy smothering base, trunk and through crown	Sever ivy	>40	B1
Group 6	Field Maples (<i>Acer</i>) x 3 Pedunculate Oak (<i>Quercus</i>) x 1	9	200 350 #	N5 E2 S7 W2	3	3 nesw	Y	Unable to access –trees in a ditch-crown shape dictated by group pressure-merged crowns	No works required at this time	20-30	C2
17	Pedunculate Oak <i>Quercus robur</i>	15	750 #	N12 E9 S10 W8	3	3s	M	Unable to access-tree is in a ditch-ivy smothering base, trunk and dominating crown-large diameter deadwood and stubs-storm damage ,broken branches and hangers	Sever ivy-remove major deadwood only for safety reasons	>40	A1
18	Pedunculate Oak <i>Quercus robur</i>	8	300 #	N6 E4 S6 W5	3	2.5s	Y	Unable to access-tree is in a ditch-bifurcated 1.8m above ground level –tight forks with included bark-pronounced ridges on either side	No works required at this time	>40	B1

19	Pedunculate Oak <i>Quercus robur</i>	9	450 #	N5 E6 S7 W8	2	2w	SM	Unable to access-tree is in a ditch	No works required at this time	>40	B1
20	Pedunculate Oak <i>Quercus robur</i>	5	250 #	N3 E3 S3 W3	2	2 nesw	Y	Unable to access-tree is in a ditch	No works required at this time	>40	B1
21	Pedunculate Oak <i>Quercus robur</i>	11	650 #	N6 E8 S10 W8	4	3e	M	Unable to access-tree is in a ditch-crown lifted on field side to the north	No works required at this time	>40	B1

Appendix 2: Outline Tree Protection

Bernie Harverson April 2014





project: Land off Horndean Road, Emsworth, Hampshire

client: Terra Firma Consultancy

drawing title: Tree Protection Plan

drawing no: BH 04

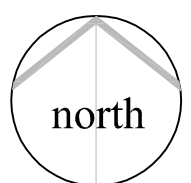
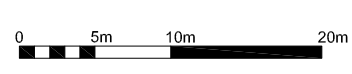
sheet: Sheet 1 of 1

scale: 1:500 @ A0

date: Apr 2014

job no: 0656

drawn by: BHH / Terra Firma



KEY

The setting out positions for the Protective Fencing in accordance with BS5837:2012 recommendations - Section 6.2 and Figures 2

Appendix 3: Outline Tree Removals

Bernie Harverson April 2014





project: Land off Hordean Road, Emsworth, Hampshire

client: Terra Firma Consultancy

drawing title: Tree Retentions & Removals Plan

drawing no: BH1 03

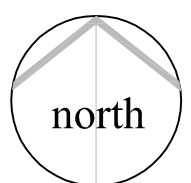
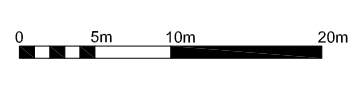
sheet: Sheet 1 of 1

scale: 1:500 @ A0

date: Apr 2014

job no: 0656

drawn by: BJH / Terra Firma

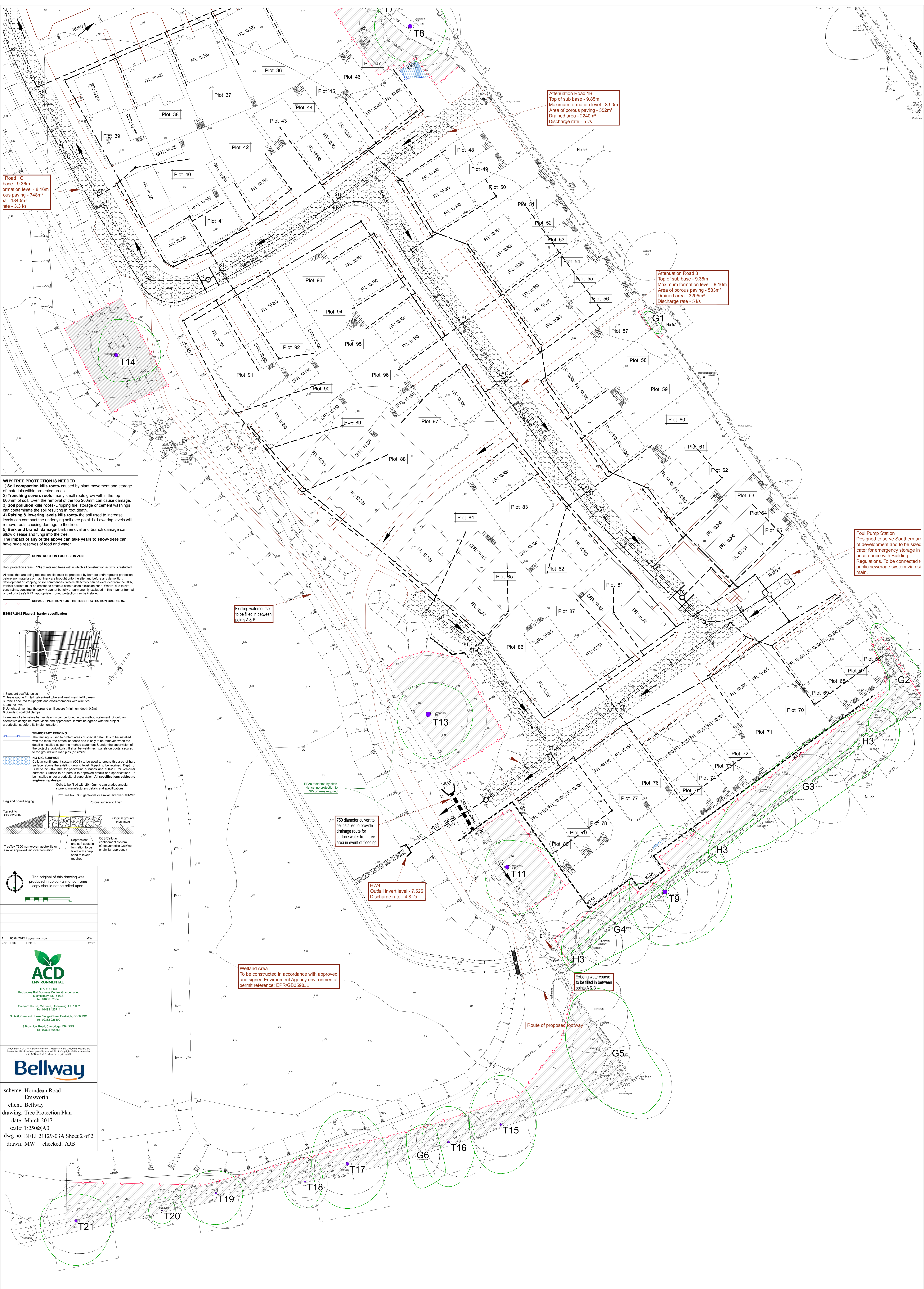


KEY

-  Trees which are to be retained and fully protected
-  Trees which cannot be accommodated and will need to be removed to facilitate the proposed layout
-  The extent of recommended pruning works

Appendix 4: Tree Protection Plan

BELL21129-03



WHY TREE PROTECTION IS NEEDED

- 1) **Soil compaction kills roots**-caused by plant movement and storage of materials within protected areas.
- 2) **Trenching severs roots**-many small roots grow within the top 600mm of soil. Even the removal of the top 200mm can cause damage.
- 3) **Soil pollution kills roots**-Dripping fuel storage or cement washings can contaminate the soil resulting in root death.
- 4) **Raising & lowering levels kills roots**-the soil used to increase levels can compact the underlying soil (see point 1). Lowering levels will remove roots causing damage to the tree.
- 5) **Bark and branch damage**-bark removal and branch damage can allow disease and fungi into the tree.

The impact of any of the above can take years to show-trees can have huge reserves of food and water.

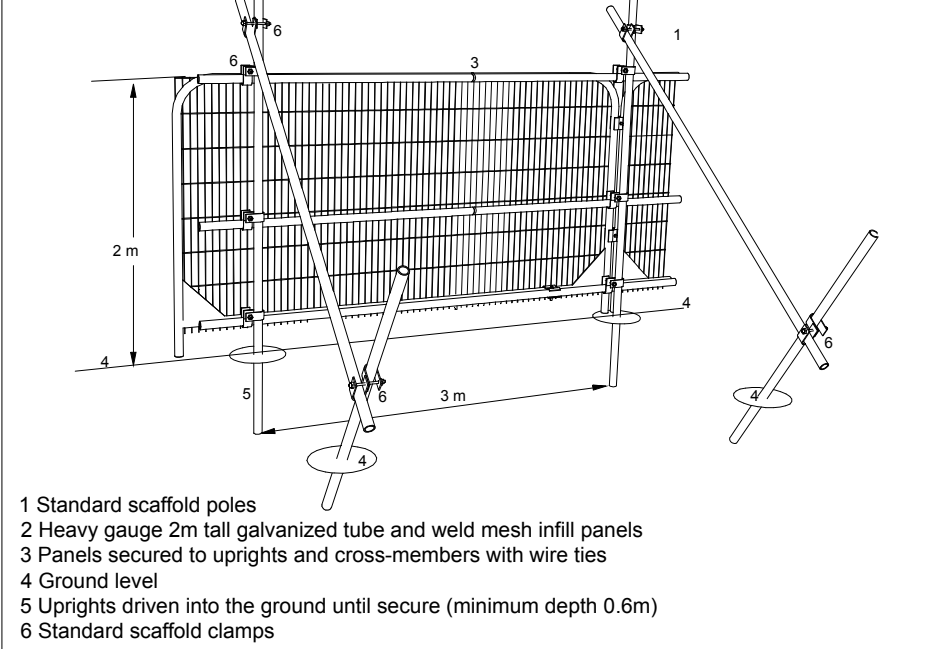
CONSTRUCTION EXCLUSION ZONE

Root protection areas (RPA) of retained trees within which all construction activity is restricted.

All trees that are being retained on site must be protected by barriers and/or ground protection before any materials or machinery are brought onto the site, and before any demolition, development or stripping of soil commences. Where all activity can be excluded from the RPA, vertical barriers must be erected to create a construction exclusion zone. Where, due to site constraints, construction activity cannot be fully or permanently excluded in this manner from all or part of a tree's RPA, appropriate ground protection can be installed.

DEFAULT POSITION FOR THE TREE PROTECTION BARRIERS.

BS5837:2012 Figure 2- barrier specification



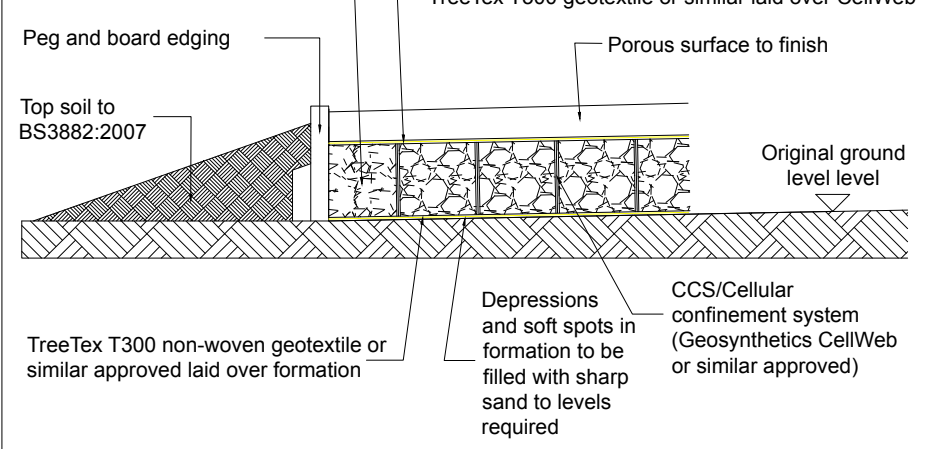
TEMPORARY FENCING

The fencing is used to protect areas of special detail. It is to be installed with the main tree protection fence and is only to be removed when the detail is installed as per the method statement & under the supervision of the project arboricultural. It shall be well-mesh panels on posts, secured to ground with steel rods (or similar).

NO-DIG SURFACE

Cellular confinement system (CCS) to be used to create this area of hard surface, above the existing ground level. Topsoil to be retained. Depth of CCS to be 50-75mm for pedestrian surfaces and 100-200 for vehicular surfaces. Surface to be porous to approved details and specifications. To be installed under arboricultural supervision. All specifications subject to engineering design.

Cells to be filled with 20-40mm clean graded angular stone to manufacturers details and specifications



The original of this drawing was produced in colour: a monochrome copy should not be relied upon.

A	Rev	Date	By	Details	Drawn
16.04.2017	1			Layout revision	MW

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Bellway

scheme: Horndean Road
client: Bellway
drawing: Tree Protection Plan
date: March 2017
scale: 1:250@A0
dwg no: BELL21129-03A Sheet 2 of 2
drawn: MW checked: AJB



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