MAXCROFT FARM
HILPERTON MARSH
TROWBRIDGE

ARBORICULTURAL IMPACT ASSESSMENT & METHOD STATEMENT

for

BARRATT HOMES PLC

ACD ENVIRONMENTAL

Ecology
Archaeology
Arboriculture
Landscape Architecture

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1. Executive Summary

1.1. For the Arboricultural Method Statement see section 4.

1.2. The site is currently open fields used for livestock grazing. The proposed development is the construction of a residential housing scheme including allocated parking and garden spaces, public open greenspaces, areas of play and SUD basins.

1.3. This impact assessment is intended to evaluate the direct and indirect effects of the proposed design on the trees on site, and where necessary recommends mitigation.

1.4. This impact assessment is based off the supplied illustrative layout provided, drawing ref: “2024_A_Masterplan_Maxcroft”.

1.5. The development proposals are in accordance with BS5837:2012 ‘Trees in relation to design, demolition and construction – Recommendations’. Adequate protection can be provided to ensure all retained trees are protected throughout development in the form of barriers and/or ground protection.

1.6. Given the number of trees on the site, the development proposals incorporate the majority of the better, more sustainable specimens.

1.7. All of the ‘A’ and ‘B’ category trees are to be retained and protected throughout the development.

1.8. All of the trees proposed for removal are in the lower two categories, ‘C’ and ‘U’, and are not of a quality that should represent any constraint to development.

1.9. Where proposed new hard surfaces encroach into the RPA of trees highlighted for retention, sensitive surface construction will be required.

1.10. Where SUD basins encroach within the RPA of retained trees, sensitive excavation methodology will be required.

1.11. Number of trees to be removed as a direct result of the current design (see section 4 for details):

BS Category	Number of individual trees	Tree Groups
U	0	0
A	0	0
B	0	0
C	2	0

1.12. Crown pruning will be required to allow 1.5m clearance from proposed building construction and 0.5m from proposed surfaces to facilitate working room and scaffolding erection.

1.13. The Arboricultural Method Statement (AMS) has been compiled in conjunction with the Tree Protection Plan (TPP) for the purpose of feasibility and planning, as per Figure 1 of BS5837:2012. These detail any mitigation which will be necessary to ensure the protection of retained trees throughout the development.

2. Introduction

2.1. ACD Environmental was instructed by Barratt Homes Plc. to prepare the following Arboricultural Impact Assessment and Method Statement. Reference should be made to the latest revision of the corresponding Tree Protection Plan (BDWB21033-03).

2.2. This Method Statement is to be made available to all operatives on site during the construction process, so that they understand the scope and importance of the measures set out for tree protection. Implementation of the protection methods and other details within this report are integral to ensuring protection for the retained trees.

2.3. For details of trees to be retained, and locations and types of special protection methods, reference should be made to the latest revision of Tree Protection Plan (ref: BDWB21033-03), which should be displayed prominently on site for all staff to see.

2.4. To ensure accuracy and avoid future costly adjustments, the Tree Protection Fence must be set out by a surveyor/engineer with all node points being marked clearly on site for the fencing contractor to work to. The AutoCAD version of the Tree Protection Plan is available on request.

2.5. This report is based on the recommendations given in BS5837:2012 ‘Trees in relation to design, demolition and construction – Recommendations’.

2.6. A search of the Wiltshire Planning Explorer mapping service provided on the Wiltshire Councils website on 21/09/23 shows that there are no Tree Preservation Orders (TPOs) in effect against any of the surveyed trees, nor is the surveyed area within a Conservation Area (CA).

2.7. The controlling authority is Wiltshire Council who can be contacted at:

Address: Wiltshire Council, County Hall, Bythesea Road, Trowbridge, BA14 8JN

Email: developmentmanagement@wiltshire.gov.uk

Telephone: 03004560114

2.8. Any questions relating to the content of this report should be directed in the first instance to: ACD Environmental, Unit 7, Godalming Business Centre, Woolsack Way, Godalming, GU7 1XW, 01483 425714, quoting the site address and report reference number.

2.9. The following abbreviations have been used throughout this document:

- Root Protection Area – RPA.
- Construction Exclusion Zone – CEZ.
- Tree Protection Plan – TPP.
- Tree Protection Fencing – TPF.
- Computer Aided Design – CAD.

3. Arboricultural Impact Assessment

3.1. The site is currently open fields used for livestock grazing. The proposed development is the construction of a residential housing scheme including allocated parking and garden spaces, public open greenspaces, areas of play and SUD basins.

3.2. This impact assessment is intended to evaluate the direct and indirect impacts on the trees on the site in relation to the proposed development. Any potential tree impacts are identified as per BS5837:2012 section 5.4, and details are given of proposed mitigation.

3.3. Any potentially damaging activities proposed in the vicinity of retained trees are identified, such that mitigation to significantly reduce or avoid this impact can be detailed in the Arboricultural Method Statement and Tree Protection Plan as recommended in BS5837:2012 section 5.4.2.

3.4. The development proposals are in accordance with BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'. Adequate protection can be provided to ensure all retained trees are protected throughout the development.

3.5. The tree survey for the site is at Appendix 2 of the Tree Report for the site, ACD reference BDWB21033ts.

3.6. This impact assessment is based off the supplied illustrative layout provided, drawing ref: "2024_A_Masterplan_Maxcroft".

3.7. Evaluation of impact of proposed tree losses

Table 1: Trees to be removed as a direct consequence of development

BS Category	Number of individual trees	Tree Groups
U	0	0
A	0	0
B	0	0
C	2	0

3.7.1. Those trees which are to be removed are shown with a red dashed canopy outline on the latest revision of the corresponding Tree Protection Plan ACD reference BDWB21033-03.

3.7.2. T15 is a 'C' category Crack Willow specimen that is proposed for removal due to significant encroachment of the proposed southern SUD basin footprint. This tree has historically failed, having subsequently been topped and now has a crown of regrowth. The remaining twin-stemmed primary structure is significantly dilapidated, with decay and failure throughout.

3.7.3. T10 is a 'C' category Leyland Cypress specimen on the boundary. Removal of this tree and a section of the surround G8 vegetation is required to facilitate the proposed water main diversion across site.

3.7.4. In terms of the effects of the tree loss required to implement the design, the trees to be removed are unremarkable and of very limited merit, such that they could be replaced with planting as part of the landscape proposals which would offer a higher quality and amenity value to the site.

3.8. Trees to be pruned

3.8.1. At this time the following tree surgery works are proposed. These works fall well within the level of good arboricultural practice:

Tree number	Species	Operation
G1	Crack Willow	Prune all sides of group constituents to allow 0.5 offset from proposed surfacing to facilitate working room.
G7	Hawthorn	Section removal and pruning as shown on Tree Protection Plan to facilitate construction of proposed pathway route and to allow 0.5m from proposed surfacing.
G8	Hawthorn, Hazel, Blackthorn	Section removal and pruning as shown on Tree Protection Plan to facilitate construction of proposed drainage allowing 0.5m from proposed easement.
T14	Ash	Prune northern crown aspect to allow 1.5m clearance from proposed building footprint. Lift lower northern crown to 3.5m over proposed garden.
G18	Hawthorn	Sectional removal as shown on Tree Protection Plan to facilitate the new access. To be cut back to 0.5m from proposed surfacing footprint.

3.8.2. Should any further pruning works become necessary, they should comply with BS3998:2010 Tree Work or more recently accepted arboricultural good practice and be approved by the LPA and project arboriculturist prior to any commencement.

3.9. Protection for retained trees

3.9.1. BS5837:2012 section 6.2.1. states: 'All trees that are being retained on site should be protected by barriers and/or ground protection (see 5.5) 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 should 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 should be installed (see 6.2.3).' As such, protection for all retained trees is shown on the Tree Protection Plan according to this specification.

3.9.2. A 1.5m offset has been allowed for working room and scaffolding erection between the Tree Protection Fencing and all proposed building construction.

3.9.3. A 0.5m offset has been allowed for working room between the Tree protection fencing and all proposed hard surfacing.90

3.9.4. BS5837:2012 figure 2 recommends a default specification for protective barrier. This is a weld mesh panel design, mounted upon a well braced scaffold framework.

3.9.5. A specification for adequate Tree Protection Fencing can be found in the Method Statement below and included on the corresponding Tree Protection Plan, this is considered to be perfectly adequate for this site where there are to be areas of high intensity development.

3.9.6. All tree protection fencing should be erected before any works start on site whatsoever.

3.10. Ground protection

3.10.1. In certain areas, space required to construct buildings will require encroachment into RPAs. Potential damage cause by foot traffic and associated works can be mitigated by the use of ground protection as specified in BS5837:2012 section 6.2.3. to ensure the ongoing survival of the retained trees, this is detailed in the Arboricultural Method Statement and indicated on the Tree Protection Plan where required.

3.10.2. Ground Protection should be capable of supporting the expected loading weight without deforming or rutting.

3.10.3. All specified Ground Protection should be installed before any works start onsite whatsoever.

3.11. Demolition & Groundworks

No special demolition procedures need be observed on this site, other than respecting the tree protection fencing.

3.12. New Hard Surfaces within RPAs

3.12.1. A proposed pedestrian path passes through sections of internal linear group G7. Where indicated on the Tree Protection Plan a low impact footpath design should be used to mitigate potential impacts to the retained group constituents by reducing compressional forces on the soil structure below and allowing the continued passage of water and gasses into any underlying rooting systems.

3.12.2. Further small encroachments have been identified within the RPAs of retained trees and groups G1, G7 and G18, however as per the recommendation of BS5837:2012 section 7.4.2.3, the new permanent hard surfacing does not exceed 20% of any existing unsurfaced ground within the retained RPAs.

3.12.3. The use of a three-dimensional cellular confinement system, such as 'Cellweb' is an acceptable approach for both pedestrian and vehicular surfacing, which aims to fulfil the above design criteria. This system maintains the passage of oxygen and water to root systems; avoids root loss through severance or asphyxiation and minimises the potential for soil compaction. It is achieved by laying a Geotextile membrane directly onto unchanged soil levels, with a three-dimensional cellular confinement system ('Cellweb') laid on top filled with no fines granular fill, with a porous finishing surface. See specification on Tree Protection Plan (BDWB21033-03).

3.12.4. An alternative approach to a low-impact pedestrian pathway is the use of a treated timber frame secured with wooden pins and infilled with a non-compacted pourous wearing surface (such as hoggin or woodchips) over a grotextile membrane.

3.12.5. Retained trees must first be protected during all stages of the development including demolition, by the erection of fencing as specified on the Tree Protection Plan (TPP). Installing the surface may require the re-positioning of the tree protection fencing to a secondary location to prevent access, or a temporary surface or ground protection laid down in lieu of the installation of the final surface.

3.12.6. The Arboricultural Method Statement describes installation of a typical no-dig surface. This follows the recommendations set out in Section 7.4 of British Standard 5837:2012. The author of this report is not an engineer and therefore detailed engineering design, and analysis must be carried out by a suitably qualified engineer. However, any design must be approved for use by the project arboriculturist.

3.13. Construction within RPAs

3.13.1. It is confirmed that there is no proposed building construction within the RPA of retained trees onsite.

3.14. Shade and future pressure to prune

The site layout has been assessed in terms of shading and future pressure to prune. Given the orientation of the site, and the relationship between the proposed buildings and the retained trees, the juxtaposition is viable for long-term tree retention, and it is considered that shading by trees is unlikely to be a concern to future residents. As a result, it is considered unlikely that there would be any undue pressure to remove trees, or excessively prune from any future occupants.

3.15. Services

3.15.1. It is fundamental to tree protection that infrastructure design is sensitively approached, as trenching close to trees may damage roots and affect tree health and stability. Details of finalised services have not been provided at the time of writing; however an indicative route and associated easement from a diverted water main is included on the supplied illustrative layout.

3.15.2. This water main diversion passes through the boundary vegetation in the southeast of the site and will require the removal of T10 and a section of G8 as shown on the corresponding Tree Protection Plan.

3.15.3. The footprint of the proposed southern SUD basin is shown within the RPA of T17. This will equate to a potential loss of up to 16.3% of the total RPA. Given the inclined nature of the profile of the basin, it is wholly feasible that the shallower excavation on the periphery of the basin can be carried out without impacting significant rooting systems within the RPA. As such, excavation should be conducted in a careful manner as per the below corresponding methodology and under direct supervision from the project arboriculturist, who will be able to quantify any impact against the tree and make a suitable decision as how to best proceed.

3.15.4. Should it be deemed, that excavation cannot be carried out without significantly affecting the retained tree due to the presence of a high volume of significant roots or fear of destabilisation then work will stop until a suitable way forward can be agreed with the local planning authority.

3.15.5. The Tree Protection Plan, showing the constraints posed by retained trees will be passed to the infrastructure engineers to inform their design, ensuring that all services avoid areas of potential conflict. As per BS5837:2012 Figure 1, once further details become available as part of the detailed/technical design for the site, the TPP and AMS will be revised to incorporate these details for services for inclusion in the Tender documentation.

3.16. Levels and Landscaping

3.16.1. Full details of any changes in ground levels on site remain to be finalised. Any alterations to levels close to trees may damage roots and affect tree health and stability.

3.16.2. Unless no-dig methodology is proposed for installation of surfaces within RPAs the original levels in these areas must be noted, retained, and integrated into the engineering design of the site.

3.16.3. Landscaping operations within the RPAs of retained trees must be carried out in a sensitive manner and be subject to a detailed method statement and arboricultural supervision.

3.17. Boundaries

All plot boundaries will need to be designed, positioned and installed to avoid damage to retained trees. When within RPAs, this will include hand excavation of all post holes, and the lining of any post holes with a non-porous membrane to stop leachates from the concrete damaging tree roots.

3.18. Supervision & monitoring

A pre-start Commencement meeting between the site manager and the project arboriculturist is recommended following tree removals and pruning to ensure that all specified tree protection measures have been installed and all areas that will require special detail (such as No-dig surfacing) are identified prior to the start of development works onsite.

Supervision is recommended during the installation of all special details, such as no-dig surfaces and construction. This should be detailed in the approved method statement and to provide comfort to the LPA, they are invited to include a planning condition to support this.

4. Arboricultural Method Statement

TO BE READ IN CONJUNCTION WITH THE APPENDED TREE PROTECTION PLAN REFERENCE: BDWB21033-03

4.1. Phasing of operations for tree protection

4.1.1. Implementation of tree protection measures on the site must be carried out in the following order:

1) Tree removals and tree surgery.
2) Line of tree protection fence to be set out to node points by surveyor.
3) Pre-commencement site meeting with project arboriculturist and site manager to ensure Accurate erection of tree protection fence and ground protection.
4) Site accessible to construction/demolition traffic.
5) Demolition/site clearance.
6) Construction.
7) Removal of tree protection fencing.
8) Remedial tree surgery (if required).

4.1.2. The above phasing must not be changed without approval from the project arboriculturist and agreement with the Council.

4.2. Site supervision

4.2.1. The development process will be subject to arboricultural supervision where construction work inside the construction exclusion zone is required, and for the installation of any special detail (e.g., no-dig surface). Therefore, input and supervision from the project arboriculturist will be required at the following stages:

1) Site meeting with project arboriculturist and site manager to ensure accurate erection of tree protection measures.
2) Sensitive excavation within retained RPAs.
3) Installation of no dig surfacing.

4.2.2. Arboricultural supervision is to be carried out at all crucial stages throughout the development process to ensure detailed tasks are carried out as per the approved methodology, and during any other, unplanned incursions into protection areas, for whatever reason.

4.2.3. Supervision will ususally require the arboriculturist to be present throughout the task, to ensure all the arboricultural objectives are met, however if the task is to take a long period of time, provided the arboriculturist is satisfied with the prior conduct and attitude of all involved, and after an additional ‘tool-box talk’, supervision may be reduced to telephone contact between the site foreman/contractor and arboriculturist with pictures supplied as requested.

4.2.4. It is the responsibility of the client to ensure that all required supervision and monitoring visits are arranged and carried out by a suitably trained arboriculturist.

4.3. Restrictions within tree protection areas

4.3.1. Inside the exclusion area of the fencing, 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.

4.3.2. 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.

4.4. Avoiding damage to stems and branches

4.4.1. Care shall be taken when planning site operations in proximity of retained trees to ensure that wide or tall loads, or plant with booms, jibs and counterweights, can operate without coming into contact with retained trees. Such contact can result in serious injury to them and might make their safe retention impossible.

4.4.2. Consequently, any transit or traverse of plant in proximity of trees shall be conducted under the supervision of a banksman, to ensure that adequate clearance from trees is at all times maintained. In some circumstances, it may be impossible to achieve this without pruning works known as ‘access facilitation pruning’.

4.4.3. Access facilitation pruning shall be kept to the barest minimum necessary to facilitate development and shall be carried out in strict accordance with the guidance below (Tree Surgery). Under no circumstances shall construction personnel undertake any tree pruning operations.

4.5. Tree protection fencing

4.5.1. The Tree Protection Plan (see the latest revision of: BDWB21033-03) shows the alignment of Tree Protection Fencing (TPF), which is to be installed prior to any of the following taking place:

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

4.5.2. Stages for installation of TPF:

1) Hand clearance of any vegetation to allow clear working access.
2) Setting out of fencing points.
3) Fencing erected.
4) Site accessible to demolition/construction traffic.

4.5.3. To ensure accuracy and avoid future costly adjustments, the Tree Protection Fence must be set out by a surveyor with all node points being marked clearly on site for the fencing contractor to work to.

4.5.4. Once erected, all TPF 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.

4.5.5. The typical TPF 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.

4.5.6. Should any alternative method of barrier construction be proposed, consultation with the project arboriculturist will be obtained to clarify the efficacy of the revised design prior to informing the local planning authority and obtaining their consent.

4.5.7. Once the exclusion zone has been protected by barriers and/or ground protection, construction work can commence.

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

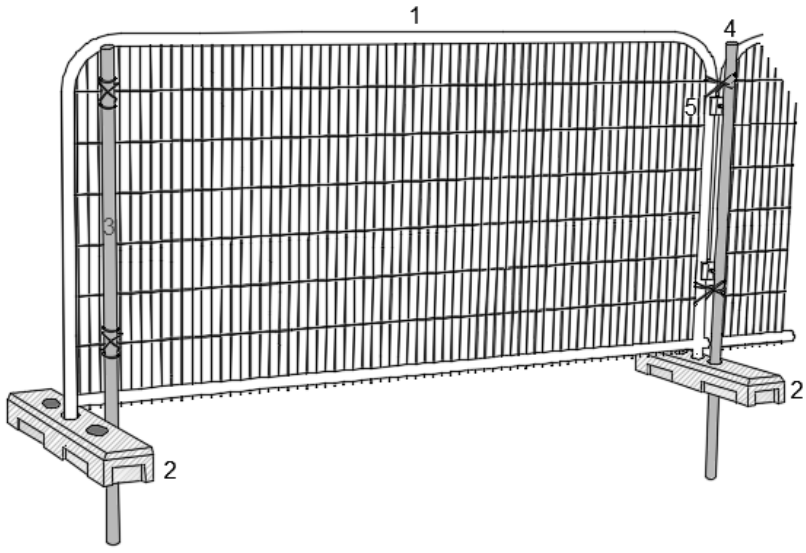


Figure 1: Tree Protection Sign (digital copies available for download at: www.acdenvironmental.co.uk)

TREE PROTECTION FENCING & EXCLUSION ZONE

All Tree Protection Fence (TPF) shall be installed prior to any plant activity on site whatsoever, including demolition, utility installation, groundworks, and soil stripping. Once erected, all TPF 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.

Tree Protection Fence shall comprise of Heras type panels on 'boots', well braced by attachment to scaffold pole uprights driven firmly into the ground. Once the exclusion zone has been protected by barriers and/or ground protection, construction work can commence. All weather notices may be erected on the barriers.



1 Weldmesh (e.g Heras) Panels
2 Concrete or rubber blocks
3 Scaffold pole uprights driven firmly into ground, then secured to panels with wire ties, or;
4 Uprights driven firmly into ground through hole in block, then secured to panels with wire ties.
5 Panels to be interlinked using clamps

Figure 2: Adequate Tree Protection Fencing specification

4.6. Site storage, parking, welfare facilities

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

4.6.2. No details of these provisions are available at the time of writing of this report.

4.6.3. None of the above provisions will be sited within RPAs of retained trees without the input or the project arboriculturist and the consent of the Local Authority.

4.7. Ground protection

4.7.1. Specification for adequate Ground Protection are shown on the Tree Protection Plan and included below. Any alternative specification to be installed must be capable of supporting the expected loads and avoiding rutting, compaction and damage to the soil. As advised in BS5837:2012 section 6.2.3:

4.7.2. 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. 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.

4.7.3. Stages for ground protection installation[1]:

<u>No plant machinery to be used in the area of ground protection for whatever reason</u>

1) Discuss procedure with project arboriculturist.
2) Dismantle primary TPF and re-erect in secondary location as shown on TPP.
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.

4.7.4. To ensure accuracy and avoid future costly adjustments, the Ground Protection must be set out by a surveyor with all node points being marked clearly on site for the fencing contractor to work to.

[1]For protection from foot traffic only

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

4.8. **Tree surgery and removal**

4.8.1. Those trees which are to be removed are shown with a red dashed canopy outline on the Tree Protection Plan, ACD drawing reference BDWB21033-03.

4.8.2. The following surgery works are to be carried out:

Tree number	Species	Operation
G1	Crack Willow	Prune all sides of group constituents to allow 0.5 offset from proposed surfacing to facilitate working room.
G7	Hawthorn	Section removal and pruning as shown on Tree Protection Plan to facilitate construction of proposed pathway route and to allow 0.5m from proposed surfacing. Grind out any remaining stumps from sectional removal.
G8	Hawthorn, Hazel, Blackthorn	Section removal and pruning as shown on Tree Protection Plan to facilitate construction of proposed drainage allowing 0.5m from proposed easement.
T10	Leyland Cypress	Remove to ground level and grind out remaining stump.
T14	Ash	Prune northern crown aspect to allow 1.5m clearance from proposed building footprint. Lift lower northern crown to 3.5m over proposed garden.
T17		Remove to ground level and grind out remaining stump.
G18	Hawthorn	Sectional removal as shown on Tree Protection Plan to facilitate the new access. To be cut back to 0.5m from proposed surfacing footprint. Grind out remaining stumps.

4.8.3. All trees to be removed or pruned are indicated on the Tree Protection Plan.

4.8.4. If any further tree surgery works are required, a proposed specification will be submitted to, and approved by the Local Planning Authority before any works are carried out.

4.8.5. All work will be carried out in accordance with BS 3998:2010 Recommendations for Tree Work, industry best practice and in line with any works already agreed with the Council.

4.8.6. The tree surgery contractor is responsible for carrying out any relevant health and safety risk assessment, and insurance, prior to any work being carried out.

4.8.7. The statutory protection afforded by the Wildlife and Countryside Act and Countryside and Rights of Way Act 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.

4.8.8. 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.

4.8.9. 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.

4.9. Soft landscaping within RPA

4.9.1. All landscaping and associated ground preparation within exclusion zones will be carried out sensitively to ensure root damage is mitigated as much as is practicable. At no time is any heavy plant to be used within any protected area. Removal of existing vegetation will be carried out by hand; turf may be removed using a mechanical turf stripper or by hand.

4.10. Turfing

4.10.1. Stages for turfing gardens and open spaces:

No plant machinery[2] to be used in the area for whatever reason

1) Remove TPF to allow access to area.
2) Do not reduce any high spots or excavate in any way.
3) Existing poor-quality turf may be removed with a turf stripper.
4) 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.
5) Import turves by hand in wheelbarrow.
6) Lay turves.

4.11. Planting

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

4.11.2. Stages for planting within tree protection areas:

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

1) Remove TPF to allow access to area.
2) Remove existing vegetation by hand, turf may be removed using a mechanical turf stripper.
3) Do not reduce any high spots or excavate in any way.
4) Import good quality topsoil by hand (with wheelbarrow) into area.
5) Level to a depth of no more than 100mm with hand tools.
6) Dig individual planting pits for each plant by hand (including hedging which must not be trench planted).
7) Any mulch should also be imported and spread by hand.

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

[2] Including rotovators

4.12. Installation of underground services within RPAs

4.12.1. If for whatever reason installation within RPAs is required, the project arboriculturist and local authority must be notified prior to any tree protection barrier removal and the following details adhered to.

4.12.2. Stages for installing services 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) Excavate the trench using hand tools only, keeping to minimum dimensions required.
5) Roots below 25mm should preferably be retained, however if required can be cut cleanly using secateurs or hand saw.
6) Roots over 25mm diameter will be retained and kept damp by covering with hessian (re-wetted as required).
7) Feed in services.
8) Back fill trench with 200-300mm depth of excavated soil, or a mixture of excavated and imported top-soil (to BS3882:2015), firming down with heels.
9) Repeat step 7 until trench is filled.
10) Re-erect tree protection fencing as per approved plan.

4.12.3. An alternative to the method of excavation above, for trenching within RPA's, is by using an 'air-spade' or similar. 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-spade services if required.

4.12.4. 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.

4.12.5. Reference can be made to National Joint Utilities Group Publication Volume 4 (NJUG Vol 4) for guidance, but any approach must be approved by the project arboriculturist.

4.13. **Supervised Excavation within RPAs**

Stages of excavation within RPAs:

1) Contact project arboriculturist to hold pre-start site meeting, ‘toolbox’ talk and supervise the operation.
2) Remove TPF to allow access to area (if required).
3) Identify sensitive area to be excavated.
4) Excavate where feasible using hand-tools only. For more significant excavations use a digger with no-tines bucket under direct supervision from the project arboriculturist.
5) If roots are found, clear by hand around them.
6) If roots found are greater than 25mm diameter, then cover with damp mateirl (e.g.hessian) and keep moist until backfilled.
7) If excavation requires all roots to be severed, then proceed as below.
8) Cleanly sever roots with bypass secateurs, loppers or pull cut saw at right angles to root. Avoid tearing or ripping the root.
9) Backfill as soon as possible to cover cut root ends.
10) If for whatever reason, the project arboriculturist feels that a tree's stability has been compromised during the operation, then the LPA shall be contacted, and the arboricultural officer (or appropriate landscape officer) notified. A decision can then be made as to the best way forward.

4.14. No-dig footpath construction

4.14.1. To ensure that tree roots, within the ground under this proposed surface, continue to survive during and after construction a cellular system such a CellWeb (Geosynthetics Ltd, 01455 617139, www.geosyn.co.uk) of 75mm depth is to be used[3].

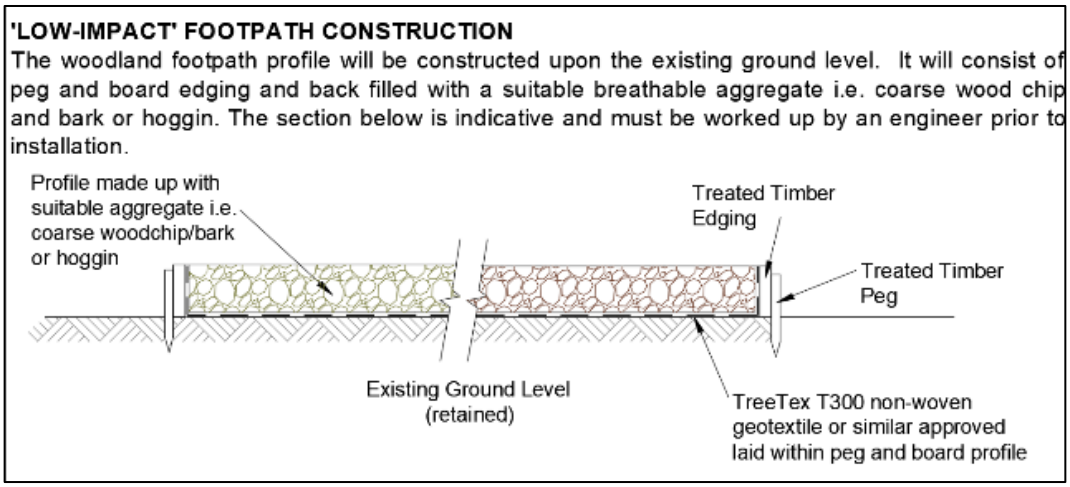


Figure 3: Indicative 'Low impact' path design

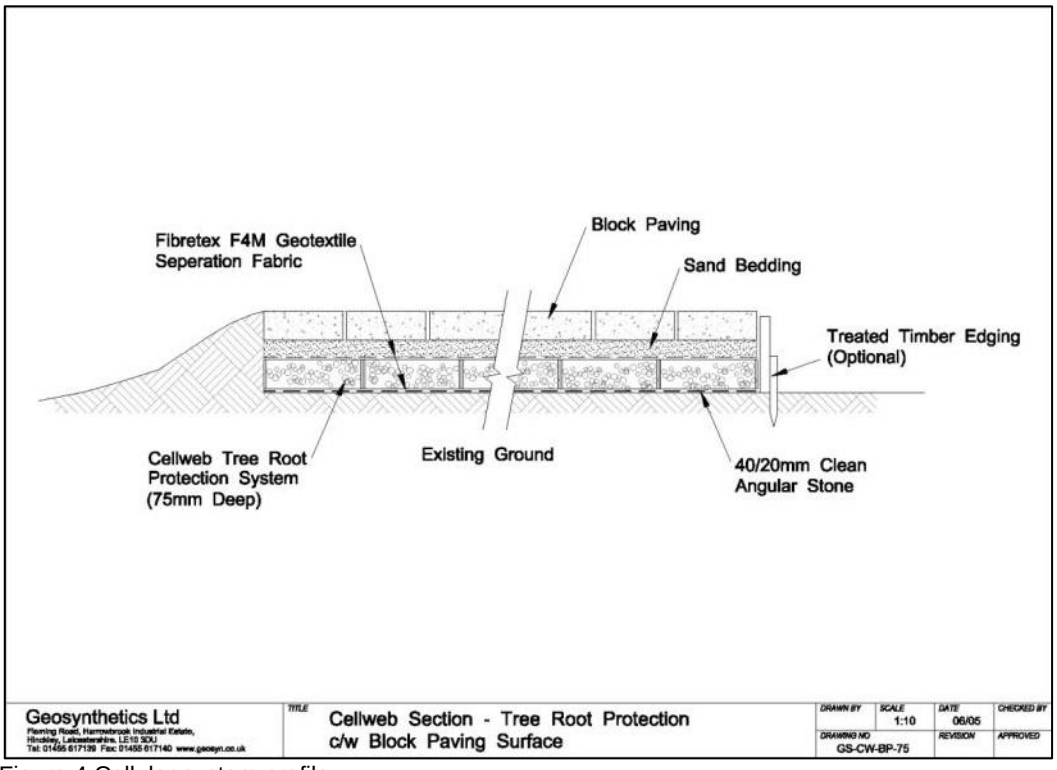


Figure 4 Cellular system profile

4.14.2. Stages for Installation of the cellular confinement surface:

[3]This approach describes installation of a typical no-dig surface. The author of this report is not an engineer and therefore detailed engineering design, and analysis must be carried out before installation.

1) Contact project arboriculturist to hold pre-start site meeting and 'toolbox' talk before starting work.
2) Dismantle TPF to allow access to work area.
3) Remove existing vegetation by using a specific herbicide (as advised by a specialist) or manual removal with hand tools only. Agreed 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) Install a non-woven Geotextile (such as Fibretex F4M) directly over soil grade level (levelled where necessary, by non-compacted washed sand) and fix in place.
6) Lay the cellular system over the Geotextile, which is secured open under tension during the infill process with steel staples or wooden pegs.
7) 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.
8) Fill the cellular system ensuring any plant machinery stands only on already filled areas. Typical infill consists of no-fines angular granular material 20-40mm, which will remain un-compacted.
9) Install porous wearing surface.

4.15. Soil remediation measures for compaction within RPAs (if required)

4.15.1. Stages for soil remediation for compaction within RPA. The following works must be undertaken by a suitably qualified and experienced soil remediation contractor:

1) Soil test to be undertaken to identify soil texture, nutrient content and pH. Based on the results, appropriate remediation measures to be undertaken.
2) Compaction test to be undertaken to identify soil compaction level.
3) Appropriate soil decompaction measures using a Terravent to reduce any compaction that may have occurred. To be used in a 1m matrix over the entire area previously covered by the fill.
4) Add layer of well composted mulch to a depth of 100-200mm over the RPA area.

4.15.2. 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.

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

4.16. **Installation of boundary fencing within protected areas**

4.16.1. 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 post holes 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 polythene bag.
6) Insert post and fill post hole with concrete to ground level.
7) Trim polythene to ground level.

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