Arboricultural Impact Assessment Overview

in Relation to Resubmission for
Approved Residential Development at

Land off Clitheroe Road, Barrow, Lancashire, BB7 9AQ

Prepared by:

Bowland Tree Consultancy Ltd

November 2020

ARBORICULTURAL IMPACT ASSESSMENT OVERVIEW
LAND OFF CLITHEROE ROAD, BARROW

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ARBORICULTURAL IMPACT ASSESSMENT OVERVIEW
LAND OFF CLITHEROE ROAD, BARROW

Project Details

Project No.: BTC2092

Site: Land off Clitheroe Road, Barrow, Lancashire, BB7 9AQ

Client: PWA Planning

Council: Ribble Valley Borough Council

Survey Date: 14 October 2020

Surveyed by: Jacob Croasdale FdSc

Prepared by: Jacob Croasdale FdSc & Joseph Lambert BSc(Hons) FdSc MArborA

Checked by: Phill Harris MSc MArborA CEnv MICFor & Joseph Lambert BSc(Hons) MArborA

Date of Issue: 11 November 2020

Version No: 1

DISCLAIMER

Survey Limitations: Unless otherwise stated all trees are surveyed from ground level using non-invasive techniques. The disclosure of hidden crown and stem defects, in particular where they may be above a reachable height or where trees are ivy clad or in areas of ground vegetation, cannot therefore be expected. All obvious defects, however, are reported. Detailed tree safety appraisals are only carried out under specific written instructions. Comments upon evident tree safety relate to the condition of said tree at the time of the survey only.

Unless otherwise stated all trees should be re-inspected annually in order to appraise their on-going mechanical integrity and physiological condition. It should, however, be recognised that tree condition is subject to change, for example due to the effects of disease, decay, high winds, development works, etc. Changes in land use or site conditions (e.g. development that increases access frequency) and the occurrence of severe weather incidents are also significant considerations with regards tree structural integrity and trees should therefore be re-assessed in the context of such changes and/or incidents and inspected at intervals relative to identified and varying site conditions and associated risks.

Where trees are located wholly or partially on neighbouring private third-party land then said land is not accessed and our inspection is therefore restricted to what can reasonably be seen from within the site. Stem diameters of trees located on such land are estimated. Any subsequent comments and judgments made in respect of such trees are based on these restrictions and are our preliminary opinion only. Recommendations for works to neighbouring third-party trees are only made where a potentially unacceptable risk to persons and/or property has been identified during our survey. Where significant structural defects of third-party trees are identified and associated management works are considered essential to negate any risk of harm and/or damage then we will first attempt to inform the site occupier of the issues and, if not possible, then inform the relevant Council. Where a more detailed assessment is considered necessary then appropriate recommendations are set out in the Tree Survey Schedule.

Where tree stem locations are not included on the plan(s) provided then they are plotted at the time of the survey using, where appropriate and/or practicable, a combination of measurement triangulation and GPS co-ordination. Where this is not possible then locations are estimated. Restrictions in these respects are detailed in the report.

The tree survey and any report information provided is intended as a guide to identify key tree related constraints to site development only. As such, the potential influence of trees upon existing or proposed buildings or other structures resulting from the effects of their roots abstracting water from shrinkable load-bearing soils is not considered herein. The tree survey information in its current form should not therefore be considered sufficient to determine appropriate foundation depths for new buildings. Accordingly, an updated survey, with reference to the current NHBC Standards Chapter 4.2 - Building Near Trees, must therefore be prepared for the specific purpose of informing suitable foundation depths subsequent to planning approval being granted. The advice of a structural engineer must also be sought with regard to appropriate foundation depths for new buildings.

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Statutory Tree Protection: It is the client's responsibility to check for the presence of any statutory tree protection measures, such as the site's location within a Conservation Area and/or the presence of any Tree Preservation Orders, directly with the applicable Council's planning department prior to scheduling or carrying out any tree works. In turn, it is also the client's responsibility to check for the need for a felling licence with the Forestry Commission prior to scheduling or carrying out any tree works. Bowland Tree Consultancy Ltd cannot be held responsible for any decisions made by the client to prune or remove trees where any such statutory protection exists.

TREE SURVEY SCHEDULE FOR ARBORICULTURAL IMPACT ASSESSMENT		Surveyor:	Jacob Croasdale FdSc	Page: 1 of 3
Site:	Land off Clitheroe Road, Barrow, Lancashire, BB7 9AQ	Survey Date:	14 October 2020	
Agent for Client:	PWA Planning	Job Reference:	BTC2092	

No.	Species	Height	Stem Diam.	Branch Spread		Branch & Canopy Clearances	Life Stage	PC	General Observations and Comments	Management Recommendations	ERC	Cat. Grade	RPA (m²)	RPA Radius (m)
T1	Weeping Willow	11	320	N E S W	4 5 4 3	1.5 0.5	EM	G	▪ Tree located within group G2. ▪ Some deadwood in shaded areas of canopy. ▪ Very minor stem lean east. ▪ No significant visible defects at time of survey.	▪ Remove tree in order to construct development as proposed. ▪ Mitigate for loss through replacement tree planting elsewhere on site.	10+	C1	46	3.84
T2	Common Beech	8	100	N E S W	1.5 2 0 2	2 2	Y	G	▪ Located on neighbouring land and subsequently not inspected in detail. ▪ Tree is evidently only remaining stem of a previous Beech hedge.	▪ Ensure protection of Root Protection Area (RPA) throughout course of development through establishment of Construction Exclusion Zone (CEZ) using temporary protective fencing.	20+	C1	5	1.2
T3	Common Horse Chestnut	8	1x140 2x50 (ms)#	N E S W	2.5 2.5 2 2.5	0.5-N 4	Y	G	▪ Located on neighbouring land and therefore not inspected in detail. ▪ Subordinate stem emerges from west side of base. ▪ Canopy has severe colonisation of Horse Chestnut Leaf Miner *(Cameraria ohridella)* and is showing a significant reduction in vitality.	▪ Ensure protection of RPA throughout course of development through establishment of CEZ using temporary protective fencing.	20+	C1	11	1.88
T4	Common Ash	16	1200#	N E S W	9 12 9 9	4 4	M	M	▪ Traverses boundary line, but larger proportion of stem evidently within client's ownership. ▪ Historically pollarded. ▪ Long history of pruning works, with numerous unoccluded to fully occluded wounds. ▪ Frequent deadwood to a diameter of 150mm. ▪ Showing minor signs of colonisation by Ash Dieback Disease in crown.	▪ Remove tree in order to construct development as proposed. NB: Due to location on boundary line, client to establish exact ownership of tree and agree necessary permissions for removal in advance with tree co-owners if applicable.	10+	C1	651	14.4
T5	Common Alder	12	300#	N E S W	5 5.5 5 5.5	3 3.5	EM	G	▪ Located on neighbouring land and therefore not inspected in detail. ▪ Some epicormic growth. ▪ No significant visible defects.	▪ Remove tree in context of proposed site landscaping. ▪ Mitigate for loss through replacement tree planting elsewhere on site	20+	B1	41	3.6
T6	Common Apple	2	50	N E S W	0.5 1 0.5 1	N/A	Y	M	▪ Evidently recently planted with protective tube around stem. ▪ Severe stem lean east.	▪ Transplant tree in order to retain elsewhere on site away from development works.	20+	C1	1	0.6

Headings and Abbreviations:

No. Allocated sequential reference number - Tree ('T'), Group ('G'), Woodland ('W') or Hedge ('H') reference number - refer to plan and to numbered tags where applicable
Species: Common name
Height: In metres, to half nearest metre – where possible approximately 80% are measured using an electronic clinometer and the remainder estimated against the measured trees. In the case of Groups and Woodlands the measurement listed is that of the highest tree
Stem Diam.: Stem diameter in millimetres, to nearest 10mm - measured and calculated as per Annex C of BS5837:2012. MS = multi-stemmed, TS = twin-stemmed
Branch Spread: Crown radius measured (or estimated where considered appropriate) from the four cardinal points (north, east, south and west) to give an accurate visual representation of the crown
Branch & Canopy Clearances: Existing height above ground level, in metres, of first significant branch and direction of growth (e.g. 2.5-N) and of canopy at lowest point – to inform on crown to height ratio, potential for shading, etc.
Life Stage: Estimated age class - Y = young, SM = semi-mature, EM = early-mature, M = mature, PM = post-mature
PC: Physiological Condition - a measure of the tree'(s)' overall vitality, i.e. D = Dead, MD = Moribund, P = Poor, M = Moderate, G = Good
General Observations and Comments: Comments relating to the tree'(s)' overall condition and any other pertinent factors including structural defects, current and potential direct structural damage, physiological decline, poor form, etc.
Management Recommendations: Either Preliminary or In Consideration of the Proposal - In the case of Arboricultural Constraints Surveys the recommended management works only take exiting site and tree circumstances and conditions into account and not proposed developments. Arboricultural Impact Assessment and Method Statement related Surveys take the proposed development into consideration with recommendations made accordingly. More than one option may be given if considered appropriate
ERC: Estimated Remaining Contribution - in years as per BS5837:2012 (i.e. <10, 10+, 20+, 40+)
Cat. Grade: Category Grading - tree retention value listed as U, A, B or C - in accordance with BS5837:2012 Table 1
RPA m²: Root Protection Area in m² - calculated area around the tree that must be appropriately protected throughout the development process in order avoid root damage
RPA Radius (m): Root Protection Area Radius - in metres measured from the centre of the stem to the line of tree protection
 # (Estimated Dimensions): Where trees are located off-site, or are inaccessible for any other reason, and accurate measurements or other information cannot be taken then the information provided is estimated and is duly suffixed with a "#" symbol

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T7	Common Oak	16.5	830	N E S W	9 12 9.5 7.5	4-N 1.25	M	M	▪ Significant stem lean east, with crown now largely weighted east due to large diameter branch failures on western side of crown. ▪ Multiple branch failures and long, dead pruning stubs to a diameter of approximately 230mm throughout. ▪ Tree is considered to have an increased risk of stem or rootplate failure due to weighting issues.	▪ Remove tree in order to construct development as proposed. NB: It is understood, from information provided by the agent for the client, that permission has already been granted to remove this tree under a separate application.	10+	C1	312	9.96
T8	Common Holly	1	40	N E S W	0.5 0.5 0.5 0.5	N/A	Y	M	▪ Recently planted. ▪ Protective tube around stem. ▪ Projected to be protected within RPA and associated CEZ of retained tree T9.	▪	40+	C1	1	0.48
T9	Common Alder	15	1160	N E S W	11 10 11 10	3-S 1	M	G	▪ Moderately heavy basal epicormics and several adventitious growths to a diameter of 100mm emerging from heights around 0.5m. ▪ Occasional partially occluded cavities throughout crown to a diameter of 100mm.	▪ Retain tree in context of proposed development. ▪ Construct proposed driveway in strict accordance with s7.4 of BS5837:2012 using a 3-d cellular confinement system installed above ground level (see appended manufacturer's brochure).	20+	A3	609	13.92
G1	2no. Silver Birch, Hazel, Common Oak, Common Alder	≤ 18	≤ 320#	N E S W	≤ 4.5 ≤ 4.5 ≤ 4.5 ≤ 4.5	0.5-S ≥ 1.5	Y-EM	G	▪ Located on neighbouring land and therefore not inspected in detail. ▪ Moderately closely spaced linear group extending northwards. ▪ Two early-mature Silver Birches with several young trees of other species in between.	▪ Prune canopies on east side by approximately 1m in order to attain clearance to construct proposed dwelling. NB: As tree's are under third party ownership all works should take place from within site boundaries following prior notification to tree owner(s). ▪ Ensure protection of RPAs through establishment of CEZ using temporary protective fencing.	20+	B2	≤ 46	≤ 3.84
G2	2no. Leyland Cypress	≤ 7	≤ 200#	N E S W	≤ 2.5 ≤ 2.5 ≤ 2.5 ≤ 2 .5	0.5 ≥ 0.5	SM	G	▪ Very closely spaced pair. ▪ No significant visible defects.	▪ Remove group in order to construct development as proposed. ▪ Mitigate for loss through replacement tree planting elsewhere on site.	10+	C1	≤ 18	≤ 2.4

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No.	Species	Height	Stem Diam.	Branch Spread	Branch & Canopy Clearances	Life Stage	PC	General Observations and Comments	Management Recommendations	ERC	Cat. Grade	RPA (m²)	RPA Radius (m)
G3	3no. Beech, 2no. Hawthorn, 1no. Common Oak, 1no. Sycamore	≤ 8	≤ 140	N ≤ 2.5 E ≤ 2.5 S ≤ 2.5 W ≤ 2.5	1.25-N ≥ 0.5	Y-M	G	▪ Northernmost tree is on site side of fence, but rest of group is located on neighbouring land and therefore not inspected in detail. ▪ Growing very close to or in contact with post and rail boundary fence. ▪ Limited potential for future growth due to conflict with boundary treatment.	▪ Remove northern most tree from group within site due to projected displacement of boundary fencing. ▪ Ensure protection of remaining group's RPAs through establishment of CEZ using temporary protective fencing.	<10	U	≤ 9	≤ 1.68
G4	8no. Common Ash, 6no. Common Oak, 4no. Sycamore	≤ 18	≤ 450#	N ≤ 7 E ≤ 7 S ≤ 7 W ≤ 7	1-W ≥ 1	EM	G	▪ Located on neighbouring land and therefore not inspected in detail. ▪ Moderately spaced linear group evidently planted as a shelterbelt for the young woodland W1 beyond. ▪ Many of crowns overhanging site with low clearance. ▪ Majority of Common Ash within group showing severe branch dieback and a significant reduction in vitality due to colonisation by Ash Dieback Disease.	▪ Ensure protection of RPAs where encroaching into site through establishment of CEZ using temporary protective fencing.	20+	B2	≤ 92	≤ 5.4
W1	Birch, Oak, Ash, Hazel, Hawthorn, Wild Cherry, Scots Pine, Holly	≤ 12	≤ 180#	N ≤ 3 E ≤ 3 S ≤ 3 W ≤ 3	0 ≥ 0.5	Y	G	▪ Located on neighbouring land and therefore not inspected in detail. ▪ Young, planted, closely spaced mixed woodland. ▪ Occasional trees with protective tubes still in place. ▪ Not projected to be impacted by proposed development.	▪	40+	B3	≤ 15	≤ 2.16
W2	Common Beech, Common Oak, Elder, Holly, Hawthorn	≤ 20	≤ 280#	N ≤ 5 E ≤ 5 S ≤ 5 W ≤ 5	0 ≥ 0	EM	G	▪ Located on neighbouring land and therefore not inspected in detail. ▪ Edge of moderately to widely spaced woodland extending eastwards. ▪ Fronted by a recently laid and currently sparse Hawthorn hedge.	▪ Ensure protection of RPAs where encroaching into site through establishment of CEZ using temporary protective fencing.	40+	A3	≤ 35	≤ 3.36
H1	Bay, Willow, Eucalyptus etc.	≤ 2.5	≤ 30#	≤ 0.5 wide	N/A	Y	G	▪ Replacement planting. ▪ Located on neighbouring land and subsequently not inspected in detail. ▪ Not projected to be impacted by proposed development.	▪	40+	C2	N/A	≈ 0.5
H2	Common Beech	≤ 1.5	≤ 50#	≤ 1 wide	0 ≥ 0	Y	G	▪ Located on neighbouring land and therefore not inspected in detail. ▪ Managed garden boundary hedge.	▪ Ensure protection of RPA throughout development where encroaching into site.	10+	C2	N/A	≈ 0.6
H3	Leyland Cypress	≤ 8	≤ 100#	≤ 3 wide	0.25 ≥ 0.25	SM	G	▪ Unmanaged garden boundary hedge.	▪ Ensure protection of RPA throughout development where encroaching into site.	10+	C2	N/A	≈ 1.2
H4	Common Hawthorn	≤ 1.5	≤ 50#	≤ 1 wide	N/A	Y	M/G	▪ Ownership unclear, expected to be located on neighbouring land. ▪ Closely spaced group forming boundary hedge ▪ Half of hedgerow has evidently been maintained and the other half left unmanaged.	▪ Client to confirm ownership boundaries and subsequent ownership of hedge. ▪ Ensure protection of hedge throughout development where encroaching into site.	20+	C2	N/A	≈ 0.6

BS5837:2012 Table 1 – Cascade Chart for Tree Quality Assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
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 (e.g. 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; see BS5837:2012 paragraph 4.5.7.*			Red
	1. Mainly arboricultural qualities	**2. Mainly landscape qualities**	**3. Mainly cultural values, including conservation**	
Trees to be considered for retention				
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)	Green
Category B Those of moderate quality and value: those in such a condition as to make a significant contribution. A minimum of 20 years is suggested.	Trees that might be included in the high category, but are downgraded because of impaired condition. Examples include the presence of remediable defects including unsympathetic past management and minor storm damage	Trees present in numbers, usually as groups or woodlands, so they form distinct landscape features which attract a higher collective rating than they might as individuals. But which are not, individually, essential components of formal or semi-formal arboricultural features. For example, trees of moderate quality within an avenue that includes better, A category specimens. Or trees which are internal to the site, therefore individually having little visual impact on the wider locality	Trees with clearly identifiable conservation or other cultural benefits	Blue
Category C Those trees of low quality and value: currently in adequate condition to remain until new planting could be established - a minimum of 10 years is suggested - or young trees with a stem diameter below 150 mm	Trees not qualifying in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit	Trees with very limited conservation or other cultural benefits	Grey
	Note – Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150mm should be considered for relocation			

- TEMPORARY PROTECTIVE FENCING & GROUND PROTECTION SPECIFICATION -

Construction Exclusion Zones (CEZs), shall be enclosed by **Temporary Protective Fencing** and/or, where necessary, **Temporary Ground Protection Measures**. The fencing/ground protection Type(s), locations, and extents shall be agreed, in writing, with the Local Planning Authority (LPA). In turn, the **Temporary Protective Fencing** and/or **Temporary Ground Protection Measures** shall:

1. be constructed as in accordance with the Type 1, Type 2 or Type 3 'Temporary Protective Fencing Construction' sections and, where applicable the 'Temporary Ground Protection Measures' section, as detailed herein and agreed, in advance with the LPA;
2. be retained in place throughout the development process until completion of the project, and only removed following receipt of written permission from the LPA;
3. be sited in the area(s) defined by the Root Protection Areas on the associated Tree Impact Plan, or as the CEZs on the Tree Protection Plan;
4. be erected prior to any construction, demolition or excavation works and remain in place for the duration of the project;
5. preclude any delivery of site accommodation and/or materials and/or plant machinery;
6. preclude all construction related activity, with the sole exception of specified arboricultural works and any other works to be carried out under supervision that have been agreed by all parties;
7. preclude the storage of all development related materials and substances including fuels, oils, additives, cement and/or any other deleterious substance; and
8. be affixed with a 600mm x 300mm warning sign reading "TREE PROTECTION AREA KEEP OUT" (see Figure 1, below), at every 10.0 metre length of protective fencing.
9. Important: Any incursion into CEZs must be by prior arrangement, following consultation with the LPA.

Figure 1: CEZ Warning Sign

– TREE PROTECTION AREA –
KEEP OUT!

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

THE FOLLOWING MUST BE OBSERVED BY ALL PERSONNEL:

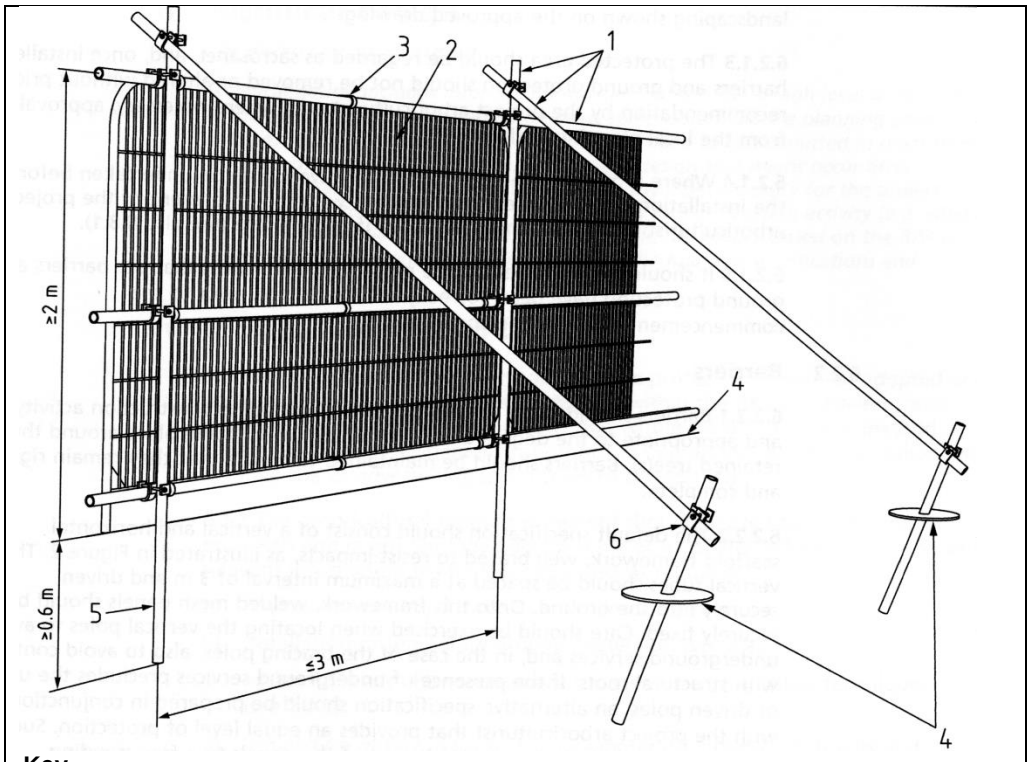
- THE PROTECTIVE FENCING MUST NOT BE MOVED
- NO PERSON SHALL ENTER THE CONSTRUCTION EXCLUSION ZONE
- NO MACHINE, PLANT OR VEHICLES SHALL ENTER THE EXCLUSION ZONE
- NO MATERIALS SHALL BE STORED IN THE EXCLUSION ZONE
- NO SPOIL SHALL BE DEPOSITED IN THE EXCLUSION ZONE
- NO EXCAVATION SHALL OCCUR IN THE EXCLUSION ZONE
- NO FIRES SHALL BE LIT IN THE EXCLUSION ZONE

ANY INCURSION INTO THE EXCLUSION ZONE MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY

Type 1 (i.e. 'Default') Temporary Protective Fencing Construction (see Figure 2, below)

1. Temporary protective fencing panels shall be weldmesh "Heras" panels of at least 2.0 metres in height.
2. The panels shall butt together and be securely fixed to a scaffold framework, as per points 3 to 5 of Figure 2, overleaf.
3. The scaffold framework shall comprise of upright poles of at least 3.0 metres in length driven no less than 0.6 metres into the ground at maximum 3.0 metre centres with horizontal and diagonal poles fixed to the uprights, as per points 4 to 5.
4. The two horizontal rail poles shall be attached to the uprights at heights of 0.6 and 1.8 metres with 3 no. clamps to each joint.
5. The diagonal scaffold pole struts be clamped to the top rail of the scaffold framework at a 45º angle and extend back into the CEZ and clamped to a 0.7 metre length of scaffold tube that shall be driven no less than 0.5m into the ground.
6. No fixing shall be made to any tree and all possible precautions shall be taken to prevent damage to tree roots when locating posts.
7. A 600mm x 300mm warning sign reading "TREE PROTECTION AREA KEEP OUT" (see Figure 1) shall be fixed to every 10.0 metre length of protective fencing.
8. On completion of erection, and prior to any demolition or construction works, site preparation, excavation or delivery of plant and materials, the Consulting Arboriculturist or the LPA Tree Officer, as agreed, shall inspect the Temporary Protective Fencing.

Figure 2: BS5837:2012 Default specification for protective barrier



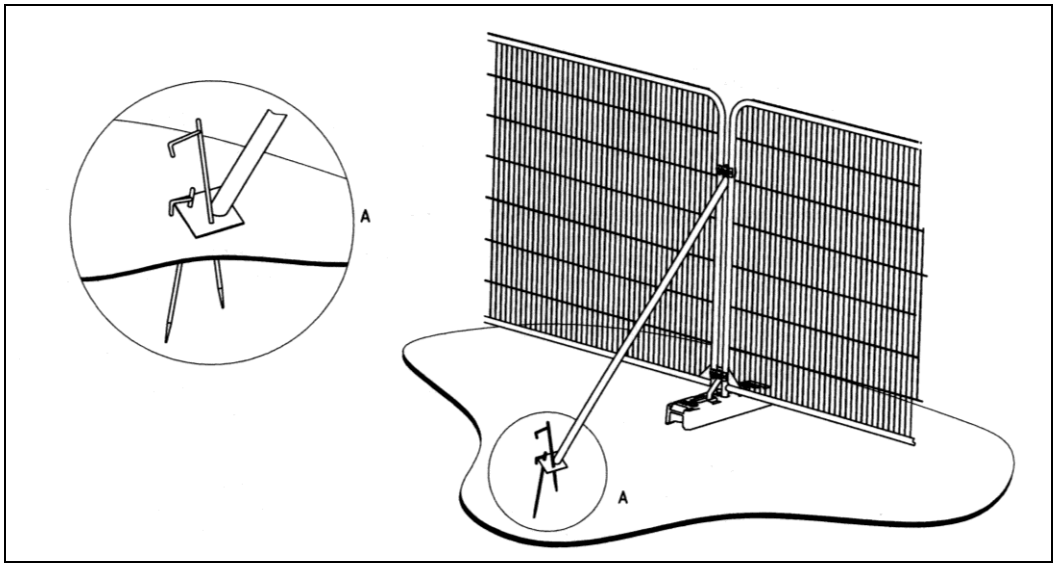
Key

1. Standard scaffold poles.
2. Heavy gauge 2 metre tall galvanised tube and welded mesh infill panels
3. Panels secured to uprights and cross members with wires ties
4. Ground level
5. Uprights driven into the ground until secure (minimum depth 0.6 metres)
6. Standard scaffold clamps

Type 2 Temporary Protective Fencing Construction (see Figure 3(a), below)

1. Temporary protective fencing panels shall be weldmesh "Heras" panels of at least 2.0 metres in height.
2. The panels shall stand on rubber or concrete feet.
3. The panels shall butt together, and be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence.
4. The distance between the fence couplers shall be at least 1.0 metre, and shall be uniform throughout the fence.
5. The panels shall be supported on the inner side by stabiliser struts, which shall be clamped to the scaffold framework at a 45º angle and extend back into the CEZ and shall be attached to a base plate, which shall be secured to the ground with pins (Figure 3a).
6. No fixing shall be made to any tree and all possible precautions shall be taken to prevent damage to tree roots when locating posts.
7. A 600mm x 300mm warning sign reading "TREE PROTECTION AREA KEEP OUT" (see Figure 1) shall be fixed to every 10.0 metre length of protective fencing.
8. On completion of erection, and prior to any demolition or construction works, site preparation, excavation or delivery of plant and materials, the Consulting Arboriculturist or the LPA Tree Officer, as agreed, shall inspect the Temporary Protective Fencing.

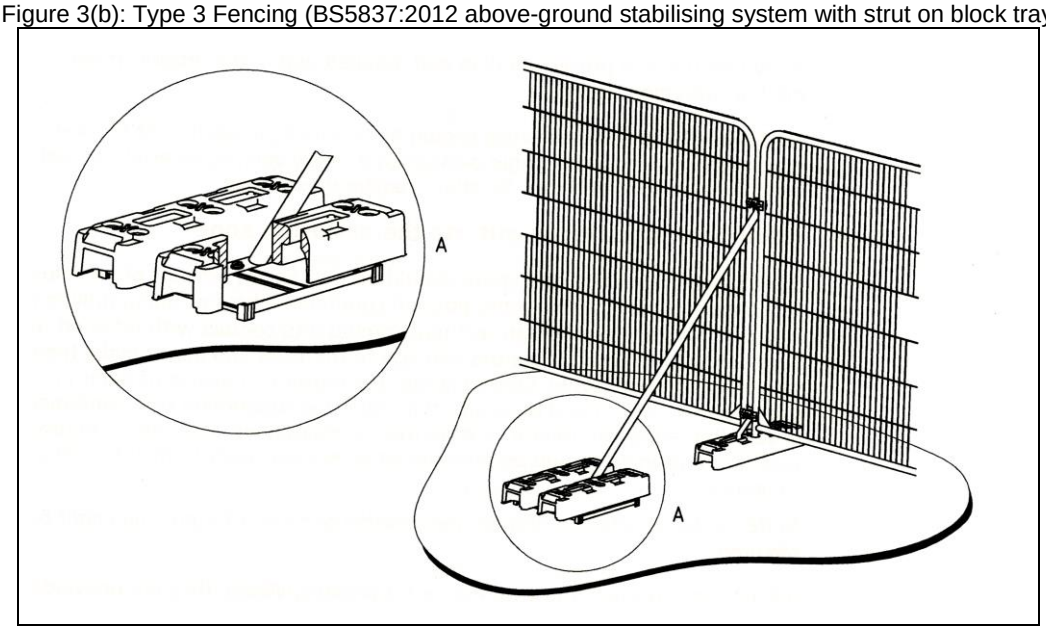
Figure 3(a): Type 2 Fencing (BS5837:2012 above-ground strut stabilising system with ground pins)



Type 3 Temporary Protective Fencing Construction (see Figure 3(b), overleaf)

1. Temporary protective fencing panels shall be weldmesh "Heras" panels of at least 2.0 metres in height.
2. The panels shall stand on rubber or concrete feet.
3. The panels shall butt together, and be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence.
4. The distance between the fence couplers shall be at least 1.0 metre, and shall be uniform throughout the fence.
5. The panels shall be supported on the inner side by stabiliser struts, which shall be clamped to the scaffold framework at a 45º angle and extend back into the CEZ and shall be attached to a block tray base (Figure 3b).
6. No fixing shall be made to any tree and all possible precautions shall be taken to prevent damage to tree roots when locating posts.
7. A 600mm x 300mm warning sign reading "TREE PROTECTION AREA KEEP OUT" (see Figure 1) shall be fixed to every 10.0 metre length of protective fencing.
8. On completion of erection, and prior to any demolition or construction works, site preparation, excavation or delivery of plant and materials, the Consulting Arboriculturist or the LPA Tree Officer, as agreed, shall inspect the Temporary Protective Fencing.

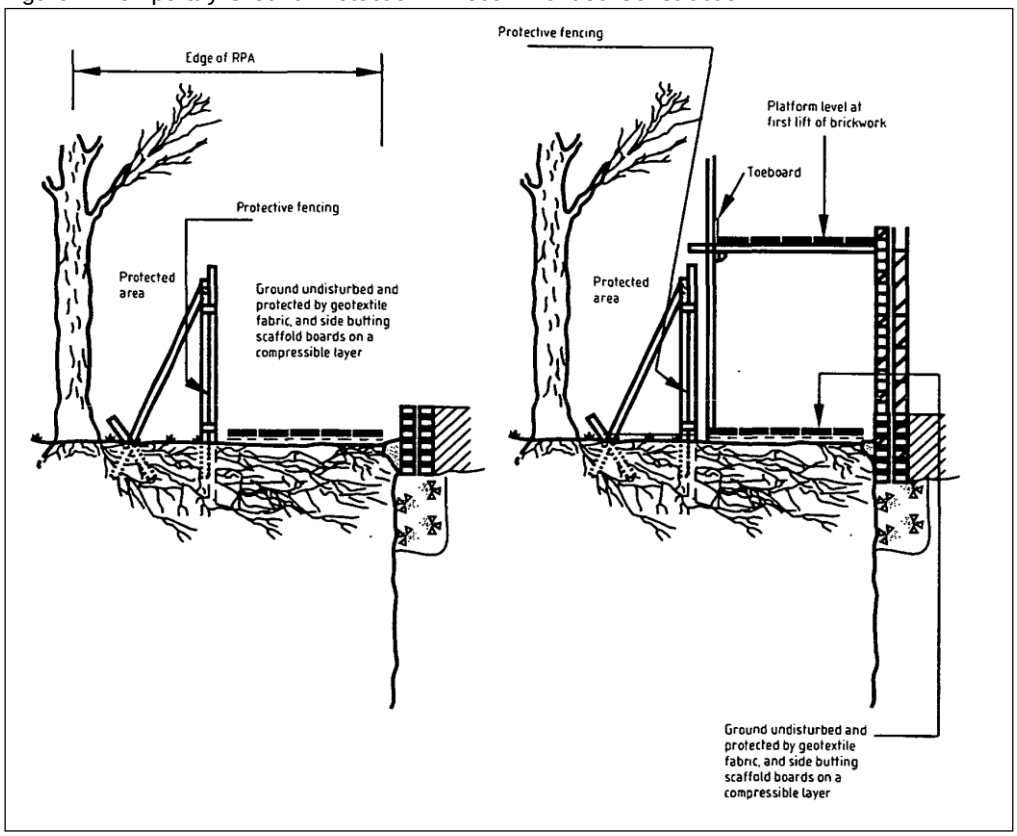
Figure 3(b): Type 3 Fencing (BS5837:2012 above-ground stabilising system with strut on block tray)



Temporary Ground Protection

1. Any necessary Temporary Ground Protection areas shall conform to Figure 4, below, unless otherwise agreed with the LPA.
2. The Ground Protection Area shall be left undisturbed and covered by a semi-permeable geotextile membrane which shall, in turn, be covered by a compressible layer consisting of a material such as woodchip.
3. Side-butting scaffold boards shall then be fitted to cover the Ground Protection Area.
4. On completion of installation, and prior to any demolition or construction works, site preparation, excavation or delivery of plant and materials, the Consulting Arboriculturist or the LPA Tree Officer, as agreed, shall inspect the Temporary Ground Protection.
5. The Temporary Ground Protection shall remain in place until completion of the project and only removed following receipt of written permission from the LPA.

Figure 4: Temporary Ground Protection – Recommended Construction



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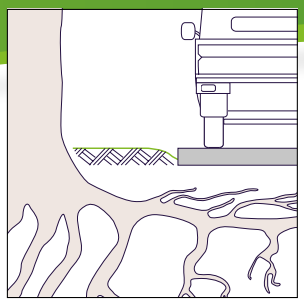
TREE ROOT PROTECTION (TRP) SYSTEM

Powered by GEOSYSTEMS® technology.



defining **green** in cellular confinement

Greenfix™
SOIL STABILISATION AND EROSION CONTROL LTD

THE PROBLEM

CONSTRUCTION-RELATED TREE DAMAGE

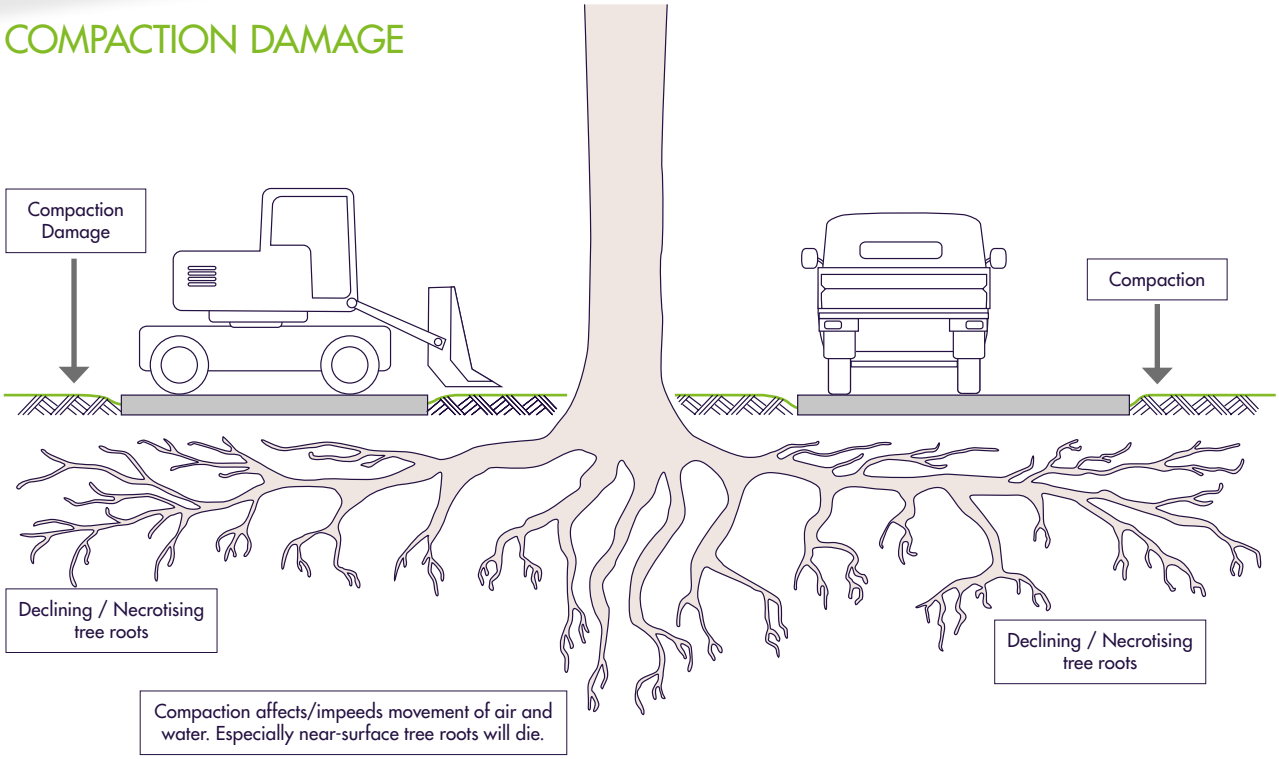
Critical Root Zone/Tree Protection Zone is the minimum area beneath a tree that must remain undisturbed to preserve a sufficient amount of root mass in order to give a tree a chance of survival.

When construction equipment and vehicles intrude a tree's Critical Root Zone, they can cause negative impacts to the soil environment including compaction of the soil, damage to near-surface roots and ultimately endanger the structural integrity of the tree. The majority of a tree's root system is contained within the top three feet of the surface, and construction excavation and compaction can damage or even destroy roots to the point where trees may not survive.

Tree Root Protection (TRP) systems should be eco-friendly as well as comply with local standards and regulations.*

*Compliance with Standards:
In the United Kingdom, Tree Root Protection systems must comply with the Arboricultural Method Statement as outlined in BS5837:2005 and may require supervision by an Arboriculturist.

COMPACTION DAMAGE



THE GEOWEB® SOLUTION

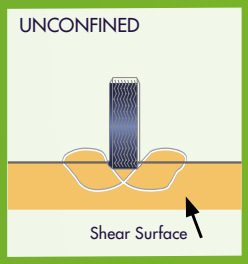
TREE ROOT PROTECTION (TRP) SYSTEM

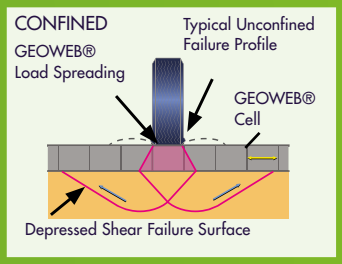
Used extensively in civil engineering construction for over 30 years, the GEOWEB® system is a three-dimensional structure that:

- provides strength to confined soils
- distributes loads laterally, not vertically
- reduces point loads
- reduces compaction of the subsoil

Manufactured from high quality, high-strength polyethylene with a textured surface and perforated walls, GEOWEB® cells with selected infill control shearing, lateral and vertical movement, and reduce subbase depth requirements.

The GEOWEB® system is a low impact development (LID) solution with exceptional load-bearing capabilities and environmental benefits. The system has a long history of solving heavy load support problems for roadways, road base support, parking lots, road shoulders, ports, trucking/intermodal terminals and railroads.

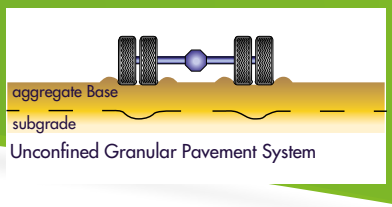




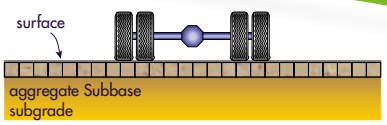
LOAD DISTRIBUTION

By distributing and bridging applied loads, the GEOWEB® TRP system reduces vertical stresses that are typically applied to the underlying soil and root zone.

The GEOWEB® system is ideally suited for tree root protection applications where weak subsoil or no-dig restrictions exist.



Unconfined Granular Pavement System



the GEOWEB® Granular Pavement System

COST BENEFITS

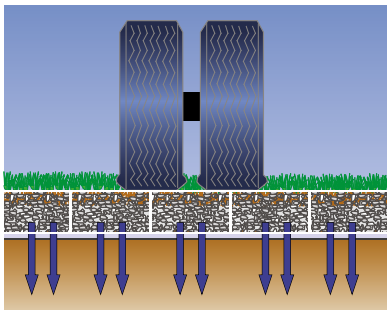
The GEOWEB® TRP system is an economical solution for reducing construction vehicle impact to the tree root zone compared with other methods. Once installed, the system has minimal-to-no visibility.

ENVIRONMENTAL BENEFITS

With permeable infill (topsoil/vegetation, aggregate, sand), perforated GEOWEB® cell walls offer environmental benefits:

- water infiltration
- lateral movement of air and water
- water and nutrient migration
- promotes root development

The tree root protection system can be a temporary or permanent solution.



SOILTEC GEOSYSTEMS

GEOWEB®

TRP SYSTEM INSTALLATION

Step 1: Remove the upper grass and soft soils by hand or by machine if acceptable.

Step 2: Install a high-strength woven geotextile allowing adequate drainage as a separation layer between soft subgrade and GEOWEB® infill material.

Step 3: Expand GEOWEB® sections over the area to be protected and use temporary stakes or weights to hold sections open to prevent movement during infilling.

Step 4: Connect adjacent sections using ATRA® Keys. Position the sections so the slots are aligned, insert the key and turn 90 degrees locking the panels together. ATRA® Keys provide a long-term connection that is safer, quicker and stronger than staples or cable ties. In environmentally protected areas (SSSI in United Kingdom), ATRA® Keys can be used without the requirement for diesel-fueled compressors.

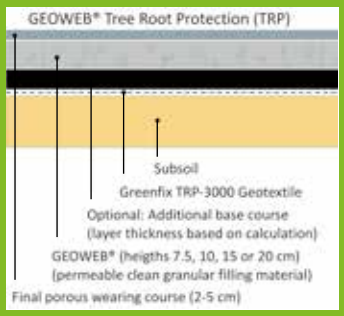
Step 5: For permeability, infill the fully connected GEOWEB® system with a well graded, crushed, angular stone such as MOT Type 1X (also known as MOT Type3). Over fill the cells by up to 30mm to allow for compaction.

Step 6: Compact the fill material with conventional plant or non-vibratory plant when required. Fill should be maintained above the GEOWEB® system by a minimum of 10mm at all times or a permanent wearing course of blocks, porous asphalt or gravel installed.

DESIGN CONSIDERATIONS

It is important to ensure the correct GEOWEB® cell size and cell depth are specified and installed based on the anticipated pavement loads. These are calculated based on the following criteria:

- traffic type and loading
- frequency of traffic
- subgrade strength (typically CBR, Ev2, Cu or SPT values)
- infill type
- allowable settlement of the pavement



To assist you in determining the correct GEOWEB® solution for your application, Presto GEOSYSTEMS® or their network of distributors/representatives can assist with the calculation for your project. You can be confident that you will receive the most suitable and economical solution for your project.

PRESTO GEOSYSTEMS® COMMITMENT — To provide the highest quality products and solutions.

Presto GEOSYSTEMS® is committed to helping you apply the best solutions for your tree root protection needs. Our solutions-focused approach to solving problems adds value to every project. Rely on the leaders in the industry when you need a solution that is right for your application. Contact Presto GEOSYSTEMS® or our worldwide network of knowledgeable distributors/representatives for assistance.

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