



ARBORICULTURAL IMPACT ASSESSMENT (BS:5837)

LOCATION: 256 & 254 West End Road, Ruislip HA4 6DX

CLIENT: Cladern Ltd

AUTHOR: Oliver Tong ND Arb TechArborA

DATE: 13th June 2023

REF: GEL00039



EXECUTIVE SUMMARY

Greenwood Environmental Ltd has been commissioned by Cladern Ltd, to assess the arboricultural impact of a development proposal for new vehicle crossovers at nos. 256 & 254 West End Road, Ruislip HA4 6DX.

A tree survey in accordance with British Standard 5837:2012 'Trees in Relation to design, demolition, and construction – Recommendations', was carried out by the author on the 29th of March 2023.

The assessment included one individual tree, which have been categorised in accordance with BS 5837:2012 Table 1 Cascade chart for tree quality assessment.

Trees are a material consideration for Local Planning Authorities (LPAs), when determining planning applications, whether they are afforded the statutory protection of a Tree Preservation Order (TPO) or Conservation Area (CA) or not.

BS5837:2012 sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and new developments.

To demonstrate how retained trees can be adequately protected during the construction stage of the development, the following have been included in the appendix of this report: Example Tree Protection Specifications; Preliminary Arboricultural Method Statement (PAMS) & Draft Tree Protection Plan (DTPP).

The impact of the development proposal is acceptable, providing the measures outlined in this report are implemented and secured by the provision of suitably worded planning conditions.





CONTENTS

EXECUTIVE SUMMARY	1
CONTENTS	2
1. INTRODUCTION	3
1.1 Instruction	3
1.2 Scope	3
1.3 Limitations	3
1.4 Methodology	4
1.5 Legal protection status of trees	4
1.6 Soils Assessment	5
2. TREE ASSESSMENT	6
2.1 Summary	6
2.2 Tree summary report	6
3. ARBORICULTURAL IMPACT ASSESSMENT	8
3.1 Summary of impacts	8
3.2 Impact assessment	8
3.3 Conclusions	8

APPENDIX

A. BS 5837:2012 Figure 1 The design and construction process and tree care	9
B. BS 5837:2012 Tree Assessment Schedule	11
C. BS 5837:2012 Table 1 - Cascade chart for tree quality assessment	14
D. Example Tree Protection Specifications	16
E. Flexipave Brochure	19
F. Preliminary Arboricultural Method Statement	24
G. Example Site Monitoring Recording Table	29
H. Guidance on Planning and Legislation for Trees	31
I. References and Bibliography	37

ANNEX

1. BS 5837:2012 Tree Constraints Plan	39
2. Draft Tree Protection Plan	41

LIABILITY

Greenwood Environmental Ltd and associates have prepared this report for the sole use of the commissioning party in accordance with the agreement under which our services were performed. No warranty, express or implied, is made as to the advice in this report or any other service provided by us. This report may not be relied upon by any other party without the prior written permission of Greenwood Environmental Ltd and associates. The content of this report is, at least in part, based upon information provided by others and on the assumption that all relevant information has been provided by those parties from whom it has been requested. Information obtained from any third party has not been independently verified by Greenwood Environmental Ltd and associates, unless otherwise stated in the report.



1. INTRODUCTION

1.1 Instruction

- 1.1.1 Greenwood Environmental Ltd has been commissioned by Cladern Ltd, to assess the arboricultural impact of a development proposal for new vehicle crossovers at nos. 256 & 254 West End Road, Ruislip HA4 6DX.
- 1.1.2 This report considers all significant trees on the site or other areas as designated within our instructions. Land adjacent to the site may also contain trees that pose a constraint on development and where necessary their details have been included.
- 1.1.3 The tree survey is not intended to be a detailed risk assessment of trees. Where the structural integrity of trees has been noted and the trees' condition is such that imminent remedial works are recommended, these should be arranged by the landowner or manager responsible for the safety of the site, as soon as is practically possible.
- 1.1.4 Comments relating to non-arboricultural matters may be made throughout this report. Making comments on such matters is within the normal remit of our instructions and the range of the author's experience. Any opinion thus expressed should be deemed as provisional and confirmation sought from an appropriately qualified professional.

1.2 Limitations

- 1.2.1 Any other planning issues related to the subject trees were not investigated. Greenwood Environmental Ltd are under no obligation to provide further advice that is subsequently required as part of the planning process or assist with planning appeals unless further instructions are given, and terms agreed.
- 1.2.2 The information contained in this report may be relied upon for a period of up to two years, after which time a further assessment of the site will be required.
- 1.2.3 The content and presentation of this report are copyright of Greenwood Environmental Ltd and may not be copied or distributed to third parties not directly involved in the subject matter without the written consent of the author.
- 1.2.4 Greenwood Environmental Ltd's standard terms of business apply, which we provided along with our fee proposal, further copies of which are available on request.
- 1.2.5 All observations were made from ground level without detailed investigations and all measurements are estimated unless otherwise indicated.



1.3 Methodology

- 1.3.1 Trees are a material consideration for Local Planning Authorities (LPAs), when determining planning applications, whether they are afforded the statutory protection of a Tree Preservation Order (TPO) or Conservation Area (CA) or not. British Standard BS 5837:2012 Trees in Relation to Design, Demolition and Construction sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and new developments.
- 1.3.2 The Standard recommends a sequence of activities (appendix a), that starts in the initial feasibility and design phase (RIBA Stage 2 'Concept Design'), with a survey to qualify and quantify the trees on site and establish the arboricultural constraints to development (above and below-ground), to inform the design in an iterative process, and continues with an assessment of the arboricultural impacts of the final design and measures to mitigate such impacts should they be negative.
- 1.3.3 Detailed technical specifications for mitigation and protection measures are devised in the design phase that follows (RIBA Stage 3-4 'Developed and Technical design'), and the sequence ends with the Implementation and Aftercare phase (RIBA Stages 5-7) with the implementation of those measures once planning permission is granted, guided by Arboricultural Method Statements (RIBA Stage 4-5, 'Technical Design and Construction) and professional guidance where appropriate.

1.4 Legal protection status of trees

- 1.4.1 We have not made any formal enquires with the Local Planning Authority (LPA) regarding the legal protection status of trees.
- 1.4.2 The Town and Country Planning (Tree Preservation) (England) Regulations 2012 allows for trees with high amenity value to be protected by tree preservation order (TPO), which can be applied individually, on groups and areas of trees and woodlands.
- 1.4.3 An Order prohibits the: cutting down, topping, lopping, uprooting, wilful damage or wilful destruction of trees without the LPAs written consent. If consent is given, it can be subject to conditions which have to be followed. In the Secretary of State's view, cutting roots is also a prohibited activity and requires the authority's consent.
- 1.4.4 Trees located within a conservation area which have a stem diameter of 75mm or greater measured at 1.5m are automatically afforded similar protection as those with a Tree Preservation Order (TPO). Works to trees within these areas require that the LPA to be given 6 weeks written notice unless an exception applies. This notice period gives the authority an opportunity to assess the tree/s and consider whether a TPO should be applied or not.
- 1.4.5 The authority's consent is not required for carrying out work on trees subject to an Order so far as such work is necessary to implement a full planning permission. For example, the Order is overridden if a tree must be removed to make way for a new building for which full planning permission has been granted.



- 1.4.6 Conditions or information attached to the permission may clarify what work is exempt. However, the authority's consent is required for work on trees subject to an Order if: development under a planning permission has not been commenced within the relevant time limit (i.e., the permission has 'expired'); only outline planning permission has been granted; and it is not necessary to carry out works on protected trees to implement a full planning permission.
- 1.4.7 The authority's consent is also required, for example, for work on trees protected by an Order that is necessary to implement permitted development rights under the Town and Country Planning (General Permitted Development) Order 2015.
- 1.4.8 As the protection status of trees can change very quickly, it is recommended that enquiries be made with the LPA each time before carrying out any works to trees.

1.5 Soils Assessment

- 1.5.1 Soil assessments should be carried out on-site by a competent person, to inform decisions relating to root protection areas (RPA); tree protection; new tree planting; foundation design and construction methods.
- 1.5.2 The assessment should determine if the soil is of a shrinkable type, as trees and vegetation have the potential to cause indirect damage to structures when growing in soils such as London clay, which can be highly shrinkable. In such cases, desiccation assessments should be carried out to determine the level of soil drying. Soil characteristics and index properties (shrink/swell potential) can only be determined precisely by laboratory testing of soil samples.
- 1.5.3 The presence of a clay within the soil is significant in terms of tree protection. As clay soils are prone to compaction, particularly when wet, just a single movement of heavy machinery or repeated pedestrian movements over the RPA of a retained tree is enough to cause compaction of the underlying soil, which is detrimental to long-term tree health. It is therefore imperative that all recommended tree protection measures are implemented in full and remain in place throughout the course of the development.
- 1.5.4 Soil structure, composition and pH should be included in the assessment for the purpose of designing new planting and landscape proposals.



2. TREE ASSESSMENT SUMMARY

- 2.1 The condition and quality of the existing tree (which has the potential to be impacted or impact upon the development), has been assessed in accordance with British Standard 5837:2012 'Trees in Relation to design, demolition, and construction – Recommendations'.
- 2.2 A tree survey in accordance with British Standard 5837:2012 'Trees in Relation to design, demolition, and construction – Recommendations', was carried out by the author on the 29th of March 2023.
- 2.3 The assessment included one individual tree, which have been categorised in accordance with BS 5837:2012 Table 1 Cascade chart for tree quality assessment.
- 2.4 Both above ground and below ground constraints posed by trees on development have been considered as part of this assessment. The included plans provide a graphical representation of trees, indicating their BS 5837:2012 category and Root Protection Areas (RPA) displayed as a magenta-coloured circle centered around the trunk of the trees.
- 2.5 RPAs are the minimum rooting area required to maintain tree health and condition and are therefore to be considered as construction exclusion zones. RPAs may be adjusted where it is justified due to predicted eccentric root morphology. Root morphology will be influenced by the ground conditions; roots will proliferate where soil conditions are favourable and less so where the ground conditions are poor. Structures and metaled roads with deep foundations may inhibit root growth into the area for example.
- 2.6 The BS 5837 quality category and sub-categories of the trees is displayed in the chart below.



Chart 1: Quality Category by Sub-Category

Fastigate hornbeam Tree ID #1

Tree Details	
Full Tree ID:	T1
Common Name:	Fastigate hornbeam
Latin Name:	<i>Carpinus betulus</i> 'Fastigiata'
Tree Height [m]:	12
Number of Stems:	1
Stem Diameter [mm]:	430
(N) Branch Spread [m]:	5
(E) Branch Spread [m]:	4
(S) Branch Spread [m]:	5
(W) Branch Spread [m]:	5.5
Height of First Significant Branch [m]:	2
Height of Canopy Above Ground Level [m]:	1.7
Life Stage:	Early-mature
Physiological Condition:	Good
Quality Category:	B
Quality Sub-Category:	1
Comments:	Street tree, impact damage to northwest of canopy
Recommendations:	Prune out damaged branches , lift canopy to 3-4 to facilitate proposed crossover

Photos





3. ARBORICULTURAL IMPACT ASSESSMENT

3.1 Summary of impacts

- 3.1.1 The developments' impact upon trees has been assessed according to any canopy and/or RPA incursions, as proposed in the provided site plan.
- 3.1.2 A summary of all arboricultural impacts is provided in the table below, further details are included in the BS 5837:2012 Tree Assessment Schedule and Draft Tree Protection Plan (DTPP).

BS5837 Category	Tree ID	Impact	No. trees impacted
B	T1 Fastigiate hornbeam	Incursion of root protection area (RPA)	1

Table 1: Summary of impacts

3.2 Impact assessment

- 3.2.1 The position of the proposed new vehicle crossovers incurs into the root protection area (RPA) of one category 'B' tree:
- 3.2.2 Tree T1 Fastigiate hornbeam is at risk of damage through impacts to trunk/direct root cutting/soil disturbance and/or indirectly through ground compaction and/or soil contamination from building materials leaching into the soil.
- 3.2.3 To ensure that any impact is controlled to an acceptable degree, it will be necessary to complete the work in accordance with the Tree Protection Specifications; Preliminary Arboricultural Method Statement (PAMS) & Draft Tree Protection Plan (DTPP), provided in the appendix of this report, including the specification of a suitably porous and flexible wear surface, such as Flexipave.

3.3 Conclusions

- 3.3.1 The impact of the development proposal is deemed to be acceptable, providing the measures outlined in this report are implemented and secured by the provision of suitably worded planning conditions.

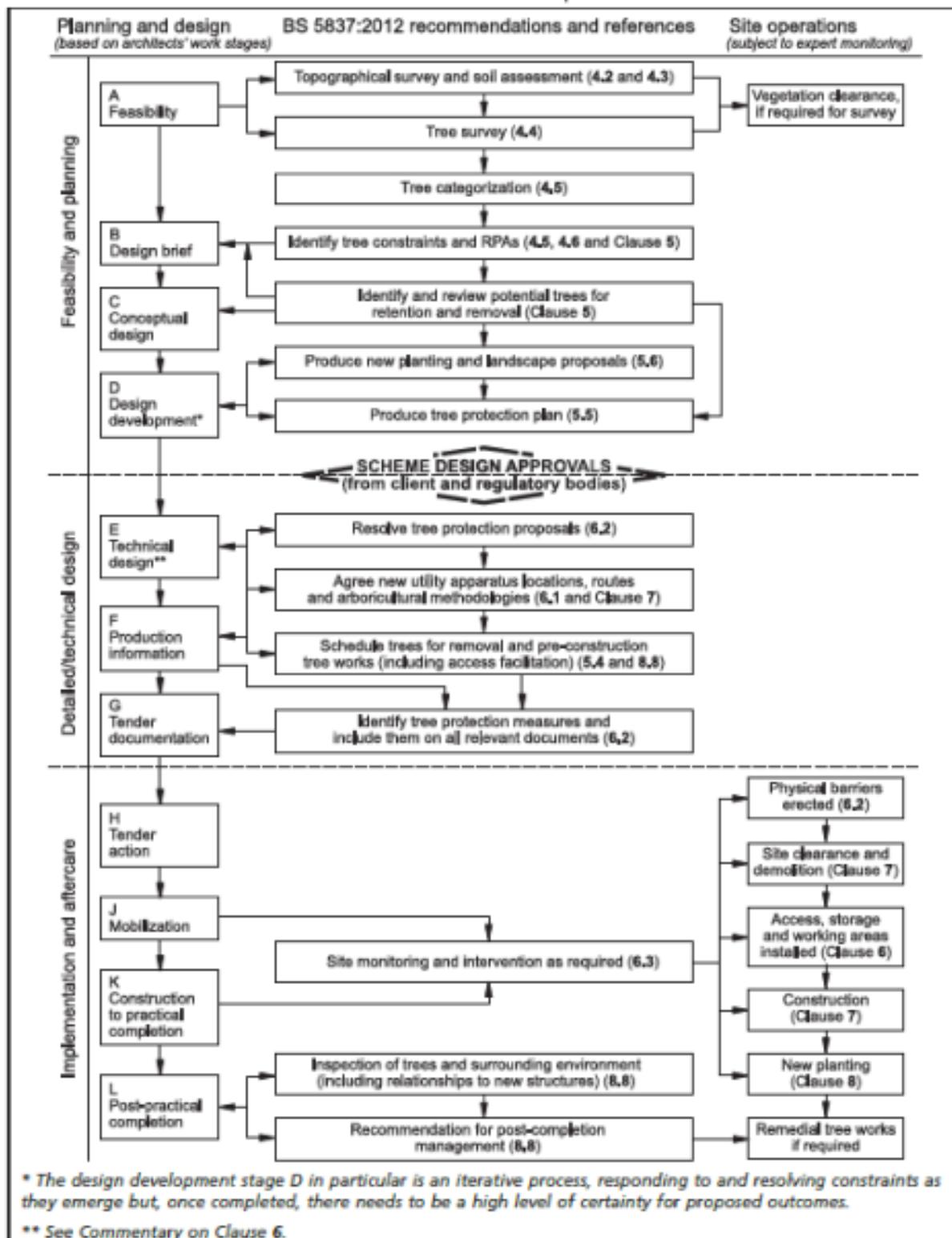


Appendix A

BS 5837:2012 FIGURE 1



Figure 1 The design and construction process and tree care





Appendix B

BS 5837:2012 TREE ASSESSMENT SCHEDULE

Common Name						
						Stem Diameter [mm]
						Tree Height [m]
						(N) Branch Spread [m]
						(S) Branch Spread [m]
						(E) Branch Spread [m]
						(W) Branch Spread [m]
						Life Stage
						Physiological Condition
						Structural Condition
						Height of Canopy Above Ground Level
						Height of First Significant Branch [m]
						Direction of First Significant Branch
						Comments
Street tree, impact damage to northwest of canopy						Prune out damaged branches, lift canopy to 3-4 to facilitate proposed crossover
						Recommendations
						Estimated Remaining Life Expectancy
						Quality Category

ntifies the trees and corresponds with the provided plans. Trees are prefixed: T (trees); G (groups) and H (hedges).
n name is given for each tree.

Taken with a diameter measuring tape at 1.5m above ground level as per Figure C1 of BS5837:2012 and recorded in millimetres. Where access has prevented direct measurement a value is estimated.

With a laser clinometer in metres.

Distance between the lowest point of the crown and ground level, measured with a laser clinometer in metres.

I: Measured with a laser clinometer in metres and given at cardinal compass points. Where access has prevented direct measurement, the value is estimated.

S to the age of the individual tree relating to the average life expectancy of each species in a similar environment:

Recently planted or establishing tree that could be transplanted without specialist equipment i.e., up to 12-14cm stem girth.

ure): An established tree but one which has not reached its potential ultimate height and has significant growth potential.

ure): A tree reaching its ultimate potential height, whose growth rate is slowing down but will increase in stem diameter and crown spread and has a safe useful life expectancy.

mature specimen with limited potential for any significant increase in size but with a reasonable safe useful life expectancy.

re): A senescent specimen with a limited safe useful life expectancy. Possibly also containing sufficient structural defects with attendant safety and/or duty of care implications.

erian trees are trees which have features of ancientness but at a younger age. These features include missing branches, hollow trunks and habitat features.

an ancient tree is a tree which is remarkably old for its species, which can vary dramatically depending on the species. All ancient trees are also veterans.

physiological condition of tree: Good; Fair; Poor; Dead

structural condition of tree: Good; Fair; Poor; Hazardous

Safe Life Expectancy: is the life expectancy of the tree modified first by its age, health, condition, safety, and location (to give safe life expectancy), then by economics, effects on



Appendix C

BS 5837:2012 TABLE 1

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	<ul style="list-style-type: none"> • 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 <p>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</p>		
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	<p>1 Mainly arboricultural qualities</p> <p>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)</p>	<p>2 Mainly landscape qualities</p> <p>Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features</p>	<p>3 Mainly cultural values, including conservation</p> <p>Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)</p>
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	<p>Trees that might be included in 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</p>	<p>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</p>	<p>Trees with material conservation or other cultural value</p>
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 150 mm	<p>Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories</p>	<p>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</p>	



Appendix D

EXAMPLE TREE PROTECTION SPECIFICATIONS



Temporary Ground Protection

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.

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.



Figure 1. Example of propriety 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, suitable for pedestrian-operated plant up to a gross weight of 2 t



Trunk Protection

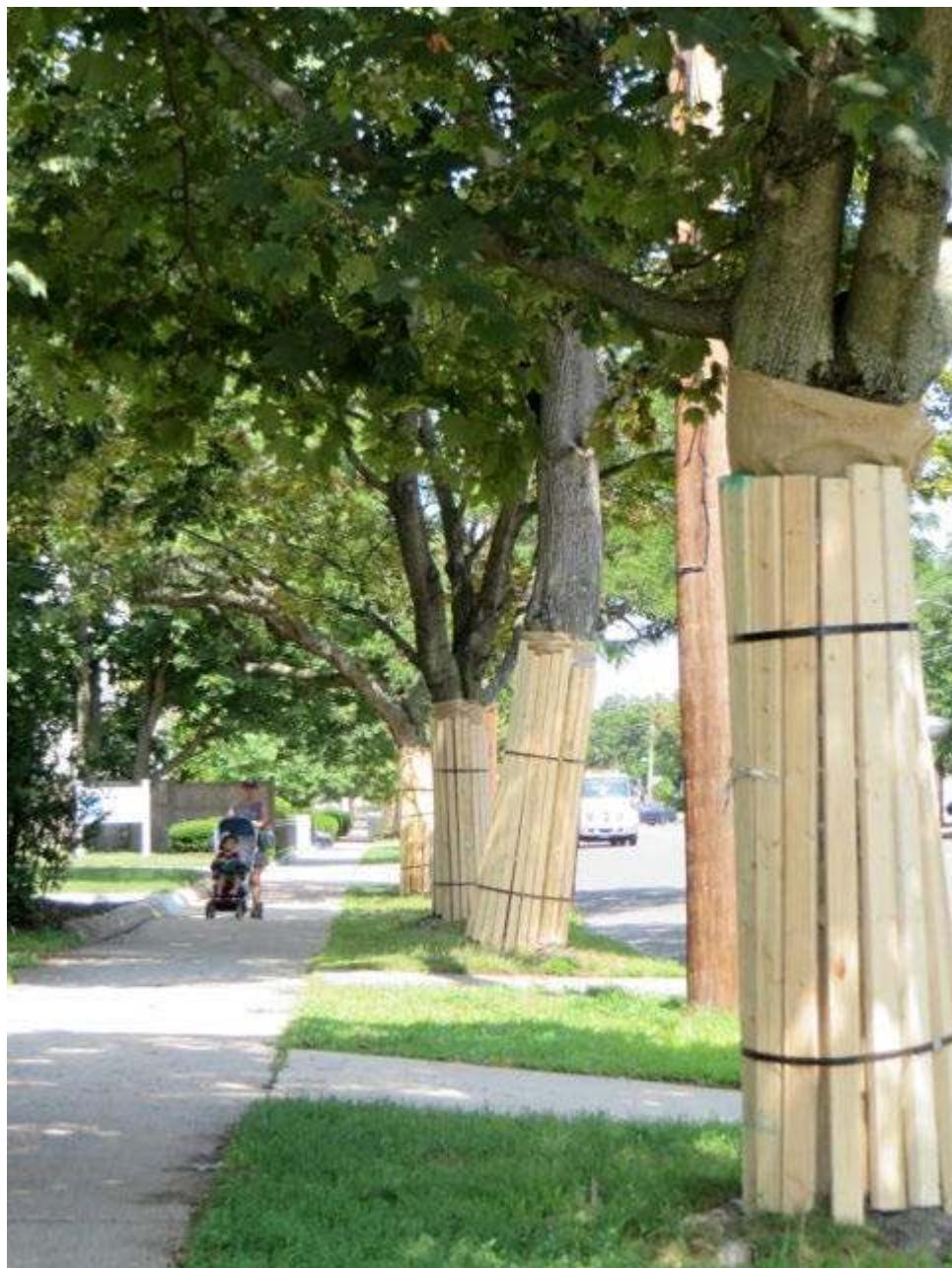
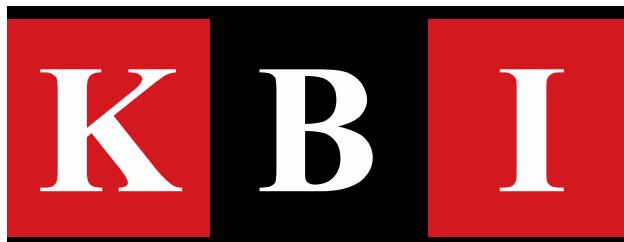


Figure 2. Example of suitable trunk protection



Appendix E

KBI FLEXIPAVE BROCHURE



Sustainable Porous Paving Solutions



www.kbiuk.co.uk

01422 242880



SUSTAINABLE POROUS PAVING SOLUTIONS

KBI UK is a specialist supplier of sustainable porous paving solutions. The products we supply have been created and developed by us, making us one of the leading exponents of porous surfacing. Our materials are significantly different to traditional hard surfaces and resin bound solutions, and offer a number of benefits as a result of their two key features: high porosity & flexibility.

 **Highly porous** - Allows water and air to flow through the material in high volumes.

 **Dynamic** - The unique polyurethane binder allows the finished surfaces to gently flex, giving them the ability to adjust to different temperatures and conditions without cracking.

 **Adaptable** - KBI products can be installed over existing hard surfaces, but can also be installed on to simple stone sub-bases without the need to lay costly engineered sub-layers.

flexipave

by **KBI**

Our flagship product, **KBI Flexipave** is a mixture of loose ground rubber (derived from recycled vehicle tyres) and stone aggregate. The loose material is mixed onsite with our unique polyurethane binder and installed by hand. The combination of rubber within the material and our unique binder gives the finished surface a dynamic flexibility that would be impossible to achieve with traditional hard materials.



KBI Flexipave is installed by hand to achieve the required depth. The thickness of the finished surface depends on how the finished surface will be used, but our engineers work closely with clients to identify the best solution for the project. **Flexipave** is a product designed to promote water recharge directly into natural aquifers, but we also provide several different solutions for managing rainfall once the water has penetrated our top surface.

KBI Flexipave is:

- Highly porous, allowing large volumes of water and air to penetrate the material.
- Able to be installed on to a number of different bases, including standard compacted stone.
- Dynamic, with the ability to gently flex and adjust to minor movement.
- Able to withstand extreme temperatures without cracking.
- Available in a variety of colours.



Sustainable Porous Paving Solutions



KBI UK Ltd
Unit 8 Nexus,
Capitol Court
Dodworth
Barnsley
S75 3UD

www.kbiuk.co.uk

01422 242880
