

Tree Assessment

Land at
3 Grove Road
Wrexham

Ref:
TCA/GWW/04/13

Date:
25th April 2013

Commissioned by:
Ms J Tynan
on behalf of
Guy Walmsley LTD

Prepared by
S. Shields

Tree Assessment

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Contents

1.0	Instruction
2.0	Introduction
3.0	Scope & Limitations
4.0	Statutory Controls & Obligations
5.0	Site Description
6.0	Arboricultural Assessment, Performance Specification & Method Statement
7.0	Arboricultural Operations
8.0	Tree Protection & Arboricultural Method Statement

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Instruction

- 1.1 Shields Arboricultural Consultancy received instructions from Ms J. Tynan to undertake an assessment of 2 lime trees at the above property that are suspected of causing structural damage to 2 stretches of boundary wall.

Introduction

- 2.1 The purpose of the assessment is to establish if the trees are the cause of the damage to the two stretches of wall. The opportunities that exist for repairing the wall and the potential for the trees to cause future damage to the wall should they be left in situ.

Scope and Limitations of the Survey

- 3.1 The survey was undertaken on 3rd April 2013 by Stephen Shields, principal consultant with Shields Arboricultural Consultancy.
- 3.2 The survey was carried out from the ground in accordance with the principals of tree inspection and assessment described in Lonsdale 1999 and using Visual Tree Assessment (VTA) techniques as described in Mattheck & Breloer 1994. This term describes an approach to tree surveying using visual observation which allows the surveyor to evaluate the stability and structural condition of a tree. The basis behind VTA is the identification of symptoms, which the tree produces in reaction to, for example, a weakness in its structure, or as a result of external stress factors e.g. drought.
- 3.3 The assessment does not consider the engineering aspect of the situation but may provide a performance specification to instruct the design of the final repair work.

Methodology

- 3.4 The trees were inspected from the ground level using field glasses and basic equipment such as a soft faced hammer and steel probe. The inspection follows a set procedure; firstly the site conditions are assessed to establish if any environmental factors are present that could affect the stability of the trees. This includes an evaluation of the soil conditions to establish if there are any aspects that could inhibit root growth, such as water logging or shallow soils. The exposure and elevation of the site are considered along with any changes to the tree's environment that could affect the tree. Next the root plate and area around the tree are visually inspected for signs of instability or decay, followed by a visual examination of the trunk and branch structure to identify structural defects or decay. Finally the vitality of the tree is assessed and any significant pest and diseases identified. Where defects or health issues were identified these are noted in the report and any required remedial measures recommended.

Statutory Controls & Obligations

- 4.1 Forestry Act; the felling of trees is controlled under Forestry Act, which requires that a felling licence is obtained prior to cutting down any trees. The Forestry Act does not apply to the felling of trees growing within an orchard, private garden, churchyard or public open space. The Forestry Commission has the responsibility for enforcing the Forestry Act.
- 4.2 Tree Preservation Orders & Conservation Areas; Local Authorities have specific powers to protect trees through the use of Tree Preservation Orders. Where trees are protected under such orders it is a criminal offence to (subject to any exemptions for which provision may be made by the order) undertake, cause or permit the cutting down, topping, lopping, uprooting, wilful damage or wilful destruction of trees except with the consent of the local planning authority. Similar controls apply to all trees growing within a designated Conservation Area.
- 4.3 Bats, wild birds and other protected species; The Wildlife & Countryside Act & the Conservation (Natural Habitats & C.) Regulations make it an offence to disturb or destroy bats and bat roosts and wild birds and their nests. Other species of plant and animal are also protected. These creatures often inhabit trees and sufficient care must be taken to ensure they are not affected during forestry and arboricultural works.

Site Description

- 5.1 3 Grove Road is a large, detached property set in its own private grounds. The property is brick built and dates from around 1850. Formally used as a private residence, it has been converted into offices and the grounds are used for car parking. The building is grade II listed and is within the Wrexham Town Centre Conservation Area.
- 5.2 The building is set centrally within the site which is mainly set to hard standing with raised landscape borders along the boundaries. The land to the rear (north west) of the site has been developed to provide a number of residential properties. Access to the site is via two entrance driveways on to Grove Road to the south east. A low wall and hedge form the boundary between the property and the highway. There is a residential housing development to the south west and a care home to the north east. A 1.5m high brick wall runs along both of these boundaries.
- 5.3 There are 4 significant trees on the site. Two, a copper beech and a Norway maple are situated close to the front of the site. The other two, both common limes are in beds adjacent to the north east and south west boundaries, towards the rear of the site.
- 5.4 The site is at an elevation of approximately 90m ASL and is reasonably sheltered. Soils at the site appear to be free draining with no indication of water logging. Geological maps indicate a glacial sand and gravel drift over Carboniferous Coal Measures.
- 5.5 No recent changes to the site were noted.

Arboricultural Assessment, Performance Specification & Method Statement

N.B Shields Arboricultural Consultancy can not provide engineering specifications for the design of the foundation and the wall, which must be undertaken by a suitably qualified person.

- 6.1 This assessment covers the two lime trees and full details of the trees are provided in the Arboricultural Inspection Record at appendix A.
- 6.2 The first specimen, identified as T1 is situated in a soft landscape border immediately to the north east of the south west boundary wall. The base of the tree is in contact with the base of the wall, which in turn is leaning away from the tree. It would appear that the pressure of the tree growing against the wall has caused the lean. The tree is within the minimum recommended separation distance (BS5837) that should be maintained between a tree of this species and a structure of this type and therefore there is an increased risk of damage in the long term.
- 6.3 It this instance it appears that the buttress roots on the south west side of the tree have come into contact with the base of the wall. At this point the wall has an extended 'toe' and it is this that the roots are pressing on. Given the extent of the damage and the age of the tree it may be possible to repair the wall and retain the tree in the longer term. This would be achieved by providing an expansion gap between the wall and the tree, utilising the space provided by the 'toe' (approx. 100mm) to provide a compressible expansion zone to allow for future growth of the tree.
- 6.4 With regard to the age and condition of the tree, which is managed as a pollard, it is expected the future lateral growth would be relatively slow and that an expansion zone of 50mm would provide space for 25 – 30 years of growth prior to the tree coming in contact with the wall again.

Performance Specification and Methodology

- 6.5 To ensure that the tree is not damaged during the demolition and construction works it is necessary to protect it and the surrounding soil to avoid both physical damage to the tree and compaction of the surrounding soil. The ground protection must extend over the soft landscape bed for the full extent of the construction area. Full details of tree protection measures are provided in section 7.

These techniques should apply to the length of wall extending 2m either side of the centre of the tree.

- 6.6 Demolition of the wall should be undertaken by hand, using only hand held tools. Once at ground level and below ground level, bricks should be carefully moved away from tree roots, which should then be wrapped in Hessian sacking and kept damp. Where roots are to be exposed for an extended period of time they can be covered in a layer of loose tipped soil.

- 6.7 Foundations for the wall are to be excavated to a minimum depth of 600mm below ground level or to engineer's specifications. Where roots are encountered within the foundation zone they are either to be cut back to a suitable growth point using sharp secateurs if under 25mm diameter and agreed by the arboriculturalist or if in excess of 25mm diameter are to be enclosed within a length of polyethylene tubing twice the diameter of the root, back filled with loose soil. This is achieved by splitting the tube along its length, enclosing the root and joining the tube up using heavy duty jointing tape. The purpose of this is to protect the root from any concrete within the foundation and allow it to be retained intact.
- 6.8 The next phase is to insert a root barrier between the tree and the foundations or the compressible zone. This should comprise a proprietary root barrier such as Re-Root 600 as supplied by Greenleaf LTD. (www.greenleaf.co.uk) installed in accordance with manufactures instructions (appendix c) to a depth of 600mm below ground level and extending out 1.5m either side of the centre line of the tree. This barrier will need to be cut around any encased roots that are to be preserved and this will then need to be made good using heavy duty jointing tape.
- 6.9 Once the root barrier is installed the concrete for the foundation trench will need to be lined with a plastic barrier such as DPM to prevent any concrete leeching into the surrounding soil. When this is in place the concrete for the wall's foundation can be poured to the required depth.
- 6.10 The next phase is to construct the wall starting with the heavy duty block at the base. This will extend from the top of the concrete foundation approximately 400mm below ground level (or as engineer's specification) to just above ground level. The block is to be the width of the new wall and is positioned to allow an expansion gap between it and the root barrier. This gap is to be filled with a compressible material such as polystyrene or pea gravel that will absorb lateral movement from root growth. The remainder of the wall can then be constructed to the required specification to match the existing walls.

Future Management

- 6.11 In order to reduce any risk of instability that may arise from the removal of the wall and disturbance to the root system it is recommended that the tree be crown reduced. Given that this tree is managed as a pollard and that it is now approaching the re-cutting part of the cycle it is recommended that this operation is undertaken once the wall is reconstructed. Ideally the wall will be rebuilt over the summer and the tree re-pollarded in mid to late summer. This operation will require the consent of the local planning authority and should form part of the overall notification for this work. In the longer term it will be necessary to remove any epicormic growth and check the stability of the tree.
- 6.12 The second tree, T2, also sits in a soft landscape area. In this case this is a raised bed adjacent to the north east boundary wall. Again the base of the tree, in particular thick epicormic growth, is in contact with the wall, which in turn is leaning away from the tree. It would appear that the

pressure of the tree growing against the wall has caused the lean. The tree is within the minimum recommended separation distance (BS5837) that should be maintained between a tree of this species and a structure of this type and therefore there is an increased risk of damage in the long term.

- 6.13 The situation with this tree differs from that of T1 in that the tree is in a raised bed, elevated some 450mm above the natural ground level. Also there is no 'toe' present on the wall in this location to provide a compressible zone. T2 is also much larger, although once managed as a pollard this regime lapsed some time ago and the tree has developed a substantial crown.
- 6.14 Given the above I consider that there are a number of difficulties associated with trying to retain this tree. Firstly is the impact the demolition of the existing wall would have on the stability of the tree. It is reasonable to assume that the structural root system is in contact with the wall and utilising the wall for support. Removing this support, even temporarily could make the tree unstable and this would have consequences for safety. Secondly, given that the tree and its root system are in contact with the wall, it is probable that parts of the structural root system would have to be cut back to allow for demolition and reconstruction. This would wound the tree and cause dysfunction within the wood and make it susceptible to decay. As the wall would need to be re-built against the cut surface of the tree, it would be very difficult to inspect and would also hinder the normal occlusion of the wound that would otherwise occur.
- 6.15 Further difficulties arise with the wall itself. As there is no space for an expansion zone, it would be necessary to construct the wall to such a specification that it could resist pressure from the tree's root system resulting from both natural growth and from the dissipation of wind energy transferred through the crown and stem. This would require an engineer to calculate probable loads and safety margins and design a suitably robust wall. Further problems would arise in trying to visually match a new wall of this specification to the existing.
- 6.16 Alternative solutions have been considered, mainly cutting the wall away from the tree and bridging over the roots and buttress area using a lintel or arch. Unfortunately this would not address the concerns about stability and would require that land on the neighbouring property was made available. On balance it was considered that none of these solutions was practical.
- 6.17 It is recognised that T2 does contribute to the amenity of the conservation area; however the cost and risk associated with attempting to retain it significantly outweigh the benefits it provides. It is therefore recommended that T2 be removed. Any loss of amenity could be offset through the replanting of a new tree on the site.

Arboricultural Operations

- 7.1 If the scheme is accepted by the Local Planning Authority it will be necessary to remove T2 and re-pollard T1. The work should be undertaken by a suitably qualified person, holding public liability insurance for the sum of £5,000 000. All operators must hold relevant NPTC certificates. A site specific risk assessment must be prepared and operators must work to a health and safety method statement.
- 7.2 The contractor undertaking the work is responsible for any loss or damage arising as a result of the operations and agrees to indemnify the owner against such occurrences.
- 7.3 All tree protection measure specified in the following section and shown on the accompanying TPP are to be fully installed prior to the commencement of the arboricultural works. Where access is required to the trees, then suitable ground protection must be used in lieu of the tree protection fences.

Tree Protection & Arboricultural Method Statement

- 8.1 This arboricultural method statement (AMS) sets out the details of tree protection measures afforded to the retained trees on and adjacent to the site.
- 8.2 This document should be read in conjunction with the attached Tree Protection Plan (TPP). The TPP indicates the Precautionary Area (PA) around T1 that must be protected using ground protection as specified.
- 8.3 Copies of the TPP & the AMS must be available on site and all tree protection requirements explained to all persons undertaking activities on the site during the site induction process.
- 8.4 All tree protection measures must be installed and inspected prior to bringing onto the site any plant, materials or equipment or undertaking any construction works or demolition or any arboricultural works. The LPA must be informed in writing once the tree protection measures are installed.
- 8.5 The site is to be inspected by the consulting arboriculturalist in accordance with the schedule of inspections.
- 8.6 All measurements are given in metric using standard abbreviations.

Ground Protection

- 8.7 It is proposed to use ground protection within the PA. The TPP indicates the position of this.
- 8.8 The ground protection specified will comprise a geo textile ground sheet on to which a layer of bark chips is spread to a depth of 50mm. Plywood boards, 20mm thick are placed on top of the bark chip and secured in place to provide a working platform. Once installed the ground protection must be inspected (see schedule of inspection) and

must then remain in place until completion of all operations and then only removed with the consent of the LPA.

- 8.9 Other than works approved in writing by the LPA, no works including storage or dumping of materials shall take place within the PA.

General Precautions

- 8.10 No materials that are likely to have an adverse effect on tree health such as oil, bitumen or cement will be stored or discharged within 10m of the trunk of a tree that is to be retained.
- 8.11 No fires will be lit within 20m of the trunk of any tree that is to be retained.
- 8.12 Positions of storage and mixing areas must be within the existing car park.
- 8.13 To ensure that all tree protection measures are properly installed the site is to be inspected and monitored by Shields Arboricultural Consultancy to the following schedule. Details of the site visits will be reported to the LPA by email within 24 hours.

Schedule of Inspection

1. On completion of installation of ground protection prior to commencement of development works.
 2. During excavations to demolish the wall and excavate foundations.
 3. On completion of project prior to the removal of ground protection.
- 8.14 Prior to the commencement on site of any work, a competent person is to be appointed to monitor the day to day activities on site. In the case of a tree being damaged or where an unexpected event arises it will be for this person to contact Shields Arboricultural Consultancy to seek advice on contingency measures.

S J A Shields

Dip.Arb. (RFS), MICFor, M.Arbor.A

Chartered Forester

25th April 2013

Record of Arboricultural Inspection

Location: 3 Grove Road

Site Type: Commercial

Zone: Red

Exposure: Low

Soils: Urban

QTRA Target Score: 2

Date: 3rd April 2013

Inspector: S.Shields

Weather: Clear, Calm

Notes:

Tree Tag #	Species	Size Class*	Age Class*	Structural Condition	Health & Vitality	Notes	Target	Size	Risk of failure	QTRA Score
1	Lime	M	M	G	G	Pollard growing close to and in contact with wall, causing it to distort. Approx 12m high. DBH 583	2	1	5	200
2	Lime	L	M	G	G	Lapsed pollard growing close to and in contact with wall, causing it to distort. Situated in raised bed approx 450 mm aboveground level. Approx 17m high. DBH 700.	2	1	5	200

KEY**Size Class****Stem**

- S Less than 5m height and / or 150mm trunk diameter
M 5m– 15m height and /or 150mm – 500mm trunk diameter
L 16m – 25m height and / or 501mm -1000mm trunk diameter
VL Over 26m height and or over 1001mm trunk diameter

Age Class:

- NP - New Planting less than 5 yrs
- Y - Young Trees less than 1/3 life expectancy
- EM - Early Mature 1/3 – 2/3 life expectancy
- M - Mature over 2/3 life expectancy
- LM - Late Mature exceeds normal life expectancy for species
- VET - Veteran Tree has characteristics of veteran tree, see Read (2000)

Health & Vitality:

- Good - No significant health problems
- Fair - Some health problems that will reduce vitality
- Poor - Significant health problems that are affecting the tree's ability to survive
- Dead - Dead

Structural Conditions:

- Good - No significant faults
- Fair - Some faults that can be rectified through surgery
- Poor - Major faults that can not be rectified through surgery
- Env - Environment in which the tree stands.

Hazard Rating:

- Low Re-assess within 5 yrs if adjacent to public access, schedule work as required*.
 - Mod. Re-inspect annually/after storms (Force 10+), undertake work within 12 months*.
 - High Remediate within 3 months, or as specified.
 - V. High Remediate within 1 month.
- * Unless otherwise specified

*Numeric rating refers to QTRA score and should be multiplied by 1000 (1K) to get risk of harm.
E.g. 60K x 1000 = 1 in 60 million*

GLOSSARY OF ARBORICULTURAL TERMS

Abscission. The shedding of a leaf or other short-lived part of a woody plant, involving the formation of a corky layer across its base; in some tree species twigs can be shed in this way

Abiotic. Pertaining to non-living agents; e.g. environmental factors

Absorptive roots. Non-woody, short-lived roots, generally having a diameter of less than one millimetre, the primary function of which is uptake of water and nutrients

Adaptive growth. In tree biomechanics, the process whereby the rate of wood formation in the cambial zone, as well as wood quality, responds to gravity and other forces acting on the cambium. This helps to maintain a uniform distribution of mechanical stress

Adaptive roots. The adaptive growth of existing roots; or the production of new roots in response to damage, decay or altered mechanical loading

Adventitious shoots. Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage. The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Architecture. In a tree, a term describing the pattern of branching of the crown or root system

Axil. The place where a bud is borne between a leaf and its parent shoot

Bacteria. Microscopic single-celled organisms, many species of which break down dead organic matter, and some of which cause diseases in other organisms

Bark. A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Basidiomycotina (Basidiomycetes). One of the major taxonomic groups of fungi; their spores are borne on microscopic peg-like structures (basidia), which in many types are in turn borne on or within conspicuous fruit bodies, such as brackets or toadstools. Most of the principal decay fungi in standing trees are basidiomycetes

Bolling. A term sometimes used to describe pollard heads

Bottle-butt. A broadening of the stem base and buttresses of a tree, in excess of normal and sometimes denoting a growth response to weakening in that region, especially due to decay involving selective delignification

Bracing. The use of rods or cables to restrain the movement between parts of a tree

Branch:

- **Primary.** A first order branch arising from a stem
- **Lateral.** A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
- **Sub-lateral.** A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch bark ridge. The raised arc of bark tissues that forms within the acute angle between a branch and its parent stem

Branch collar. A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot. A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling. An irreversible deformation of a structure subjected to a bending load

Buttress zone. The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium. Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker. A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Canopy species. Tree species that mature to form a closed woodland canopy

Cleaning out. The removal of dead, crossing, weak, and damaged branches, where this will not damage or spoil the overall appearance of the tree

Compartmentalization. The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compression strength. The ability of a material or structure to resist failure when subjected to compressive loading; measurable in trees with special drilling devices

Compressive loading. Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition. An indication of the physiological vitality of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree

Construction exclusion zone. Area based on the Root Protection Area (in square metres) to be protected during development, by the use of barriers and/or ground protection

Crown/Canopy. The main foliage bearing section of the tree

Crown lifting. The removal of limbs and small branches to a specified height above ground level

Crown thinning. The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping. A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

Crown reduction/thinning. Reduction of the canopy volume by thinning to remove dominant branches whilst preserving, as far as possible the natural tree shape

Deadwood. Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Decurrent. In trees, a system of branching in which the crown is borne on a number of major widely-spreading limbs of similar size (cf. excurrent). In fungi with toadstools as fruit bodies, the description of gills which run some distance down the stem, rather than terminating abruptly

Defect. In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Delamination. The separation of wood layers along their length, visible as longitudinal splitting

Dieback. The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease. A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Distal. In the direction away from the main body of a tree or subject organism (cf. proximal)

Dominance. In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud. An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction. In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height). Stem diameter measured at a height of 1.5 metres (UK) or the nearest measurable point. Where measurement at a height of 1.5 metres is not possible, another height may be specified

Endophytes. Micro-organisms which live inside plant tissues without causing overt disease, but in some cases capable of causing disease if the

Appendix B

tissues become physiologically stressed, for example by lack of moisture

Epicormic shoot. A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Excrescence. Any abnormal outgrowth on the surface of tree or other organism

Excurrent. In trees, a system of branching in which there is a well defined central main stem, bearing branches which are limited in their length, diameter and secondary branching (cf. decurrent)

Felling licence. In the UK, a permit to fell trees in excess of a stipulated number of stems or volume of timber

Flush-cut. A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root. A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Guying. A form of artificial support with cables for trees with a temporarily inadequate anchorage

Habit. The overall growth characteristics, shape of the tree and branch structure

Hazard beam. An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Heartwood/false-heartwood/ripewood. Sapwood that has become dysfunctional as part of the natural aging processes

Heave. A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

High canopy tree species. Tree species having potential to contribute to the closed canopy of a mature woodland or forest

Incipient failure. In wood tissues, a mechanical failure which results only in deformation or cracking, and not in the fall or detachment of the affected part

Included bark (ingrown bark). Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Increment borer. A hollow auger, which can be used for the extraction of wood cores for counting or measuring wood increments or for inspecting the condition of the wood

Infection. The establishment of a parasitic micro-organism in the tissues of a tree or other organism

Internode. The part of a stem between two nodes; not to be confused with a length of stem which bear nodes but no branches

Lever arm. A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin. The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing. A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end-loading

Loading. A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Longitudinal. Along the length (of a stem, root or branch)

Lopping. A term often used to describe the removal of large branches from a tree, but also used to describe other forms of cutting

Mature Heights (approximate):

- **Low maturing** – less than 8 metres high
- **Moderately high maturing** – 8 – 12 metres high
- **High maturing** – greater than 12 metres high

Microdrill. An electronic rotating steel probe, which when inserted into woody tissue provides a measure of tissue density

Minor deadwood. Deadwood of a diameter less than 25mm and or unlikely to cause significant harm or damage upon impact with a target beneath the tree

Mulch. Material laid down over the rooting area of a tree or other plant to

help conserve moisture; a mulch may consist of organic matter or a sheet of plastic or other artificial material

Mycelium. The body of a fungus, consisting of branched filaments (hyphae)

Occluding tissues. A general term for the roll of wood, cambium and bark that forms around a wound on a woody plant (cf. woundwood)

Occlusion. The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen. A micro-organism which causes disease in another organism

Photosynthesis. The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Phytotoxic. Toxic to plants

Pollarding. The removal of the tree canopy, back to the stem or primary branches. Pollarding may involve the removal of the entire canopy in one operation, or may be phased over several years. The period of safe retention of trees having been pollarded varies with species and individuals. It is usually necessary to re-pollard on a regular basis, annually in the case of some species

Primary branch. A major branch, generally having a basal diameter greater than 0.25 x stem diameter

Primary root zone. The soil volume most likely to contain roots that are critical to the health and stability of the tree and normally defined by reference to BS5837 (2005) Trees in Relation to Construction Recommendations

Priority. Works may be prioritised, 1. = high, 5. = low

Probability. A statistical measure of the likelihood that a particular event might occur

Proximal. In the direction towards from the main body of a tree or other living organism (cf. distal)

Pruning. The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial. In the plane or direction of the radius of a circular object such as a tree stem

Rams-horn. In connection with wounds on trees, a roll of occluding tissues which has a spiral structure as seen in cross-section

Rays. Strips of radially elongated parenchyma cells within wood and bark. The functions of rays include food storage, radial translocation and contributing to the strength of wood

Reactive Growth/Reaction Wood. Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Removal of dead wood. Unless otherwise specified, this refers to the removal of all accessible dead, dying and diseased branchwood and broken snags

Removal of major dead wood. The removal of, dead, dying and diseased branchwood above a specified size

Respacing. Selective removal of trees from a group or woodland to provide space and resources for the development of retained trees.

Residual wall. The wall of non-decayed wood remaining following decay of internal stem, branch or root tissues

Root-collar. The transitional area between the stem/s and roots

Root-collar examination. Excavation of surfacing and soils around the root-collar to assess the structural integrity of roots and/or stem

Root protection area. An area of ground surrounding a tree that contains sufficient rooting volume to ensure the tree's survival. Calculated with reference to BS5837 (2005)

Root zone. Area of soils containing absorptive roots of the tree/s described. The **Primary** root zone is that which we consider of primary importance to the physiological well-being of the tree

Sapwood. Living xylem tissues

Secondary branch. A branch, generally having a basal diameter of less than 0.25 x stem diameter

Selective delignification. A kind of wood decay (white-rot) in which lignin is degraded faster than cellulose

Shedding. In woody plants, the normal abscission, rotting off or sloughing

Appendix B

of leaves, floral parts, twigs, fine roots and bark scales

Silvicultural thinning. Removal of selected trees to favour the development of retained specimens to achieve a management objective

Simultaneous white-rot. A kind of wood decay in which lignin and cellulose are degraded at about the same rate

Snag. In woody plants, a portion of a cut or broken stem, branch or root which extends beyond any growing-point or dormant bud; a snag usually tends to die back to the nearest growing point

Soft-rot. A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Spores. Propagules of fungi and many other life-forms; most spores are microscopic and dispersed in air or water

Shrub species. Woody perennial species forming the lowest level of woody plants in a woodland and not normally considered to be trees

Sporophore. The spore bearing structure of fungi

Sprouts. Adventitious shoot growth erupting from beneath the bark

Stem/s. The main supporting structure/s, from ground level up to the first major division into branches

Stress. In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

Stress. In mechanics, the application of a force to an object

Stringy white-rot. The kind of wood decay produced by selective delignification

Storm. A layer of tissue which supports the fruit bodies of some types of fungi, mainly ascomycetes

Structural roots. Roots, generally having a diameter greater than ten millimetres, and contributing significantly to the structural support and stability of the tree

Subsidence. In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Subsidence. In relation to branches of trees, a term that can be used to describe a progressive downward bending due to increasing weight

Taper. In stems and branches, the degree of change in girth along a given length

Target canker. A kind of perennial canker, containing concentric rings of dead occluding tissues

Targets. In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping. In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Torsional stress. Mechanical stress applied by a twisting force

Translocation. In plant physiology, the movement of water and dissolved materials through the body of the plant

Transpiration. The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

Understorey. A layer of vegetation beneath the main canopy of woodland or forest or plants forming this

Understorey tree species. Tree species not having potential to attain a size at which they can contribute to the closed high canopy of a woodland

Vascular wilt. A type of plant disease in which water-conducting cells become dysfunctional

Vessels. Water-conducting cells in plants, usually wide and long for hydraulic efficiency; generally not present in coniferous trees

Veteran tree. A loosely defined term for an old specimen that is of interest biologically, culturally or aesthetically because of its age, size or condition and which has usually lived longer than the typical upper age range for the species concerned

White-rot. A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure. The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure. The force exerted by a wind on a particular object

Windthrow. The blowing over of a tree at its roots

Wound dressing. A general term for sealants and other materials used to cover wounds in the hope of protecting them against desiccation and infection; only of proven value against fresh wound parasites

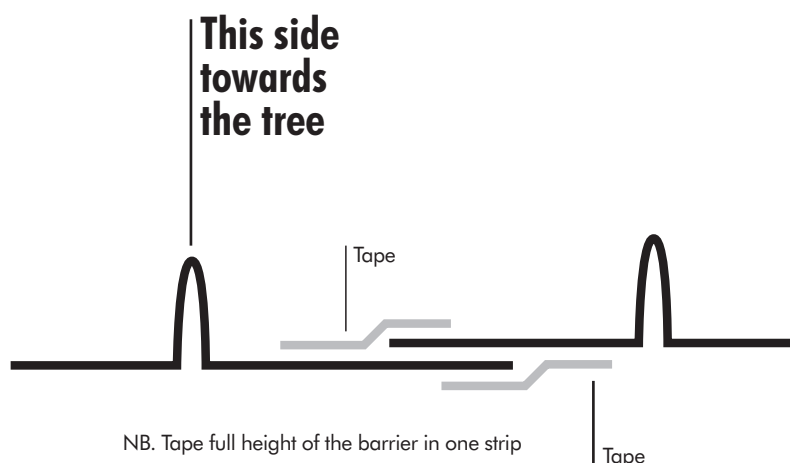
Woundwood. Wood with atypical anatomical features, formed in the vicinity of a wound

Jointing instructions

When jointing lengths of ReRoot root barrier, abide by the following instructions:

1. Use only approved ReRoot jointing tape.
2. Ensure barrier surfaces are clean and dry.
3. Overlap the barrier by a minimum of 100mm.
4. Apply tape over the join in a continuous length.
5. Tape the join down both sides of the barrier.
6. After applying the tape make sure it is firmly attached without wrinkles or air pockets which could allow a fine root hair through.

It is easiest to join the barriers when working on a firm level surface. Once joined the barrier can be lowered into the prepared trench and backfilled.



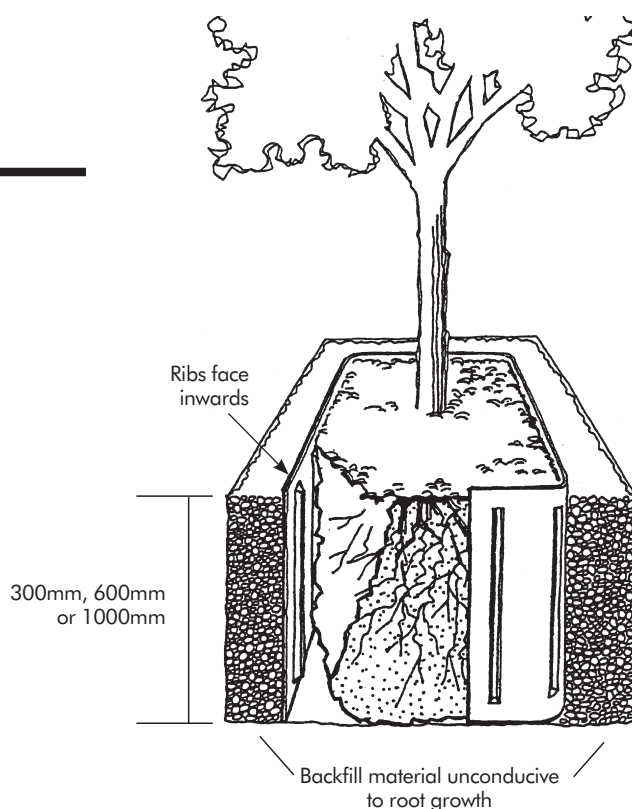
New planting

The ReRoot barrier should be installed when the tree pit has been fully excavated and before any backfilling has taken place.

In a surround situation as below, the base of the tree pit should be loosened to aid drainage. The barrier is then formed around the pit perimeter with the ribs facing inwards allowing as generous clearance as possible (minimum 150mm) between roots and barrier to ease backfilling and allow the roots to spread. Minimum dimensions, shown below, should be observed. The barrier should then be cut to length with a sharp knife allowing a minimum overlap of 300mm.

The join should then be taped using ReRoot polypropylene jointing tape. Both sides of the join must be taped and it is very important that the surfaces be clean and free of dust, dirt, grease etc. and that there are no gaps through which a root could penetrate.

It is most important that the ribs face inwards towards the tree roots. The top edge of the barrier should be installed to protrude very slightly above the finished level, ie 5-10mm, but not more than 20mm.



REROOT BARRIER 300/600/1000

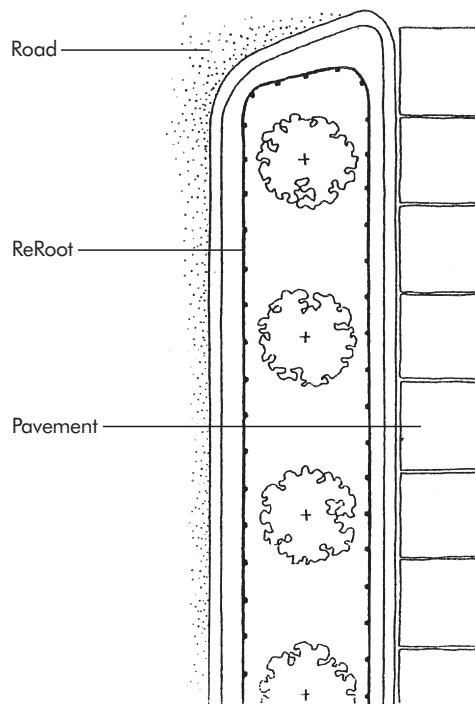
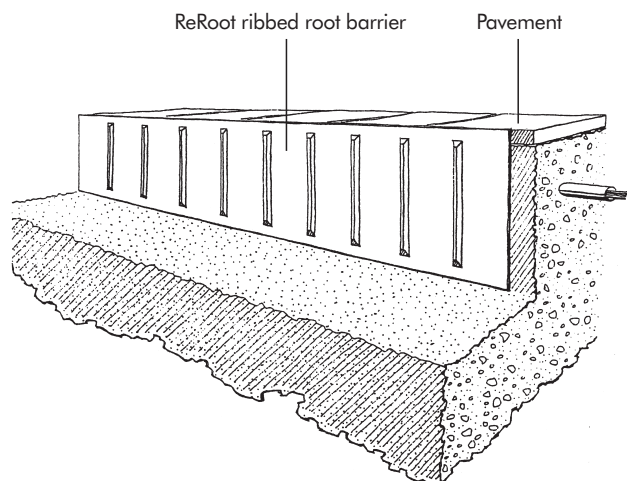
Installation instructions

Please read carefully

For linear installations, care must be taken to ensure that the barrier is kept vertically upright in the trench when backfilled, If a slope is unavoidable the top edge should slope very slightly towards the tree.

For joining two rolls together follow joining instructions shown over page.

Again it is important that ribs protrude towards the tree and the upper edge of the barrier is slightly above the final level of the soil in the tree pit (this prevents root overgrowth).



25 April 2013

3 Grove Road

Shields Arboricultural
Consultancy

Tree & Woodland Management
Solutions

Tree Protection Plan

Land at
3 Grove Road
Wrexham

Legend

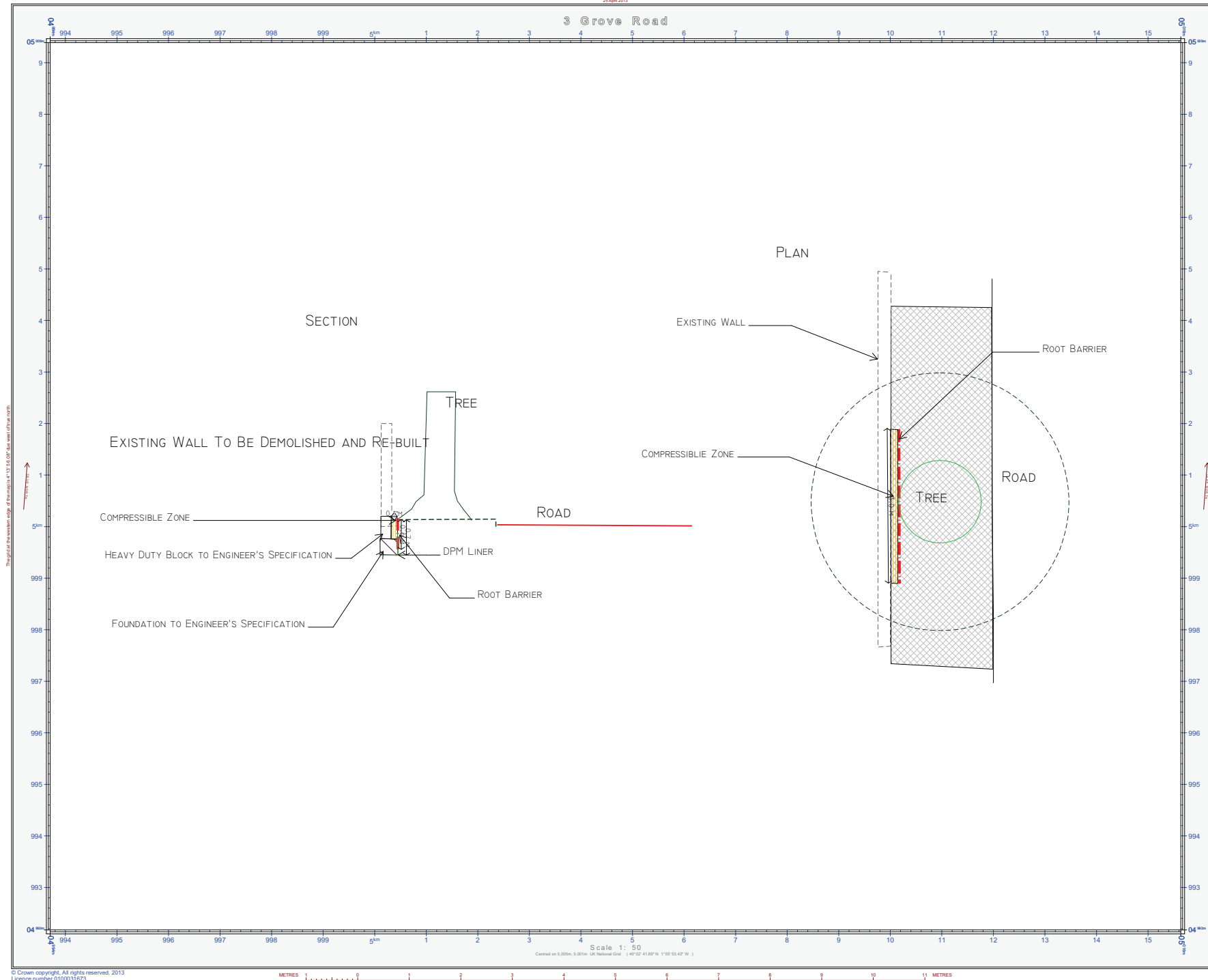
- Existing Structure
- New Structures
- Root Barrier
- DPM
- Foundation
- Compressible Zone
- Precutary Area

SECTION

PLAN

Theroid of the maximum slope of the ground is 1:1.5 (0.67) and the area of the slope is 1:1.5 (0.67)

Theroid of the maximum slope of the ground is 1:1.5 (0.67) and the area of the slope is 1:1.5 (0.67)



Drawing No: GWW/TPP/04/13/01

Drawn By: S. Shields

Scale: 1:50 @ A2

Date: 25th April 2013

Revision:

Do not scale from this drawing all dimensions to
be checked on site

Drawing is colour coded and a monochrome
copy should not be relied upon

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