Salopian Consultancy

Arboricultural Appraisal

(Incorporating an Arboricultural Impact Assessment and Tree Protection Measures in accordance with BS5837:2012: *trees in relation to design, demolition and construction – Recommendations*)

Project: Trevor Basin, Wrexham, LL20 7TT

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On Behalf of: Canal and River Trust

Foreword

Salopian Consultancy Ltd is an Arboricultural/Ecological consultancy which provides inputs to guide developers and architects during the planning process.

Core services include BS5837:2012 tree surveys, condition assessments, mortgage applications and woodland management. In addition, Salopian Consultancy Ltd have in house ecological expertise enabling them to perform a range of Phase 1 and Phase 2 ecological surveys.

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Executive summary

Brief of the study and context of development

This report has been prepared to identify the key arboricultural constraints to inform a planning application for the construction of a classroom and landscaping arrangements at Trevor Basin. The aim of the study has been to highlight those arboricultural constraints so that significant impacts upon trees are avoided or minimised as far as possible whilst identifying opportunities to enhance the tree stock in the long term.

Survey methods

A tree survey was undertaken in accordance with the methodology set out in **BS5837:2012 Trees in relation to design, demolition and construction – Recommendations.** This information has been presented to the design team to act as a tool to ensure consideration has been given to those trees on and immediately off site during the design process.

An Arboricultural Impact Assessment (AIA) has been performed to provide an informed account on how foreseeable direct and indirect impacts associated with development may impact upon the tree stock. Following completion of the AIA, tree protection measures have been prescribed to demonstrate how those trees proposed for retention can be protected during development.

Findings and recommendations

The AIA identified that the removal of **4T**, a tall, etiolated C grade ash tree will be necessary to construct the classroom.

Areas of new hard standing fall within the Root Protection Areas (RPAs) of **2T** and **3T,** an early mature sycamore and ash tree. The construction of hard standing within these areas has the potential to result in significant damage to tree roots if undertaken using conventional methods of installing a subbase for hard surfacing. The use of a Cellular Confinement System has been proposed within the landscaping plan to mitigate physical damage to tree roots and compaction of underlying soils, thereby maintaining a healthy rooting environment. A key aspect of this will be retaining the existing ground levels as part of a 'no dig construction methodology'. Neither the lowering or raising of the ground level will be permitted as part of this methodology therefore consideration will need to be given regarding the interface between the cellular confinement system and adjacent tarmac surfacing.

In addition, further encroachment within the RPAs of **2T/3T** as well as **5G, 6G** and **7T,** has been identified associated with the reading circle and area of boundary fencing. This level of encroachment is considered within the relative species ability to tolerate and therefore hand dig methodologies have been proposed during these works to provide a degree of caution in areas where tree roots may be encountered.

All other trees can be protected during construction by means of protective barrier fencing to maintain a Construction Exclusion Zone (CEZ) that respects the RPA of each tree. Such protection measures and provisions for new planting could be secured by a suitably worded planning condition.

Section 1: Tree Survey

Introduction

1.1 This report, it`s plans and associated appendices have been prepared on behalf the Canal and River Trust `the client', to meet the requirements of **BS5837:2012 Trees in relation to design, demolition and construction - Recommendations**, at Trevor Basin, hereafter referred to as 'the site'.

1.2 The tree survey was performed on the 04th of September 2024 by Douglas Williams, Salopian Consultancy Ltd`s Principal Arboriculturist. Doug has over 15 years' experience working within the Arboricultural industry and is a professional member of the Arboricultural Association. He holds a MSc in Biological Recording, a BSc (Hons) in Biological Sciences, L4 Diploma in Arboriculture, the LANTRA Professional Tree Inspection Certificate and undertakes regular annual CPD with a range of recognised training providers.

1.3 The tree survey has been undertaken in accordance with the methodology set out in **Section 4.4** of **BS5837:2012** which is summarised in **Appendix 1**.

1.4 The data obtained from this survey is presented within the Tree Schedule and depicted in the Tree Constraints Plan (**Plan 1**) towards the end of the report. The position of those trees surveyed are derived from topographical data included in **Appendix 2**. Each item surveyed has been allocated a sequential identification number which correlates with the Tree Schedule.

1.5 **Plan 1** depicts the theoretical rooting system of each tree using a yellow circle or polygon. The crown spreads of trees are colour coded in accordance with **Table 1 Cascade Chart for Tree Quality Assessment** described in **BS5837:2012.** The purpose of this has been to provide a hierarchy system for tree retention during decision making based on their condition and contribution to the amenity of the local area. The crown spreads of high-grade trees illustrated in green, moderate quality trees shown in blue and low-grade trees in grey. Those trees which have a limited life expectancy due to either a compromised structure or poor physiological condition are shown with red canopy spreads and referred to as 'U grade' trees.

1.6 The theoretical RPA for each tree has been calculated using formulas provided in **Section 4.6** of **BS5837:2012.** Both **Plan 1** and **Plan 2** acknowledge that pre-existing site conditions may prevent tree roots distributing asymmetrically. In such instances RPAs may be modified but not reduced based on arboricultural reasoning.

1.7 The findings of the tree survey have been used to highlight initial design implications with the aim of guiding the design process to encourage a harmonious relationship between trees and development.

Scope of the study

1.8 The primary focus of the study is to inform the planning process by;

- Meeting the validation requirements of Wrexham County Borough Council by presenting the findings of a tree survey undertaken in accordance with **BS5837:2012.**
- Present those arboricultural constraints in a clear and concise manner to aid the design process.
- Perform an assessment of those likely impacts associated with proposed site layout DRG.**9815 S4** and the Proposed GA landscape Plan **la- 065- 027**
- Detail appropriate tree protection measures and working methodologies to safeguard trees proposed for retention during construction.

Limitations

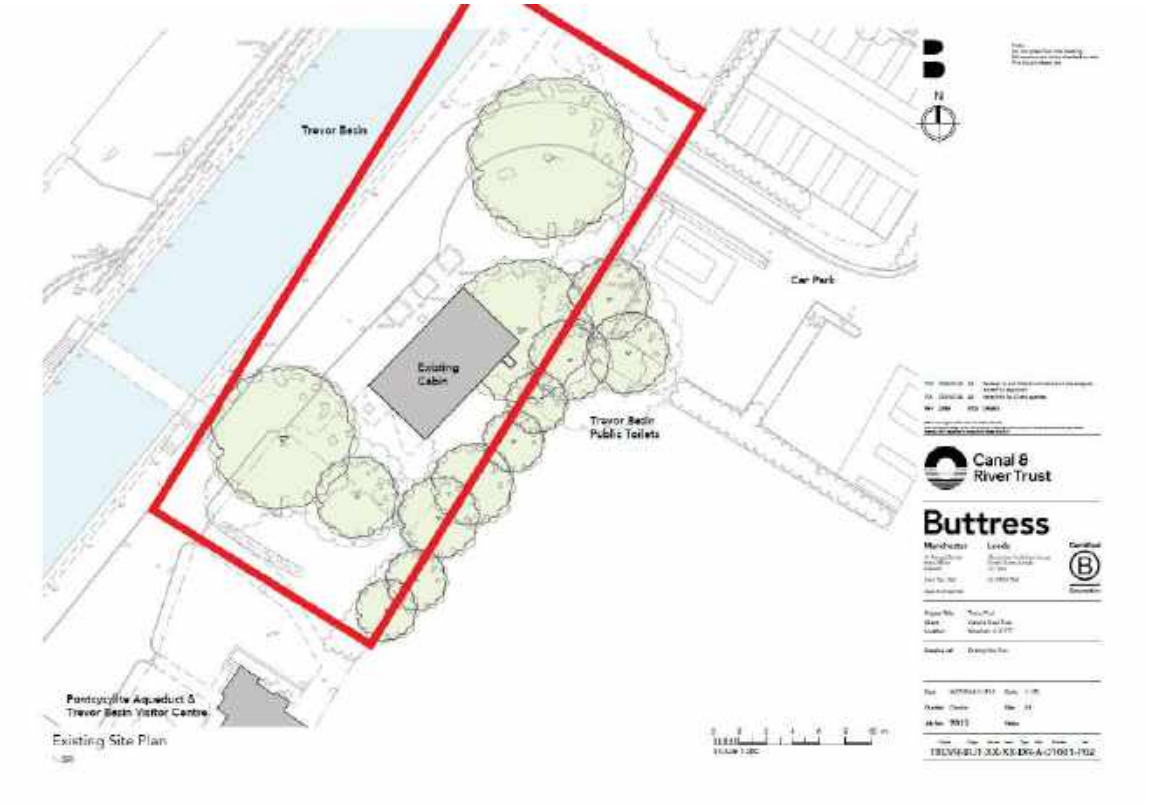
1.9 This report does not;

- Provide an assessment of the likelihood of subsidence caused by the interactions between water availability, soils and tree roots, at present or in future years. Foundation design should be undertaken in accordance with the guidance available in **National House Building Council (NHBC) publication Building near trees, Chapter 4.2** following a soil assessment by competent personnel.
- Carry out a detailed structural assessment of each tree surveyed. The absence of recommended tree work in **Schedule 1** does not imply that a tree is safe. Trees are dynamic structures and even those trees in good condition can fail or enter decline under extraordinary physical stress or following infection by pests and disease.
- The accuracy of the findings of this report are reliant on the information presented in the topographical survey, the proposed site layout and Proposed GA landscape Plan. Checks of the accuracy of third-party information have not been undertaken.

Site location and context of development

1.10 The site is accessed from New Road leading to Trevor Basin which forms the focus of the study. An initial assessment of the proposal identified that planning permission is sought for the demolition of the existing building and replacement with a classroom, in addition to a series of landscaping alterations.

Figure 1 Site location plan



Statutory legislation & planning policy

1.11 Necessary checks prior to all tree works must be undertaken by the appointed tree work contractors to ensure statutory laws are not contravened. In addition to individual protection by virtue of TPOs or Conservation Areas (CA) consideration should also be given to restrictions to tree removal imposed by the Forestry Act (1967) and the potential to support protected species (notably nesting birds and roosting bats) governed by the Wildlife and Countryside Act (1981) and EU Habitats directive, detailed further in **Appendix 3.**

1.12 Trees have many social, ecological and cultural benefits and are recognised for their economic value through the ecosystem services they provide. Such services include, but are not limited to; shade provision, pollution absorption/interception[1], carbon sequestration/storage and stormwater attenuation reducing the risk of flooding and soil erosion[2] . In addition, numerous studies[3] have shown that the presence of mature trees provides significant physiological and psychological benefits. The demand for properties set within neighbourhoods with mature trees is also reflected by higher average house prices, as is the investment in areas with established green infrastructure "environmental attractiveness[4] [5].

1.13 The importance of trees are recognised in various European and UK legislation such as; EU Habitats directive and the Town and Country Planning Act (1990); as well as planning guidance detailed within Planning Policy Wales and Welsh Government Technical Advice Note 5 (TAN5). These policies refer to trees in respect to conserving and enhancing the natural environment and indirectly in relation to issues such as climate change, biodiversity and biosecurity.

1.14 Local planning policies GDP1, EC4, and EC6 give particular weight to the retention and protection of trees as assets that contribute towards biodiversity and landscape value. The default position should be to incorporate trees into any proposed layout with consideration to the direct and indirect impacts associated with development. Where there is tree loss as a consequence of development it should be demonstrated how the wider benefits of the proposal outweighs tree loss prior to determination of a planning application. In such instances appropriate level of compensatory planting is expected to attempt to mitigate tree loss as part of sustainable development.

[1] Nowak *et al*. (2006) Air pollution Removal by Urban Trees and Shrubs in the United States. *Urban Forestry and Urban Greening* 4, p115-123

[2] http://www.woodlandtrust.org.uk/en/moretrees-moregood/Documents/Trees-flooding.pdf

[3] R.S.Ulrich Health Benefits of Gardens in Hospitals Chalmers University of Technology

[4] CABE (2005) Does money grow on trees? http://webarchive.nationalarchives.gov.uk/20110118095356/http://www.cabe.org.uk/files/does-money-grow-on-trees.pdf

[5] Gripaios et al. (1997) The Role of Inward Investment in Urban Economic Development: The Cases of Bristol, Cardiff and Plymouth

Section 2: Arboriculture Impact Assessment

Summary of impacts

2.1 The Arboricultural Impact Assessment (AIA) is a desk-based study which has been undertaken by superimposing the Proposed GA landscape Plan (**Appendix 4**) onto **Plan 1** to produce **Plan 2** which illustrates the foreseeable impacts associated with development.

2.2 Development has the potential to cause a number of direct and indirect impacts upon trees that can be detrimental to their health. This section highlights those impacts that the construction process is likely to have upon the tree stock and gives consideration to the likely conflicts that the built form may have with those retained trees in future years.

2.3 **Plan 2** depicts those trees which are to be retained with their sequential numbering, full RPAs and crown spreads intact. Those trees and hedgerows which will need to be removed to implement the proposal are illustrated with a infilled red canopy spreads and their RPAs omitted.

2.4 Impacts associated with construction activities can in most cases be reduced or completely mitigated for in the first instance through the installation of protective barrier fencing to maintain a stand-off area from trees. This stand-off area is referred to as the Construction Exclusion Zone (CEZ). Where activities within the RPAs of retained trees are necessary, specialised construction methods and working practices will be required to mitigate impacts to an acceptable level as detailed in **Section 3.**

Table 1 Summary of tree removal/impacts

Impacts	A Grade Items	B Grade Items	U/C Grade Items
Trees/Hedgerow loss	N/A	N/A	**4T**
Tree pruning	N/A	N/A	N/A
Activities within RPAs	N/A	**2T**	**3T,5G, 6G,7T**
Temporary RPA set back	N/A	**2T**	**3T, 7T**
Conflicts with shading	N/A	**2T**	**3T, 5G**

Tree removal

2.5 Review of the proposed site layout identified that the removal of **4T**, a tall, etiolated C grade ash tree will be necessary to construct the classroom.

Tree pruning

2.6 The pruning of canopies of retained trees is not envisaged as part of the proposal. Where tree works are required as part of the proactive management of the wider tree stock, such works must be performed in accordance with **BS3998:2010 Tree work. Recommendations** and in line with those statutory controls and permissions outlined in **Appendix 3** by suitably trained and insured Arborists. Key requirements of the standard include target pruning back to sufficient growth points and minimising the size/number of pruning cuts to achieve the desired clearance.

Activities within RPAs

2.7 A review of the landscaping plan identified areas of both new, and replacement hardstanding within the RPAs of **2T** and **3T**. The level of encroachment is significant and has the potential to cause detriment to tree roots and the long-term physiological condition of both trees. The use of a Cellular Confinement System is advised to mitigate potential impacts upon tree roots and compaction of soils.

2.8 In overview a Cellular Confinement System is a series of 3 dimensional geocells arranged in a honeycomb formation which is laid upon a geo textile membrane. When filled with angular stone this system is capable of displacing loading pressures which would otherwise result in compaction of soils. By installing a permeable surface dressing on top of the system (porous asphalt, resin or stone) the movement of water and gaseous exchange to and from the rooting environment beneath can be maintained. The finishing level of the surrounding area will need to accommodate this.

2.9 A key requirement of this system is maintaining the existing ground levels when installed with the purpose of protecting tree roots. Neither the lowering or raising of the ground level will be permitted as part of this methodology

2.10 Further details of the requirements/limitations of 'no dig' construction methodology and Cellular Confinement Systems are discussed in **Section 3** and in greater detail within **Guidance Note 12 The Use of Cellular Confinement Systems Near Trees: A Guide to Good Practice (2020).**

2.11 In comparison a minor encroachment has been identified within the RPAs of **2T, 3T, 5G, 6G** and **7T** associated the reading circle and area of boundary fencing. The level of encroachment associated with these activities are considered well within the relative species ability to tolerate. It is advised that excavation within this area should be undertaken using a hand dig methodology as discussed in **Section 3** to exercise a degree of caution in areas where tree roots may be encountered.

Temporary RPA set back

2.12 The proposed site plan has not identified the need to enter areas of exposed RPAs. There will be the need to enter the RPAs of **2T, 3T,** and **7T** to undertake demolition, construction and landscaping works. In some areas existing hard standing provide sufficient ground protection capable of mitigating any further compaction/root disturbance.

2.13 In the event access is required within exposed RPAs without the presence of pre-existing hard standing; the installation of ground protection measures will be essential (installed in accordance with **Appendix 6),** to avoid compaction within RPAs by vehicles, machinery and workers. The use of <6 ton tracked excavators may be acceptable (provided the soil is not

saturated) as this is generally low enough to avoid soil compaction, avoiding turning within the RPAs to prevent surface smearing[6].

Indirect Impacts

2.14 **Shading** – the class room will fall within the shade arc **2T, 3T** and **5G.** It is acknowledged that this degree of shading is not insignificant and may lead to future pressures to prune.

2.15 **Privacy and screening – 2T, 3T** and **5G** provides a degree of screening to and from the site which can be maintained as part of the proposal. This provides some reassurance against future pressures to prune discussed above given the benefits screening provides.

2.16 **Direct damage –** Whilst difficult to predict, the ongoing growth of above and below parts of trees can result in direct damage to built structures**.** This can occur through abrasion from tree branches and roof tiles/guttering. Likewise, where there is already damage drainage pipes/sewage pipes it is possible for tree roots to gain entry leading to future physical damage following incremental growth of roots. It will be important to maintain clearance from **5G** in future years to address such concerns.

2.17 **Seasonal Nuisance.** Leaf fall can cause conflict with development, where gutters become blocked, and litter areas of paving. There are however design options by way of non-slip paving and provisions of leaf guards or grills on gutters to reduce seasonal nuisance of leaf fall as detailed within **Paragraph 5.3.4 b** and **e** of **BS5837:2012. 2T, 3T and 5G** are likely to cause such impact, especially given that sycamore is large leafed species and that both ash and sycamore produce samara seed pods which disperse freely in the wind, known to contribute to blocking guttering.

Future growth

2.18 There will be the likely need to maintain canopy clearance from **2T, 3T** and **5G** from the roof line of the structure in the medium to long term, given that these items have yet to reach their mature canopy spread.

Utilities

2.19 A detailed drainage strategy is not available at present to base the AIA upon. It is anticipated that underground and overhead services can be located outside the RPAs and canopies of retained trees. Where unavoidable, allowances are made for the use of hand dig methodologies or trenchless insertion methods so that roots can be retained, and desiccation avoided as permitted in **Section 7.1** and **7.7** of **BS5837:2012**

[6] Guidance Note 12 The Use of Cellular Confinement Systems Near Trees: A Guide to Good Practice Section 2.2 para 3.2

Storage of materials

2.20 Space for the storage of materials and vehicles during site preparation and construction is limited within the site. It is envisaged however that the delivery of materials and removal of arisings, will be managed via a phased programme particularly for ground works to make best use of the space available.

New tree planting

2.21 New Tree and hedgerow planting should meet the requirements of **BS8545: 2014 Trees: from nursery to independence in the landscape. Recommendations** with specific reference to the procurement of new trees, species selection, aftercare and maintenance. This could be achieved via planning condition through a formal Tree Planting Scheme.

Figure 2 Poor planting practices to avoid: Examples of poor planting design, involving medium growing species in close proximity to structures and paved surfaces, likely resulting in the need for tree removal/cyclical pruning before maturity is reached.







Figure 3 Poor planting practices to avoid: Restricted rooting volumes, impermeable surfacing and planting trees near underground services/drainage runs



Section 3: Arboricultural Method Statement

Schedule of development

3.1 The AMS details specific solutions to those impacts raised in **Section 2** in order to mitigate/reduce potential impacts upon those trees proposed for retention. An outline program of management and an auditable process has been prepared to demonstrate that those tree protection measures proposed are capable of providing sufficient protection for trees pre, during and post development.

3.2 Such a program of activities is advised under the guidance of an experienced Arboricultural Clerk of Works (ACW) to ensure that the content of this method statement is understood and implemented effectively.

3.3 Direct supervision by the ACW is advised at pre-determined phases to assist with the development process and ensure correct implementation of tree-protection measures as illustrated within **Plan 2**. A copy of this report plans and appendices will be available on site throughout the duration of construction.

Stage 1: Pre-commencement meeting

3.4 An appropriately experienced ACW will be appointed at the cost of the developer to ensure tree-protection measures are understood and enforced which could be secured using a suitably-worded planning condition. Monthly site meetings will be scheduled to identify any issues associated between trees and construction before conflicts occur. A pre-commencement meeting will be held before the commencement of works, normally attended by the ACW, the site manager and a Local Planning Authority (LPA) representative.

3.5 The sequence of construction and implementation of tree-protection measures will be discussed further to identify any changes or difficulties that may arise. The extent of the CEZ/Protective Barrier Fencing will be double checked during this meeting and an inspection regime will be agreed upon by all parties and the timing of protection/mitigation measures will follow the timetable below.

Table 2: Implementation and timings of tree protection/mitigation measures

Actions	**Timing**					
Installation of protective barrier fencing						
Removal of 4T						
Demolition of existing building						
Installation of cellular confinement system within RPAs of **2T** and **3T**						
Construction Phase						
Excavation using hand dig methodology within RPAs of **2T,3T 5G, 6G** and **7T,** during construction of the reading circle erection of boundary fencing						

Actions	Timing					
Monthly check to ensure tree protection measures are upheld						
Ground works and construction phase						
Removal of protective barrier fencing						
Post development tree survey						

Stage 2: Pre commencement tree works and Installation of tree protection measures

3.6 The removal of **4T** as depicted within **Plan 2** by a red infilled canopy will be completed prior to any construction works as will the installation of tree protection measures e.g. protective barrier fencing and ground protection measures.

3.7 The appointed tree contractor must hold adequate public liability, product liability and employer's liability insurances, with the relevant qualifications for the tasks at hand. All tree work operations will be undertaken in accordance with **BS3998: 2010 Tree works. Recommendations.** All necessary checks prior to all tree works must be undertaken by the appointed tree work contractors to ensure statutory laws are not contravened which includes the potential for trees to support protected species (notably nesting birds and roosting bats) governed by the Wildlife and Countryside Act (1981) and EU Habitats directive, detailed further in **Appendix 3.**

3.8 Construction activities have the potential to cause long-term detriment to trees. It is therefore essential that appropriate tree-protection measures are installed and maintained throughout the duration of construction to prevent avoidable impacts upon trees. The position of these measures will be confirmed by an appointed ACW prior to the implementation of construction activities.

3.9 The majority of a trees rooting system is located within the upper 50cm of the soil horizon. This layer provides the optimal level of organic material, water, enabling tree roots to respire, grow, repair and drive photosynthesis. Compaction or disturbance of this layer can have a serious effect on a trees ability to perform these functions. Root severance must be avoided to prevent undermining a tree's stability in addition to causing physiological stress.

3.10 To ensure adequate protection is afforded to the root system, stem and canopy of retained trees, the extent of the RPA will be enclosed using a protective barrier fencing as illustrated in **Appendix 5**. **Plan 2** depicts the position of protective barrier fencing as a solid pink line and must be checked against the RPA measurements provided in the Tree Schedule. Once installed the ACW will inform the LPA that protective barrier fencing is in place and fit for purpose to allow works to commence.

3.11 The area within the line of protective barrier fencing is referred to as the CEZ, illustrated as an Transparent grey area in **Plan 2.** This area will be treated as sacrosanct and will not be entered during construction. Once installed, protective barrier fencing must not be removed or altered without the prior approval of the ACW and LPA.

3.12 Access to the site will be restricted to the existing vehicular access Parking of vehicles, plant and storage of materials will be located within a designated compound, 2m from the RPA of any tree.

3.13 Lighting of fires or mixing of materials will not be permitted within 2m of the CEZ. No mixing of materials will take place uphill from the CEZ to prevent leakage into these areas. In the event of spillage, all works will halt and the ACW will be contacted for advice. All plant and machinery will be fitted with spill kits and water will be available to flush spilt material to avoid contamination of the rooting environments.

3.14 The placement of cranes and lifting machinery will be outside of the RPA of any retained trees. The use of a banksmen and additional workers to assist with tag lines will be undertaken to control loads and avoid twisting in the wind, which poses the risk of inadvertently striking parts of trees.

3.15 Biosecurity control measures shall be implemented to avoid transportation of pest or disease to and from the site in line the **Arboricultural Associations Guidance Note 2 Application for Biosecurity**. This broadly involves cleaning machinery, uniform, PPE and vehicles using a disinfectant to minimise transportation of soil, water and plant materials from the works site.

3.16 Cases of ill health in trees must be brought to the attention of the ACW. The presence of a pest or disease will then be reported using the Forestry Commission Tree Pest and Pathogen sighting reporter (Tree Alert) https://treealert.forestry.gov.uk.

Stage 3 Works to be performed under supervision by ACW.

3.17 Where construction activities are undertaken within the RPA of retained trees, direct supervision by the appointed ACW is required. The ACW will be given a minimum of two weeks' notice prior to such works.

Construction and replacement of existing hard standing within RPAs 2T and 3T

3.18 A no dig construction methodology will be adopted as detailed in **Section 7.4.2 of BS5837:2012** ensuring the existing ground levels are maintained in situ to reduce the impacts upon tree roots as far as practically possible.

3.19 A Cellular Confinement System (such as Cell Web) will be laid upon the ground and filled with a no fines, granular material, thereafter, capped with a permeable surface treatment. Such a treatment allows the free movement of air and moisture to the rooting medium whilst displacing loading pressures to avoid compaction of soils to maintain a healthy rooting environment.

3.20 The system will be installed under the supervision of the ACW and must be installed in accordance with the suppliers specification. An example of this is described in the CellWeb

Technical support Package reproduced within **Appendix 7**), and broadly set out below. The final specification however must be produced or approved by a civil engineer based on the saturate California Bearing Ratio (CBR) value of the soil to ensure the final surface is stable and durable. This requirement is highlighted in **paragraph 1.3** of the Arboricultural Association`s **Guidance Note 12 The Use of Cellular Confinement Systems Near Trees: A Guide to Good Practice** as well as the limitations and benefits of Cellular Confinement Systems.

Ground Preparation

- All ground vegetation will be killed using a systemic herbicide applied to the foliage, after which all dead organic material will be removed.
- All major protrusions will be removed. Stumps ground out; and major hollows filled with sharp sand.

New Hard Standing

- Lay geotextile membrane such as Treetex over the surface required overlapping edges by 300mm.
- Lay the chosen Cellular Confinement System e.g CellWeb upon the geotextile membrane over the entire length of proposed surface within RPA to extend 100mm beyond surface edge. (A Cellular Confinement System with a depth of 100-150mm is advised for domestic traffic up to 6 tons). A depth of 75mm is normally suitable for pedestrian walkways/cycle paths.
- The application of this product will be installed from the extremities of the RPAs working towards the stem of any retained tree ensuring that a minimum of 1m clearance is kept from the stem(s). This process will act as ground protection when later infilling the confinement system.
- J pins will be used to secure and fully extend each cell under tension to the required aperture (259mm x 224mm).
- Edging boards will be attached to pegs driven into the ground through the cellular confinement system.
- The Cells of the Cellular Confinement System will then be filled with clean angular stone Type 4/20 or 20/40. The material will be tipped from one end so that machinery moves on an already spread sub-base and not upon the Confinement System or ground close to the Confinement System;
- For a Cellular Confinement System to function effectively it is essential that the cells are filled to their full capacity to ensure they do not deform which effects their ability to spread loading pressures
- A minimum of 25mm overfill of clean angular stone will be sought when used in conjunction with a hard surfacing.
- The stone will be encouraged to settle with the use of a light roller or with 2-3 passes of the construction plant used for installation, after which a permeable surface treatment (porous asphalt or resin bound systems) will be laid.

3.21 Consideration must be given to the interface between existing and other areas of proposed hard surfacing and the cellular confinement system as the ground levels of the underlying soil beneath the cellular confinement system will not be raised or lowered. This will likely involve either a short ramp/lip or lowering/building up the existing hard standing to meet the final level of the cellular confinement system, or ensure other new area of hard standing work to the cellular confinement system as a datum.

Limited excavation within RPAs of 2T, 3T, 5G, 6G and 7T,

3.22 The reading circle and area of boundary fencing falls within extremities of the RPAs **2T, 3T, 5G, 6G** and **7T**. This level of ground disturbance is not considered likely to have a significant impact upon the condition of this tree. Any excavation will be undertaken using hand dig methodologies to provide a degree of caution where tree roots may be encountered to act as a failsafe measure. Such actions are permitted in **Section 7.2 of BS5837:2012** and restricted to the use of hand tools only.

3.23 In the event that tree roots are encountered, those smaller than 25mm in diameter may be pruned back using a sharp tool to perform a clean cut. In the unlikely event roots above 25mm are encountered, works will halt, exposed roots will be covered with hessian to prevent desiccation and advice sought from the appointed ACW.

Temporary Access Within RPAs

3.24 Movement across the RPA`s of retained tree will only be permitted where existing hard standing is present capable of acting as ground protection. Ground protection measures must be installed as specified in **Appendix 6** within any other part of an RPA which has not been subject to the activities above to prevent the compaction of underlying soils.

3.25 For pedestrian use the installation of single scaffold boards placed on top of a compression resistant, layer such as 100mm of wood chip would provide sufficient ground protection during pedestrian movement. Alternatively scaffold boards placed on top of a scaffold frame to form a suspended walkway would also be sufficient. The set back of protective barrier fencing will only be permitted during those specific actions which require it after which the line of protective barrier fencing will be reinstated.

Removal of existing hard standing, demolition of structures within RPAs

3.26 The removal of hardstanding and demolition of structures within the RPA of retained trees will be undertaken in a ‘top down/pull back’ approach taking care not to excavate below the original ground layer prior to any other ground works.

3.27 The removal of hard standing within RPAs will be performed under arboricultural supervision using a tracked excavator positioned outside of the RPAs. Where this is not achievable the use of <6 ton tracked excavators may be permitted within RPAs (provided the soil is not saturated) as this is generally low enough to avoid soil compaction, avoiding turning within the RPAs to

prevent surface smearing[7].. The original surface layers thereafter will be remediated through the aeration and decompaction using an air spade or manually using hand tools, after which, grass seed will be applied to the exposed surface.

3.28 Thereafter the line of protective fencing with be reinstalled, incorporating the full RPA`s during all other activities/duration of the construction phase.

Landscaping and other matters

3.29 Where boundary fencing has been proposed within RPAs, excavation of new fence posts and panels will be undertaken by hand, any concrete post holes will be lined with plastic to ensure no leakage into the surrounding soil of those trees to be retained and ground protection used where access is necessary within RPAs.

3.30 Any landscaping works such as grading of soil levels, application of topsoil will not be undertaken within RPAs unless specifically agreed with the ACW.

3.31 Any planting of shrubs, or seeding/laying of turf within the RPAs of retained tree will be undertaken by hand, with no machinery or vehicles permitted within these areas.

Stage 4 Monitoring of tree protection measures

3.32 The ACW will undertake predetermined site visits agreed during the pre-commencement meeting, to ensure tree protection measures remain intact and fit for purpose. In the event that conflicts arise between trees and construction activities, it is the responsibility of the site manager to contact the ACW to seek advice on alternative working methods.

Stage 5 Removal of tree-protection measures

3.33 Following completion of works, tree protection measures can be dismantled and removed from site. A post-construction tree survey undertaken by the project ACW is advised to highlight any remedial tree work required prior to occupation of the site.

Concluding statement

3.34 Provided that the tree protection measures and working methodologies detailed in the AMS are adhered to, no adverse effects upon trees proposed for retention or conflicts with construction activities are envisaged. Such protection measures and provisions for new planting could be secured by a suitably-worded planning condition. The tree survey and arboricultural appraisal is valid for two years. It is recommended that a biennial survey of the tree stock is undertaken as part of the proactive management of those trees on site to help maintain a healthy tree population and sufficient safety threshold. In the event that the development proposals alter significantly, an updated impact assessment must be undertaken to identify the likely impacts upon the tree stock and amendments made to the AMS accordingly.

[7] Guidance Note 12 The Use of Cellular Confinement Systems Near Trees: A Guide to Good Practice Section 2.2 para 3.2

Tree Schedule

Site Trevor Basin
Client Canal & River Trust
Surveyor D.Williams
Survey date 04/09 /2024
Climatic conditions Overcast with drizzle

			Tree Constraints Information											
Tree Reference No.	Species	Stem Diameter (mm) at 1.5m	Category Grade	Radius of RPA (m)	Area of RPA (m2)	Height (m)	Canopy Spread (m)				Life Stage	Physiological Condition	Structural Condition	Recommendations	Priority Code
							N	E	S	W					
1T	Ash	370, 330, 310	B1	7.0	154.7	11	5	4.5	4.5	6	Early mature	Fair	Minor deadwood within canopy, typical of age and species. Monitor in the long term for signs of ash dieback.	N/A	N/A
2T	Sycamore	300, 360, 300 #	B1	6.7	140.1	11	5	5	5	5	Early mature	Good	Multi-stemmed form.	N/A	N/A
3T	Ash	300, 300, 300, 300	C1	7.2	162.9	13	4	4	4	4	Early mature	Good	Early signs of die back, subtle at this stage, 80-90% live canopy.	N/A	N/A
4T	Ash	280	C1	3.4	35.5	9	6	4	6	4	Semi mature	Good	Tall, etiolated growth form.	N/A	N/A
5G	Ash, Hazel & Sycamore	150	C1	1.8	10.2	10	2	2	2	2	Semi mature	Good	Provides screening to and from the site.	N/A	N/A
6G	Ash & Sycamore	400 #	B1	4.8	72.4	12	5	5	5	6	Mature	Good	Linear group merges into 5G, larger in stature.	N/A	N/A
7T	Ash	150	C1	1.8	10.2	12	1.5	2	3	3	Young	Fair	Early signs of die back, subtle at this stage, 80-90% live canopy. Tall, etiolated growth form.	N/A	N/A
8T	Rowan	75	C1	0.9	2.5	4	0.5	0.5	0.5	1	Young	Fair	Supressed by neighbouring trees.	N/A	N/A
9T	Pedunculate Oak	530	B1	6.4	127.1	12	7	7	7	7	Mature	Good	Dense ivy obscures lower stem, canopy overhangs public toilets.	N/A	N/A

- The tree survey process has been undertaken in accordance with ***Section 4.4 of BS5837:2012 Trees in Relation to Design, Demolition and Construction Recommendations***, summarised in ***Appendix 1*** of the Arboricultural Appraisal.
- Each item surveyed has been given a sequential number with the respective prefix 'T' for trees 'G' for groups of trees, 'H' for hedgerows and 'W' for woodland which corresponds to the Tree Constraints Plan (**Plan1**) and Tree Protection Plan (**Plan 2**).
- The Root Protection Area (RPA) values have been calculated using the methodology set out in ***Section 4.6*** and ***Annexes C & D of BS5837:2012.*** Where pre-existing site conditions may indicate that the rooting system is not asymmetric, the RPAs may be modified in **Plan 1** and **Plan 2** but the area not reduced based on arboricultural reasoning. Such instances include the physical obstruction to root development or inhospitable rooting environments.
- Where trees are located outside of the client land ownership, or access is not achievable stem diameter have been estimated, highlighted using the suffix #
- Category Grading afforded to each item surveyed provides a hierarchy system for retention based on condition, amenity value and longevity in accordance with ***Table 1 Cascade Chart for Tree Quality Assessment described in BS5837:2012.*** A = High value, B = Moderate value C = low value & **U** compromised condition. Suffix 1,2 & 3 related to Arboricultural, Cultural and Ecological value respectively.
- Priority codes provide a classification of the urgency of works; Code 1 = Undertake within 1 month or sooner, Code 2 = Perform within 12 months or sooner, Code 3 = Undertake once all code1 and 2 works are complete, within 12 months
- Where specified small diameter limbs/deadwood refer to a diameter <75mm, moderate deadwood/medium diameter limb equates to that of 75mm – 150mm and large diameter limbs/deadwood are those that exceed a diameter of 150mm

Appendix 1: Summary of BS5837:2012 survey methodology

The methodology adopted for this survey is based on guidelines set out in **BS5837:2012 Trees in Relation to Design, Demolition and Construction Recommendations**, especially **Section 4.4**, 'Tree Survey'.

The tree survey includes all trees and other significant vegetation with a stem diameter of >75mm at 1.5m within the site, in addition to those located beyond the boundaries within a distance of 12 times their stem diameter. The position of each item is represented in **Plan 1,** are derived from the topographical data included in **Appendix 2.** Those items not recorded on the topographical survey have been annotated by hand and marked using the symbol '*'.

All trees have been visually inspected from ground level, with no climbing or further detailed investigative tests undertaken. All measurements detailed in the Tree Schedule are metric and have been recorded in accordance with **Section 4.4.2.5 of BS5837:2012** summarised below. Where access to trees has been restricted, either as a result of vegetation, ground conditions or third party land ownership, dimensions have been estimated and highlighted using symbol '#' in **Schedule 1.**

Any recommendations given regarding longer-term management have been made on the basis of optimising the life expectancy of trees, given their current situation and any effects, which may arise as the results of the development proposal.

Sequential reference number

All numbering of surveyed items is sequential with the respective suffix 'T' for trees 'G' for groups of trees, 'H' for hedgerows and 'W' for woodland.

Species

Common English names are used wherever possible for simplicity.

Stem diameter (DBH)

This is the measurement of the stem diameter in millimetres taken at 1.5m above ground level in accordance with **Annex C of BS5837:2012**.

Category Grading

Trees have been assigned 'U' or category grading 'A' to 'C' in accordance with the Cascade Chart given in **BS5837:2012** reproduced overleaf.

RPA radius & RPA Area (m^2)

Both values been calculated using the methodology set out in **Section 4.6** and **Annexes C & D of BS5837:2012.** Where pre-existing site conditions may indicate that the rooting system is not asymmetric, the RPAs may be modified in **Plans 1** and **2** but the area not reduced based on arboricultural reasoning. Such instances include the physical obstruction to root development or inhospitable rooting environments.

Height

An approximation of height in metres is provided for the highest point of each tree.

Canopy spread

This is taken at four cardinal points, to provide a representative account of the canopy spread.

Life stage

There are six classes to which trees are assigned:

Table A.1: Definition of ages classes

Age class	Description
Young	Newly planted within 0-10 years
Semi mature	A tree in the first third of its normal life expectancy for the species (significant potential for future growth).
Early mature	A tree in the second third of its normal life expectancy for the species (some potential for future growth).
Mature	A tree in the latter third of its normal life expectancy for the species (typically having reached its ultimate size).
Over mature	Beyond the normal life expectancy for the species.
Veteran	A tree that is of interest biologically, aesthetically or culturally because of its condition size and/or age.

Physiological condition

The trees physiological condition is classified as good, fair, poor or dead on the basis of leaf or bud density, taking note of signs of physiological stress.

Structural condition

Details of the trees structural condition are provided identifying structural defects and or signs of decay, pest and pathogens where present.

Proposed tree works

Whilst a formal tree inspection has not been undertaken the survey process does take into consideration implications for damage or injury to persons and/or property; recording defects and assessing the structural condition of those trees surveyed. Where necessary, tree works have been proposed within the tree schedule to mitigate potential hazards as part of proactive management of the tree stock with the aim of optimising the life expectancy of those trees surveyed.

Tree work priority codes

Priority codes from 1 to 3 have been given for those trees requiring tree works detailed in **Table A.2** below. The definition and level of urgency have been determined based on the perceived likelihood of failure and hazards posed to potential or actual targets.

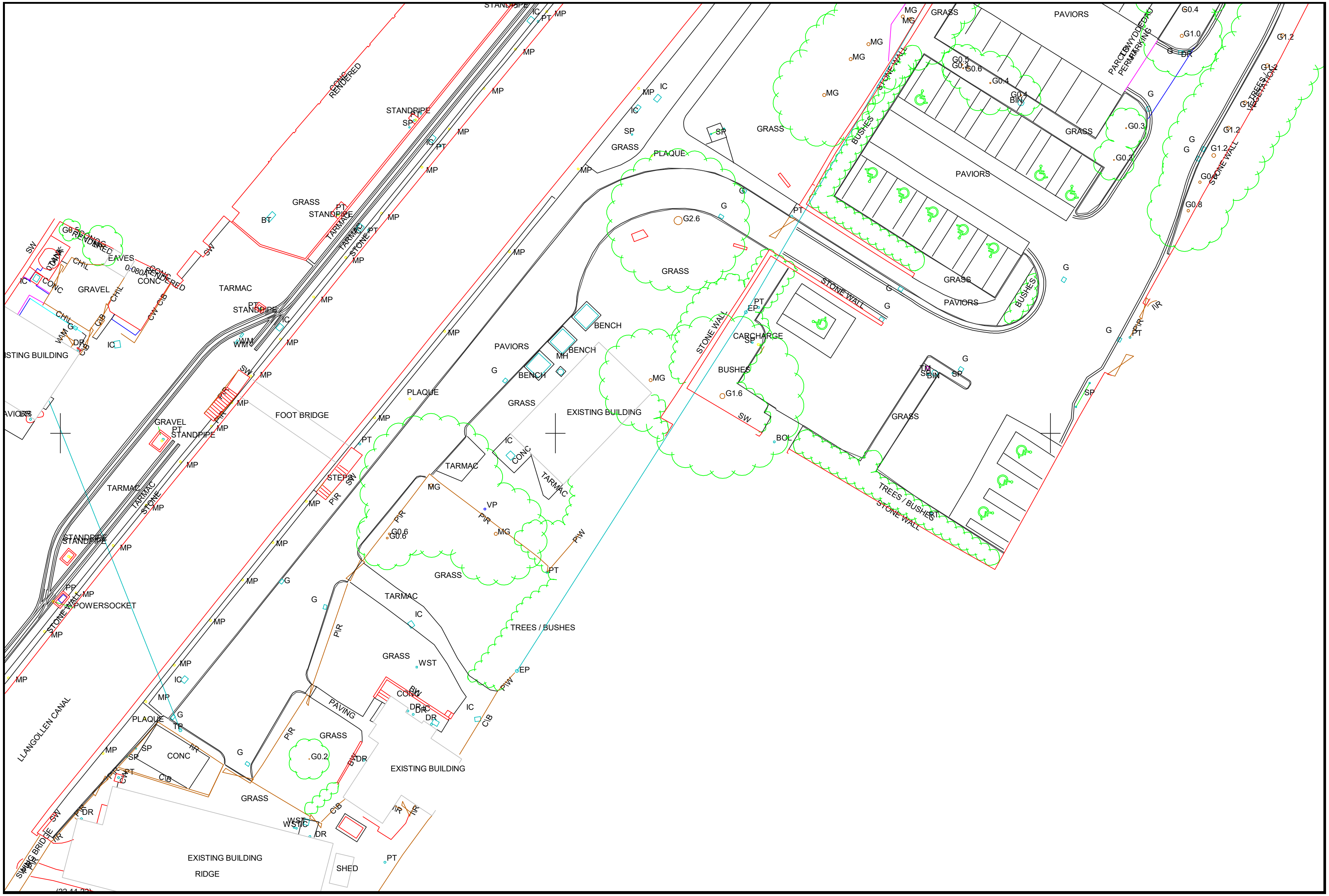
Table A.2: Tree works priority codes

Priority Code	Description
Priority Code 1	An identified hazard considered to pose an imminent or serious risk to person or property in the context of the current land use. Works must be undertaken at the earliest possible opportunity.
Priority Code 2	Works considered necessary to mitigate a perceived hazard from an observed and recorded defect. These tree works should be undertaken prior to any development works commencing on site.
Priority Code 3	Considered to be general maintenance works which should commence post development but prior to residential occupancy.

Table A.3: Summary of Cascade Chart for tree quality assessment

Category and definition	Criteria
Category U	Those trees in such a condition that they that cannot be realistically retained as a living tree in the context of the current land use for longer than 10 years. If they cannot be safely retained as an ecological receptor following proposed remedial works, these trees should be removed for arboricultural reasons followed by appropriate replacement planting.
Category A (High quality of value)	Trees with an estimated life expectancy of at least 40 years. These trees may be of particular good example of their species or contribute an important visual landscape feature or provide significant historical/conservation value.
Category B (Moderate quality and value)	Trees with an estimated life expectancy of at least 20 years. These are trees that may be included within category A, but are downgraded due to the presence of significant but remedial defect. May also include trees present in such numbers that they form a distinctive landscape feature i.e. woodland, or tree of a material conservation/cultural value.
Category C (Low quality and value)	Trees with an estimated life expectancy of at least 10 years. Generally regarded as an unremarkable specimen of its species, or of such an impaired condition that they do not qualify for higher categories providing little landscape/conservation or cultural value.

Appendix 2: Topographical survey



LLANGOLLEN CANAL
FOOT BRIDGE
EXISTING BUILDING
EXISTING BUILDING
EXISTING BUILDING
EXISTING BUILDING
STONE WALL
TREES / BUSHES
PAVIORS
GRASS
TARMAC
GRAVEL
BENCH
PLAQUE
STANDPIPE
CARCHARGE
BUSHES
PARCIO
PARKING
STEPS
SHED
RIDGE
POWERSOCKET
CONC
PAVING
SWING BRIDGE

Appendix 3: Statutory Controls

Tree Preservation Orders & Conservation Area

Written consent must be obtained from the local planning (LPA) authority prior to any works upon a tree subject of a Tree Preservation Order unless the tree is;

- Dead or dangerous
- Works are in line with an obligation under an Act of Parliament
- Permission has been granted through a Planning application

A six week notice to the LPA is required under Section 211 of the Town and Country Planning Act (1990) for any tree works within a Conservation area.

It is a criminal offence to cut down, uproot, wilfully destroy or deliberately damage a tree subject of a Tree Preservation Order. Under Section 210(2) of the Town and Country Planning Act (1990) anyone found guilty of the actions above are liable of a fine of up to £20,000 if convicted by a magistrates' court. In serious cases a person may be committed for trial in the Crown Court which will also consider any financial benefits which has or is likely to result from such an offence. In addition there is also a duty requiring landowners to replace a tree removed, uprooted or destroyed in contravention of a Tree Preservation Order.

Where full planning permission is authorised, the statutory obligations above are no longer applicable, transcended by the Town and Countryside Planning act (1990), which permits tree removal for the purpose of development.

Forestry Act 1987

A felling licence is required wherever an excess of 5 cubic metres of timber is felled per calendar quarter. Exceptions to the Forestry Act (1967) include felling trees which when measured at 1.3m above ground that have a stem diameter of 8cm or below. Other exceptions include thinning of woodland trees with a stem diameter of 10cm or below and coppicing of trees with a diameter of 15cm or below.

Exceptions are also afforded to work carried out by statutory undertakers; removal of dangerous and dead trees, prevention of abatement of a nuisance and to prevent the spread of quarantined pests or disease in response to a notice served by a Forestry Commission Plant Health Officer.

The Occupiers Liability Act 1957/1984

Land owners have a duty of care to ensure they have taken practice steps to ensure those trees within the curtilage of their property are reasonably safe for permitted visitors.

Highway Act 1980

The highway authority have the ability to issue a land owner a 14 days notice to carry out works upon tree or hedgerow that overhang a highway road or footpath which the public has access to as to endanger or obstruct the passage/sight lines of vehicles or pedestrians.

Protected species

All species of British bat are listed as a European Protected Species (EPS) on Schedule 2 of The Conservation of Habitats and Species Regulation (Amended) (EU Exit) (2019) which transpose the Habitats Directive making it an offence to:

- *Deliberately capture, injure or kill a wild animal of a EPS;*
- *Deliberately disturb wild animals of a EPS wherever they are occurring, particularly any disturbance which is likely to impair their ability to survive, to breed or reproduce, or in the case of hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong;*
- *Deliberately take or destroy the eggs of a wild animal of a EPS; or*
- *Damage or destroy a breeding site or resting place of a wild animal of a EPS*.

Additional protection for bats is also afforded under the Wildlife and Countryside Act 1981 (as amended), making it an offence to intentionally or recklessly disturb bats whilst they are occupying a structure or place which is used for shelter or protection, or to obstruct access to this structure or place.

All wild birds, their nests and eggs are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended), this makes it an offence to:

- *Intentionally kill, injure or take any wild bird;*
- *Take, damage or destroy the nest of any wild bird while it is in use or being built;*
- *Take, damage or destroy the egg of any wild bird; or*
- *To have in one's possession, or control, any wild bird (dead or alive) or egg or any part of a wild bird or egg.*

Appendix 4: Site Layout And Proposed GA landscape Plan

Trevor Basin

Soft landscapng to entrance of site: introduce wild flower mix and planting

Secondary timber single gated access.

Timber fencing to form secure boundary

Hard surface to walkway to be reclaimed brick from the former cabin.

Hornbeam hedge to provide privacy to education spacefrom public area

Poured surface to walkways with natural finish

Bench with concrete base to be relocated within seated picnic area

Primary timber single gated pedestrian access.

Timber gated vehicle access.

Self Binding Gravel.

Dropped kerb for flush access.

Compliant 5m ramped access between garden and education space: 1:21 gradient. Proposed cell web buildup to form no dig ramp

Self binding gravel circle. Stone to be reclaimed from Boat hire basin. Proposed cell web buildup to form level surface

Reading circle, with oak reading chair

Reclaimed local stone to be positioned to form seating area

Replace hedge and provide temporary fence to boundary

Paved edge to rear for maintenance access

Reclaimed oak beam benches

Habitat features installed throughout site

regrade and reseed grass area.

New hedge planting to enclose boundary

STANDPIPE
PT
SP
IC
PT
IC
PT
IC
SP
SP
PLAQUE
MP
G
G
G2.6
MP
MP
MP
BENCH
MH
G
BENCH
MG
PLAQUE
G1.6
PT
EP
CARCHARGE
SP
BOL
PT
IC
MG
VP
MG
G0.6
G0.6
PT
IC
WST

PLEASE NOTE - DRAWINGS ARE INTENDED FOR PLANNING PURPOSES ONLY AND ARE BASED ON O.S DATA AND SITE PHOTOGRAPHIC SURVEY ONLY. MEASUREMENTS, LEVELS AND CO-ORDINATES SHOULD BE CHECKED ON SITE PRIOR TO FABRICATIONS, INSTALLATION OR FOR DETAILED PURPOSES.

Canal & River Trust
Making life better by water

Trevor Public

Proposed GA. Landscape Plan

1/100 @ A1

Project No.
P12222

Sheet No.

Sheet Size. A1

P1222-CRT-LA-065-027-L-001

Project Name.

Trevor Basin Education

Sheet Name.

Proposed GA Landscape Plan

Details

Work Stage:	RIBA 3
Version No:	V1
Version Author:	RS
Version Date:	19/03/2025
Version:	V1
V'Notes:	sheet created
Functional Location:	LA-065-027
Project Address:	Trevor Basin Trevor: Wrexham LL20 7TT

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Sheet Scale 1/500@ A1

0m 1m 2.5m 5m

Scale Bar 1/100@ A1

N



Existing Ground Floor Plan

1 : 100

1 0 1 2 3 4 5 m

SCALE 1:100

N

Note:
Do not scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.

Area

GEA existing (grey) - 95 m²

Rev	Date	Intls	Details
P01	2024.07.05	LB	Initial info for Client queries.

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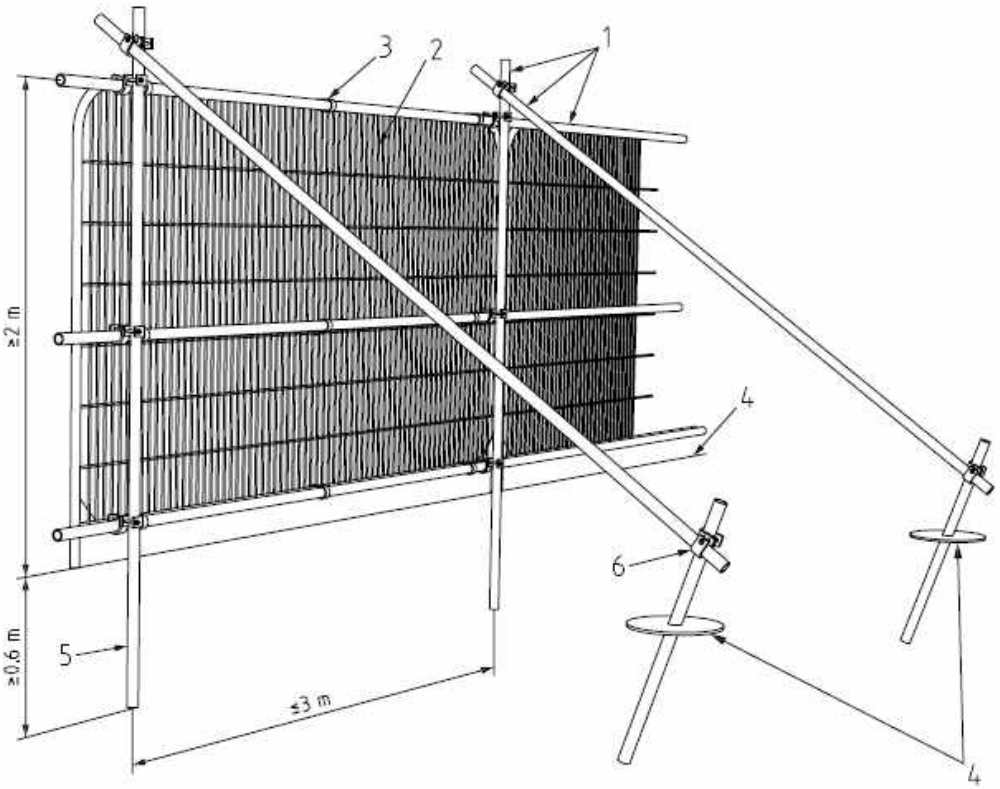
Certified B Corporation

Project Title	Trevor Basin - Pod
Client	Canal & River Trust
Location	Wrexham, LL20 7TT
Drawing ref	Existing Ground Floor Plan
Date	19/03/2025
Scale	1 : 100
Checker	LB
Size	
Job No:	**9815**
Status	**S4**

Project	Origin	Volume	Level	Type	Role	Number	Rev
TREVR	BUT	XX	00	DR	A	01002	P01

Appendix 5: Specification of protective barrier fencing

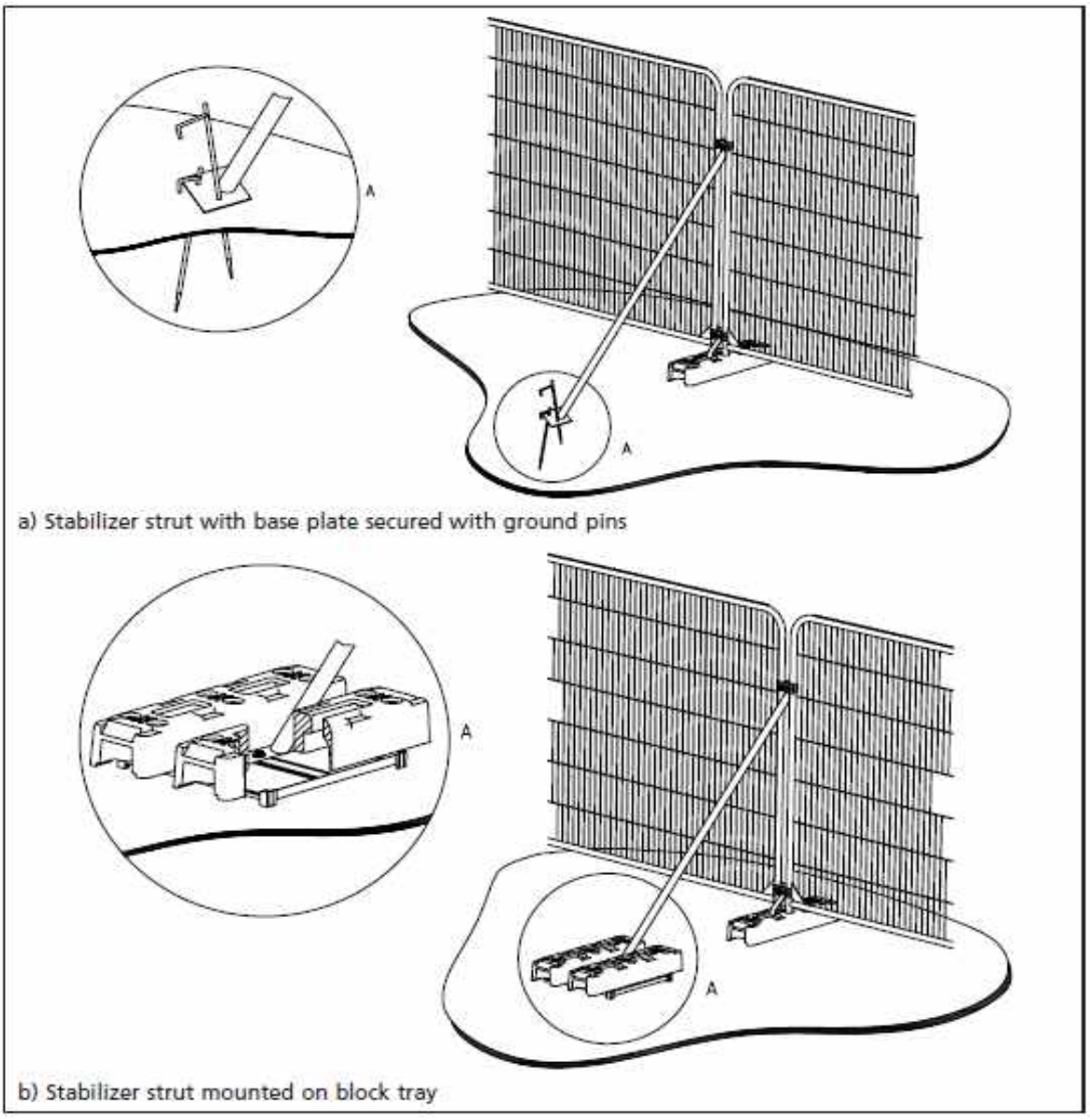
(Extract from BS 5837:2012, Figure 2)



Key

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

Alternative options available for securing protective barrier fencing (Extract from BS 5837:2012, Figure 3)



Appendix 6: Specification of ground protection measures

(Extract from BS5837:2012)

6.2.3.2 Where the set-back of the tree protection barrier would expose unmade ground to construction damage, new temporary ground protection should be installed as part of the implementation of physical tree protection measures prior to work starting on site.

6.2.3.3 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.

NOTE The ground protection might comprise one of the following:

a) *for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;*

b) *for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;*

c) *for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.*

6.2.3.4 The locations of and design for temporary ground protection should be shown on the tree protection plan and detailed within the arboricultural method statement (see **6.1**).

6.2.3.5 In all cases, the objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.

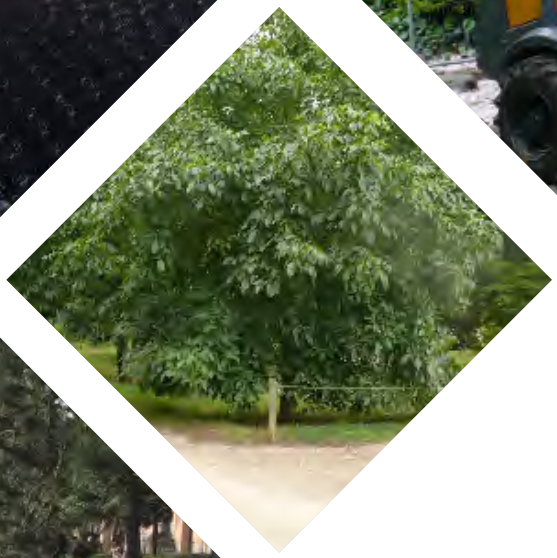
Appendix 7: CellWeb Technical Support Package

www.geosyn.co.uk











Geosynthetics

Cellweb® TRP

Technical Support Package

"Creating Innovative Solutions with Outstanding Products"

What is Cellweb® TRP





What is Cellweb® TRP?

Cellweb® TRP is a cellular confinement system specifically designed for tree root protection. The system creates a stable, load bearing surface for traffic or footfall whilst eliminating damage to roots through compaction and desiccation of the soil.

The Cellweb® TRP system comprises of three specific elements; Cellweb®, Treetex™ pollution control geotextile and an infill of clean angular stone. The system has been designed combining the best possible products to create an unparalleled solution for tree root protection applications.

Cellweb® TRP is a no dig solution that ensures that the load placed upon it is laterally dissipated rather than transferring to the soil and roots below. The use of Treetex™ pollution control geotextile allows for drainage and separation whilst preventing contaminants from reaching the roots.

The walls of the cells are perforated and when combined with an infill of clean angular stone this enables free movement of water and oxygen ensuring that supplies to the tree roots are maintained.

What makes Cellweb® TRP different?

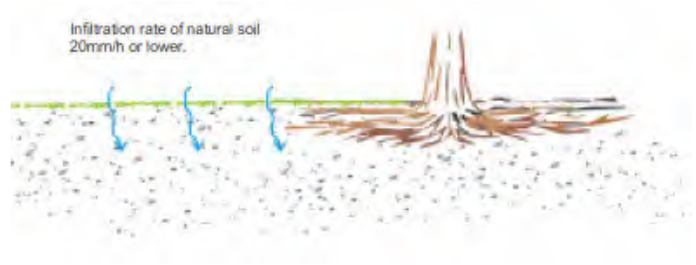
From the drawing board to installation, we are here to help.

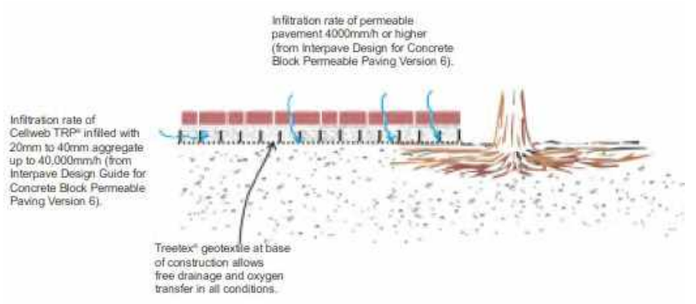
We have been supplying the Cellweb® TRP system since 1998 and our technical team have vast experience with tree root protection and the associated legislation.

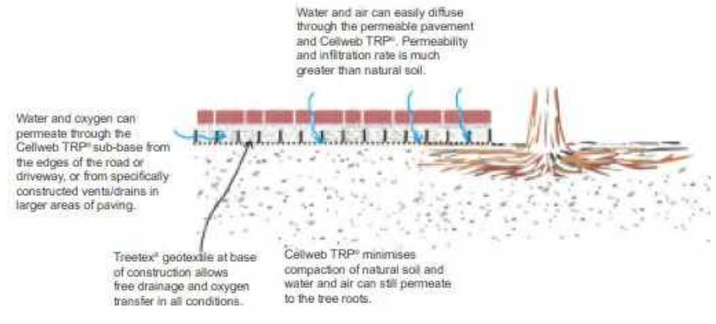
Delivering complete peace of mind to customers is our number one priority. As part of this customer care package we offer free on site consultations, technical recommendations and on site installation guidance on all projects.

Our in house Engineering Team provide site specific recommendations to ensure the solution used is cost effective and environmentally sound.

For more information on Cellweb® TRP or Geosynthetics Limited please contact our sales office on 01455 617139 or visit www.geosyn.co.uk.







Benefits Of Our Guarantee

Tried and tested
Cellweb® TRP is the only guaranteed system available today which has also the been independently tested and proven to prevent over compaction of the sub-soils and roots. Customers have been using the system since its inception without failure.

Full tree root protection services
Combining Cellweb® TRP with our in-house arboriculturalists and design engineers gives our customer the assurance that all their specific requirements will be met.

Peace of mind
The guarantee covers the replacement of not only the Cellweb® TRP system but also the tree(s), giving the customer complete peace of mind.

Helping to build the right solution
Our in-house engineers will provide free site specific technical recommendations to value engineer the project.



NBS Specification Clause



Obtaining a Guarantee

Provide a copy of the Arb Report
If an arb report hasn't already been produced, we would advise approaching an Arboricultural Association registered consultant to have a full survey completed.

Complementary Technical Recommendation (TR)
We offer all our customers full use of our engineering services free of charge. For all guaranteed projects, we provide a full technical recommendation and calculations which ensure the optimum solution is provided.

Scope Agreement
Once we have received the arb report and technical recommendation, we will work with our customer to specify which trees can be covered under the guarantee using a scoping agreement.

Installation
All we ask is that our customers follow our installation guide alongside the technical recommendation provided. Once completed we will ask for a customer signature agreeing to the terms and conditions of the guarantee.

Certification
Upon your agreement with the terms and conditions, we will send out a guarantee certificate alongside a copy of all of the details of the project.

NBS Specification Clause

I. The Tree Root Protection System shall be Cellweb® TRP by Geosynthetics Ltd 01455 617139

II. The Tree Root Protection System shall include Cellweb® TRP 3 dimensional cellular confinement panels measuring 8.1m in length x 2.56m wide. The system also includes a Treetex™ Pollution Control Geotextile.

III. The Cellweb® TRP shall incorporate perforated cell walls to provide lateral flow and frictional interaction between infill material and adjacent cells. Perforations shall be 11% of the cell wall surface area for Cell height of 100mm and 200mm and 16% for Cell height of 75mm and 150mm.

IV. The Cellweb® TRP shall incorporate a green identification strip along the length of the panel.

V. The seam peel strength of the cells shall be as shown in the following table:

Cell Height (mm)	75	100	150	200
Seam Peel Strength (N)	1065	1420	2130	2130
U.S.Army Corps of Engineers. Technical report GL86-19, Appendix A				

VI. The expanded cell size (width x length) shall be 259mm x 224mm.

VII. The infill material shall be a clean angular stone typically 40mm to 20mm or 20mm to 4mm.

VIII. The system shall be installed strictly in accordance with the manufacturers installation instructions.

IX. Fact Sheets 1,2,3,4,and 5 provide factual evidence of the Cellweb® TRP and Treetex™ systems performance in the application of Tree Root Protection.

X. The system shall encorporate a 10 year guarantee which covers the replacement of any dead tree(s) up to a value of £10,000 per tree, as well as a replacement of the system which has failed up to the value of £50,000.

Product Data

Weight Capabilities

- 75mm Cellweb® TRP confinement system

For foot and cycle traffic. This also provides a control measure for crust compaction

- 100mm Cellweb® TRP confinement system

For domestic traffic, such as cars and transit vans up applicable up to a 6t gross weight

- 150mm Cellweb® TRP confinement system

For emergency access and refuse collection applicable up to a 30t gross weight

- 200mm Cellweb® TRP confinement system

For H.G.V and construction traffic applicable up to a 60t gross weight

Note: This is a general guidance for the depth of Cellweb® TRP according to Gross Vehicle Weight for a firm and stable subgrade (CBR>3%).
If the ground conditions are poor and/or unstable please contact Geosynthetics Ltd to provide a site specific design.

Treetex™

Treetex™ is a heavy duty needle punched geotextile fleece. Manufactured from polyproplyene, Treetex™ is ideal for use in a Tree Root Protection system as it is easily moulded to the shape of the aggregate and has been proven to absorb 1.7 litres of oil per m2 ensuring that the roots are not damaged by pollutants from the surface.

Clean Angular Stone

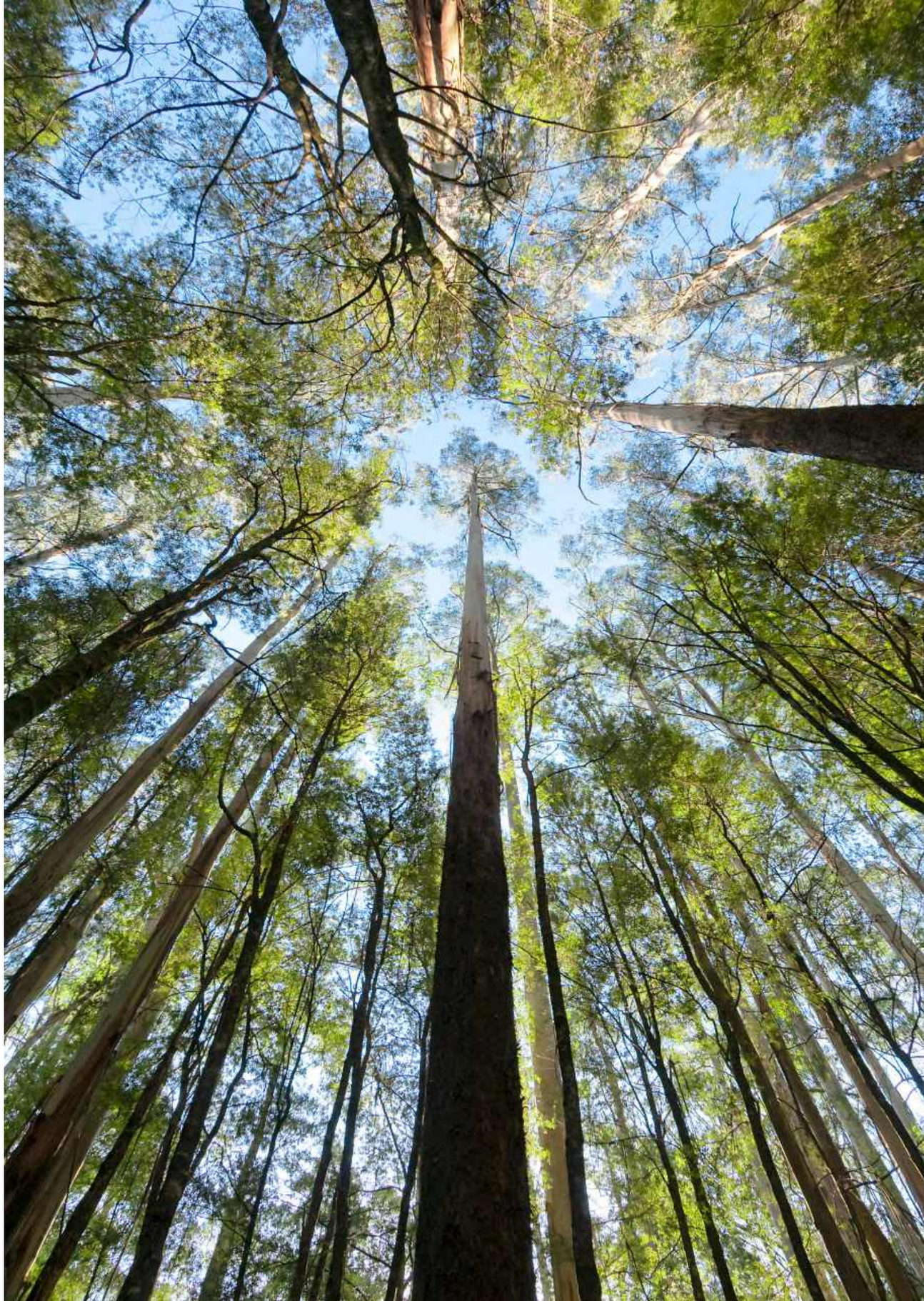
We recommend using a 4/20 mm clean angular stone type 4/20 mm (preferred) or 4/40mm to allow water permeation and gaseous exchange within the rooting environment.
(*) Please contact Geosynthetics Ltd for further information on clean angular stone.

Aggregate gradings for sub-base materials to BS EN 12620

	Percentage Passing (%)	
Sieve Size (mm)	Coarse aggregate	Coarse aggregate
	4/40	4/20
80	100	-
63	98-100	-
40	90-99	100
31.5	-	98-100
20	25-70	90-99
10	-	25-70
4	0-15	0-15
2	0-5	0-5
1	-	-

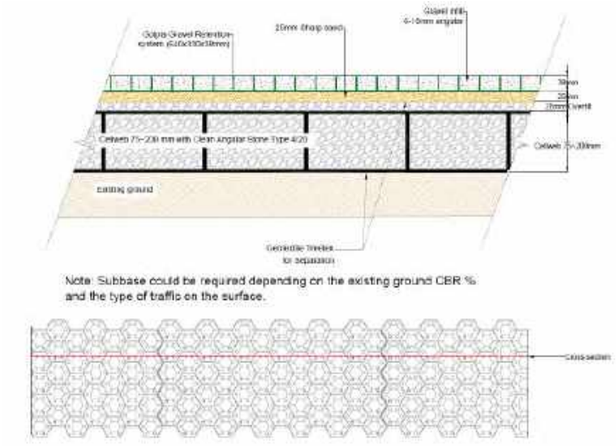
Ancillary Products - Fixing Pin

Fixing Pins	
Cellweb® Pins	
Geosynthetic Cellweb® pins are specifically manufactured to pin the Cellweb® system in place prior to fill. They are a 700mm long 12mm profiled bar with a 100mm return. Due to the heavy duty application they are the largest and strongest pins we manufacture.	
Cellweb® Stapler	
Cellweb® stapler rapid heavy duty 31 stapler.	
Cellweb® Staples	
Cellweb® staples 10mm staples 5000 per box.	



Surfacing Options

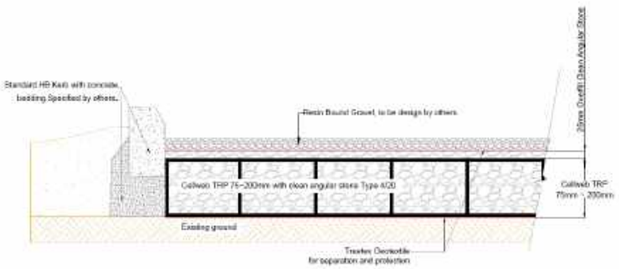
Golpla® Grass & Gravel Pavers





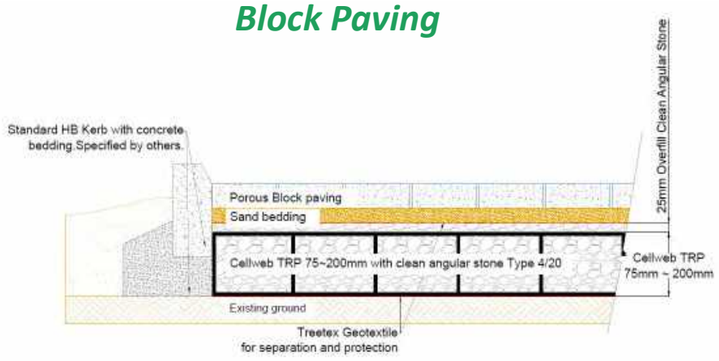


Resin Bound Gravel

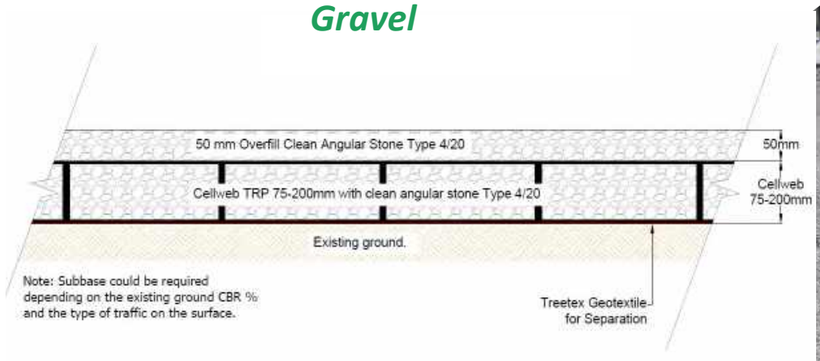




Block Paving

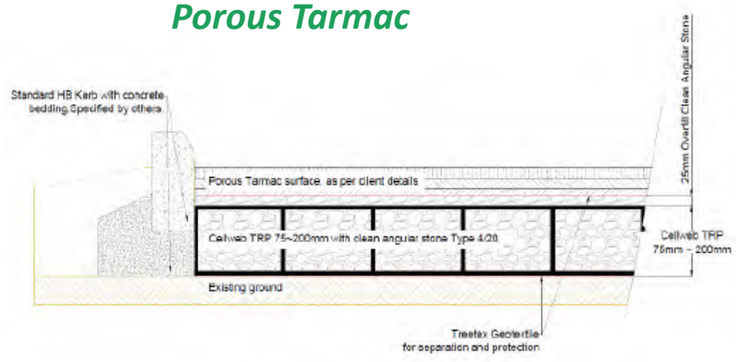


Gravel





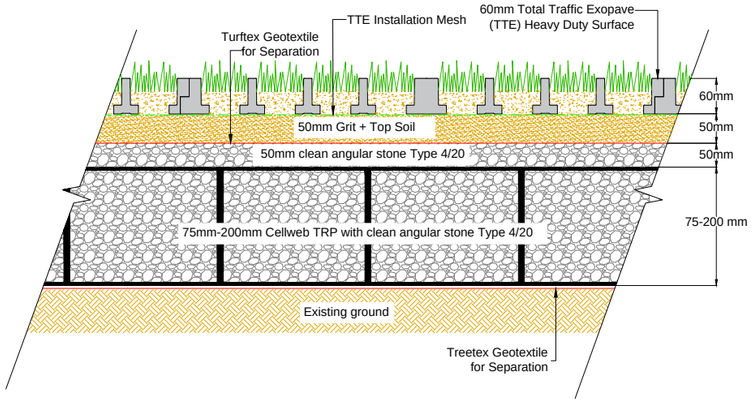
Porous Tarmac





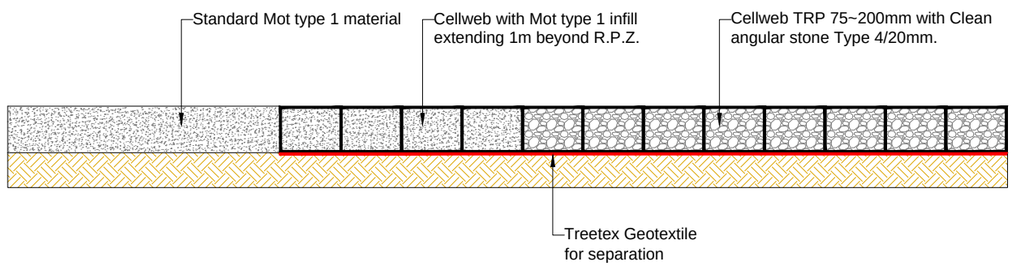


TTE® Heavy Duty Pavers

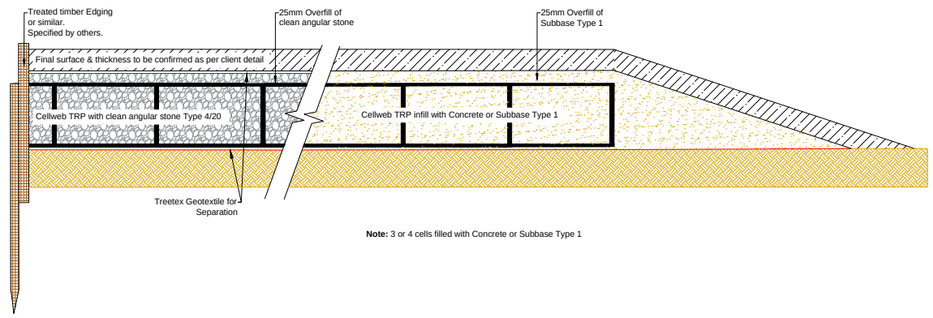


Edging and Transition Details

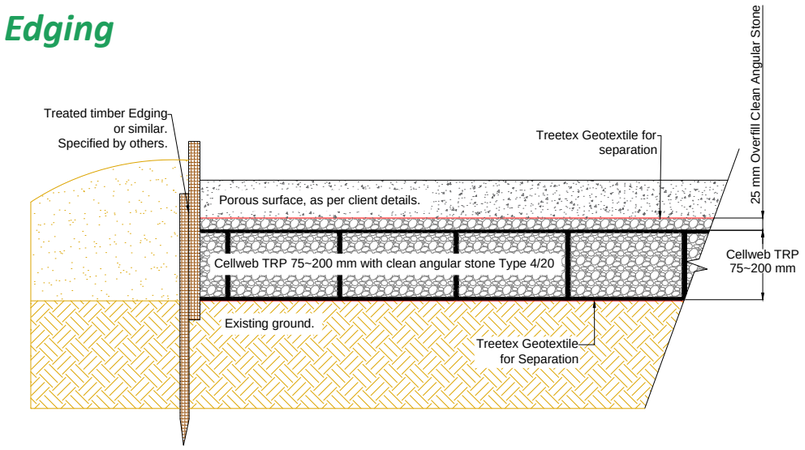
Transition Detail (Flat)



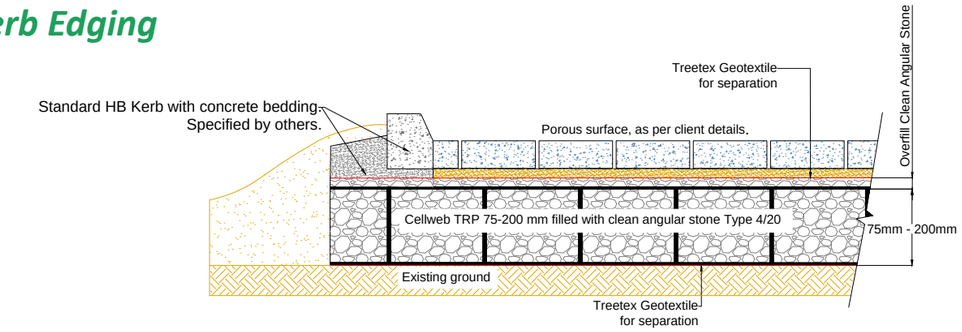
Transition Detail (Ramp)



Timber Edging



Kerb Edging



Adopted Roads and Footpaths



Cellweb® Tree Root protection is the UK's market leading tree root protection system and is widely specified for the construction of new hard surfaces within root protection areas in accordance with BS5837.

Difficulties when specifying the system often occur for the construction of public roads, footpaths and carparks where there is a requirement for the local authority to take responsibility for the maintenance of the new structure and formally adopt it.

The following page shows examples of where new hard surfaces constructed using the Cellweb® TRP system have been adopted by local authorities. This document is designed to provide examples to specifiers of the system and local authorities.

This document is designed to be used in conjunction with technical advice and site specific recommendations which are also available free of charge from Geosynthetics Limited.

Adopted Roads and Footpaths





Castle Gardens, Leicester

Location:	Castle Gardens Castle view Leicester
Project details:	This project was undertaken by Leicester City Council in 2015. The aim of the project was to create a new access and footpath from St Nicholas Circle in the centre of Leicester down into the Castle Gardens. This would create improved access to the Castle Gardens and enable the public to pass through the gardens to access other parts of the city. The project required thoughtful design to overcome significant changes in levels within the root protection areas of several mature trees and utilise Cellweb® TRP as a no dig solution. A full case study is available on this project.
Architect:	Levitate Architecture and Design Studio
Council:	Leicester City Council





Stoke Road, Norfolk

Location:	Stoke Road Poringland Norfolk NR14 7JL
Project details:	This no dig access road has be approved for formal adoption by Norfolk County Council. The road currently provides access to a newly constructed doctor's surgery, but will ultimately become the access to approximately 100 new homes to be built by developers David Wilson Homes. The road will be formally adopted on completion of the development.
Architect:	Plandescil Consulting Engineers
Council:	Norfolk County Council



Stanford in the Vale

Location:	Stanford in the Vale Faringdon Oxfordshire
Project details:	This footpath which runs adjacent to the railings was constructed on a David Wilson Homes development, to protect the roots and rooting environment of the Willow seen in the photograph. Both the Cellweb® TRP footpath and the road are surfaced with permeable blocks and has been adopted under a section 38 agreement by Oxfordshire County Council.
Architect:	Infrastruct CS Ltd
Council:	Oxfordshire County Council



Case Study

Cellweb®TRP

Helping to Protect Ancient Trees

Location:
Calke Abbey
Ticknall
Derby
Derbyshire
DE73 7LE

Project Description:
Provide a solution to prevent further die back of 'The Old Man of Calke' at Calke Abbey



Technical Requirements:

- Solution to alleviate existing soil compaction and encourage decomposers
- To minimise further soil compaction

Installer:
Geosynthetics Limited
National Trust

'The Old Man of Calke' is Calke Abbey's oldest tree and is thought to be up to 1200 years old. With the average age of large oak trees in Britain being 200 years it certainly is the 'Old Man' of oak trees. Put into context, this means that this tree would have been 200 years old when William the Conqueror arrived in Britain.

Many years of heavy footfall had caused a significant increase in soil compaction beneath one side of the tree. This had resulted in reduced water and oxygen availability to roots beneath this compacted ground. This was reflected in the crown, which was displaying accelerated and significant die back on the footpath side. A solution needed to be found to alleviate the existing soil compaction and minimize further future compaction, ultimately preventing further die back.

Geosynthetics' engineeering team and in house arboriculturalist worked with Brian Muelaner, the ancient tree advisor at the National Trust, to provide a solution to prevent the further decline of this ancient tree.

A 90mm layer of mulched wood chip was applied to the existing ground surface before the installation of the Cellweb®TRP system. This was used to encourage decomposers such as earth worms to help alleviate the ground compaction and aerate the soil.

A layer of Treetex geotextile was then laid on top, acting as a separation layer and pollution control measure. Panels of Cellweb®TRP were then laid on top of the Treetex and infilled with a clean angular stone. The Cellweb®TRP would minimise any further compaction within the rooting environment, while decomposers would naturally aerate the ground, reducing soil bulk density. The use of Cellweb®TRP infilled with clean angular stone would also allow the continued permeation of water and gas exchange between rooting environment and atmosphere.

This whole project was designed, supplied and installed courtesy of Geosynthetics. The Geosynthetics Tree Root Protection Team donated their time, knowledge and products to ensure that this tree will survive for generations to come.





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sales@geosyn.co.uk
www.geosyn.co.uk

"This is an exciting new development in how to reduce compaction damage from vehicles and footfall to an ancient tree's roots, made possible by the generous donation by Geosynthetics in time, expertise and materials."

Brian Muelaner - Ancient Tree Advisor - National Trust

Geosynthetics

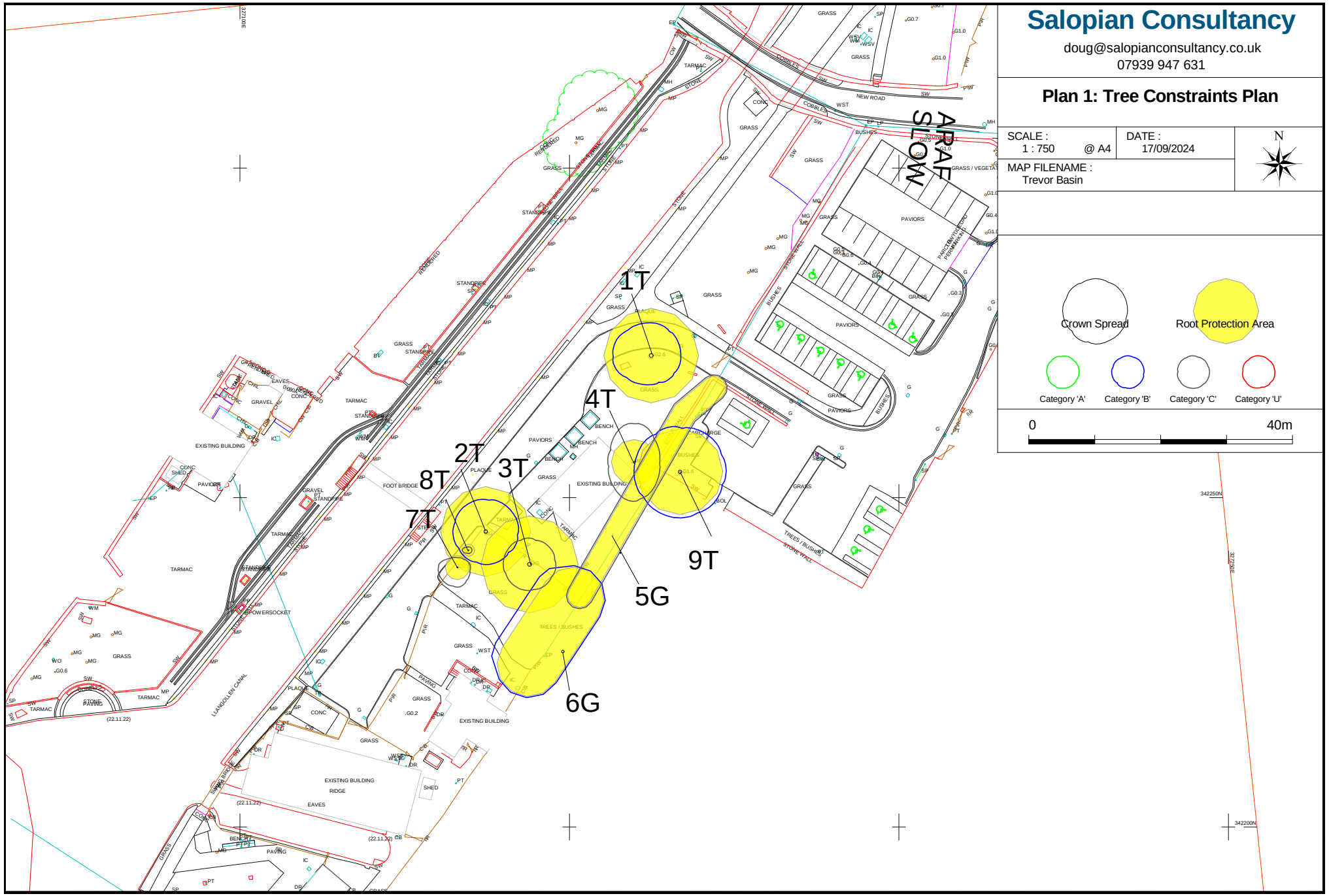
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INVESTORS IN PEOPLE | Bronze

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Salopian Consultancy

doug@salopianconsultancy.co.uk
07939 947 631

Plan 1: Tree Constraints Plan

SCALE :	DATE :
1 : 750 @ A4	17/09/2024

MAP FILENAME : Trevor Basin

N

Crown Spread

Root Protection Area

Category 'A' | Category 'B' | Category 'C' | Category 'U'

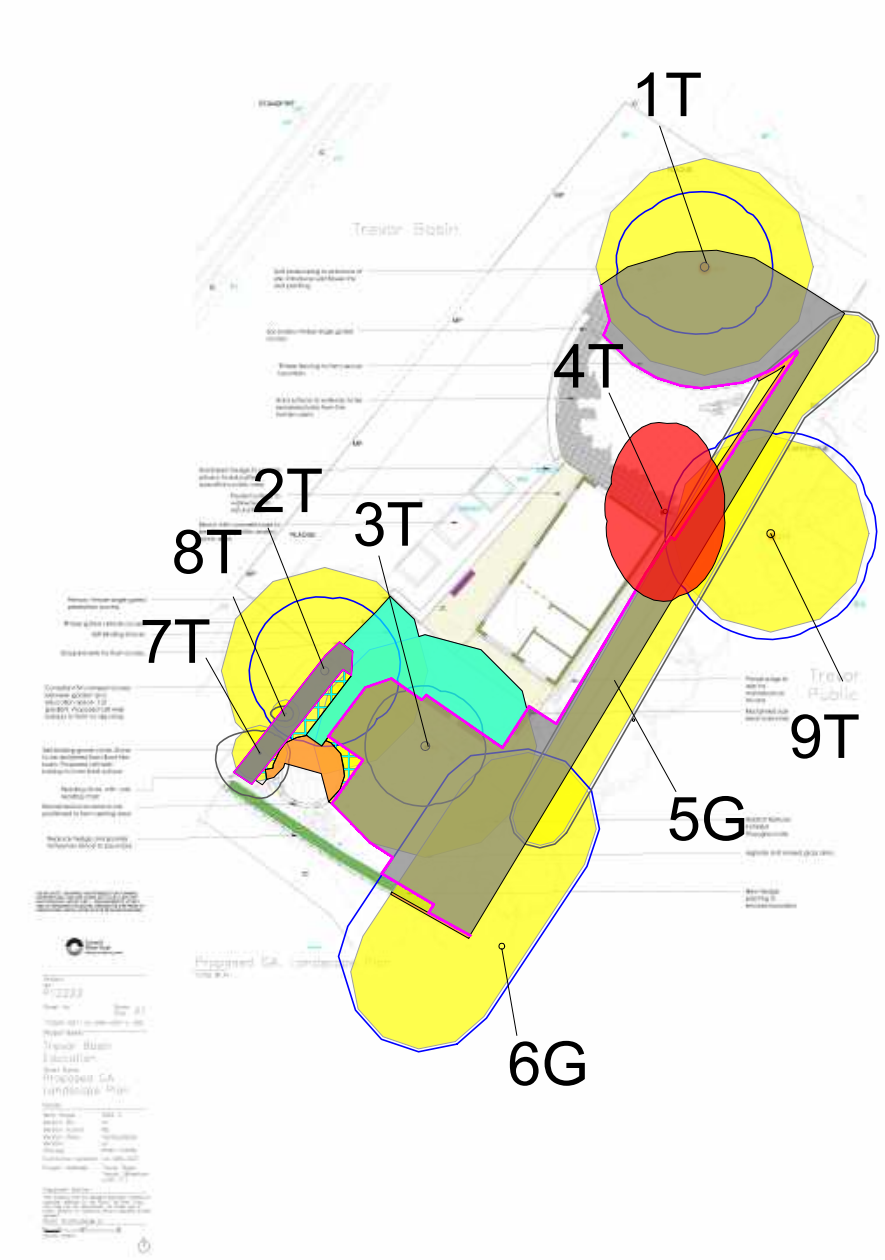
0 — 40m

Salopian Consultancy

doug@salopianconsultancy.co.uk
07939 947 631

Plan 1: Tree Constraints Plan

SCALE :	DATE :	N
1 : 500 @ A4	12/05/2025	
MAP FILENAME : Trevor Basin		



Crown Spread
Root Protection Area

Category 'A' Category 'B' Category 'C' Category 'U'

0 30m

Arboricultural Impacts/Tree Protection Measures

- No Dig Construction Methodology
- Hand Dig Construction Methodology
- Ground Protection
- Construction Exclusion Zone
- Tree Removal
- Protective Barrier Fencing