



Geosynthetics
Tree Vitality Observations
Cellweb®TRP
3rd Edition



Tree Vitality Assessment of historic Cellweb® TRP projects

Geosynthetics Cellweb® TRP is the UK's leading three-dimensional cellular confinement tree root protection system. Since 1998 it has been installed as a no-dig solution for the construction of new hard surfaces within root protection areas (RPAs). It remains the only tree root protection system to have undergone independent testing. The system is specifically designed to prevent root severance, minimise soil compaction and perform as a porous subbase. This enables continued root growth and exploration, water permeation and gas exchange between the rooting environment and the atmosphere. Ultimately ensuring the long-term health of the tree.

After many successful years of supplying the Cellweb® TRP system, in 2015 Geosynthetics Limited began a project to investigate the long-term effects of Cellweb® TRP on the vitality of trees, subject to historic installations. A number of different historic installations were revisited and vitality assessments were made in summer 2015. Photographs taken at the time of installation were used to give an indication of tree vitality and were compared with assessments made and photos taken in 2015. The aim of the project was to provide a body of observational data and photographic evidence, that Cellweb® TRP maintains the physiological and biological wellbeing of trees, subject to the construction of new hard surfaces within their RPAs.

The first edition of our tree vitality assessments was completed and made available in autumn 2015. This represented the beginning of an ongoing programme, whereby the trees featured in the first edition would be revisited and reassessed every two to three years. The second assessments were made in summer 2017. This edition details our assessments made in 2020 and provides photos, which are compared with those taken at the time of installation, in 2015 and in 2017.





Methodology

Tree vitality assessments were carried out by an external, independent arboricultural consultancy. When assessing tree vitality, Visual Tree Assessment (VTA) techniques were used to assess tree condition. Observations were recorded and photos were taken. The key indicators of tree condition observed are below. Changes in these key criteria can indicate that a tree is under stress conditions and is experiencing physiological changes.

Leaf / needle / bud coverage

A lower than normal leaf, needle or bud density for the species in question can indicate that the tree is under stress. This can occur in drought conditions caused by soil compaction or the introduction of new hard surfaces in the rooting area. Particular attention is paid to crown density above the Cellweb® installation and is compared with the remaining crown.

Leaf / needle size, shape and colour

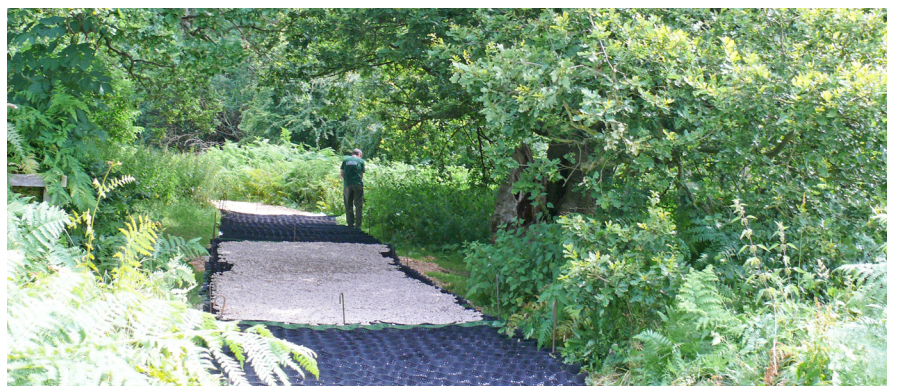
Smaller than normal leaves for the species can be caused by decreased cell expansion which is common under drought conditions. Discolouration and curling of leaves and needles may also indicate drought conditions or possible nutrient deficiencies. These can be caused by soil compaction and root death.

Presence of dead wood

The presence of a larger than normal quantity of dead wood in the crown would indicate die back. This is the trees natural response when it is unable to access the water and nutrients required to maintain its biological processes throughout the tree. Particular attention is paid to the presence of dead wood in the crown above the Cellweb® installation as this could indicate soil compaction or root death.

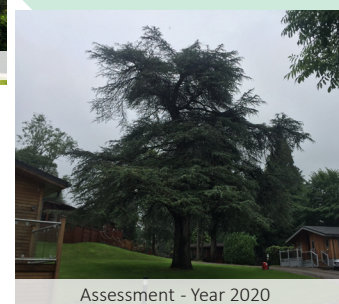
Evidence of bacterial or fungal colonisation

Trees which are stressed by drought conditions, nutrient deficiencies or physical damage, over time can become more prone to bacterial and fungal colonisation. Attention will be paid to the presence of both.



Lakeside Development

Tree species:	Atlas Cedar <i>Cedrus atlantica</i>
Project details:	This project involved the construction of a holiday park on the banks of lake Windemere. The site comprises numerous luxury chalets set amongst mature trees. Cellweb® TRP was used for the construction of the access roads around the new park and was surfaced with a permeable asphalt. The photos show the tree at the time of installation and at the time of the 2015, 2017 and 2020 inspections. A full case study is available for this project.
Installation date:	18 th March 2011
Assessment dates:	18th August 2015, 17th July 2017 and 27th July 2020
Leaf, needle and bud coverage:	Dense and even needle coverage was observed
Leaf and needle size shape and colour:	Needle shape and colour were normal for species.
Dead wood content:	Minor deadwood was observed in the inner crown. This can be considered normal for the species.
Bacterial or fungal colonisation:	No evidence of bacterial or fungal colonisation was observed.
Other observations and comments:	The tree exhibits historic storm damage, which could be expected in this exposed location on Lake Windermere. However, the tree shows no signs of ill health or reduced vitality.
Next assessment date:	Summer 2022



McDonalds, Cirencester

Tree species:	Common Lime <i>Tilia x europaea</i>
Project details:	In October 2016 McDonalds Cirencester embarked on a project to improve their parking facilities and drive through. This included the construction of a minimal dig Cellweb® footpath through the RPA's of two Lime trees. A full case study is available for this project.
Installation date:	October 2016
Assessment dates:	20th June 2017 and 22nd July 2020
Leaf, needle and bud coverage:	Leaf coverage is good and even across the crowns.
Leaf and needle size shape and colour:	Leaf size is normal for species and colour is good.
Dead wood content:	A small amount of minor deadwood was observed throughout the crown. This could be considered normal for this species in this stage of its life cycle.
Bacterial or fungal colonisation:	No evidence of bacterial or fungal colonisation was observed on inspection.
Other observations and comments:	Both trees have been subject to historic crown reduction. Some minor epicormic growth was observed on the main stems but this can be considered normal for species and appears to be managed annually.
Next assessment date:	Summer 2022

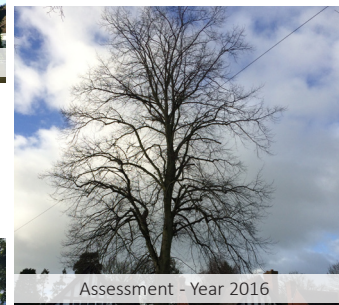


Shelton Road

Tree species:	Common Lime <i>Tilia x europaea</i>
Project details:	In order to construct a driveway and create a garage, the drive needed to pass through the RPA of a mature Lime. The photos above show the tree at the time of installation, in 2008 and during 2016, 2017 and 2020 assessments. This has enabled us to view the tree in winter and in leaf. A full case study is available for this project.
Installation date:	5th December 2008
Assessment date:	3rd February 2016, 5th July 2017 and 27th July 2020
Leaf, needle and bud coverage:	Dense and even leaf coverage was observed.
Leaf and needle size shape and colour:	The leaf size, shape and colour is normal for species.
Dead wood content:	Minor deadwood was observed throughout the crown which is common to the species at this stage in the life cycle.
Bacterial or fungal colonisation:	No fungal fruiting bodies or exudates were observed.
Other observations and comments:	No signs of reduced vitality were observed.
Next assessment date:	Summer 2022



Installation - Year 2008



Assessment - Year 2016



Assessment - Year 2017



Assessment - Year 2020

Parkside School

Tree species:	London Plane <i>Platanus x hispanica</i> and Mable <i>Acer pseudoplatanus</i>
Project details:	In December 2014 Parkside school embarked on the construction of a new carpark to increase capacity for staff and visitor parking. The 200mm Cellweb® was used to construct the minimal dig carpark and access road. The access road and carpark encroach significantly into the RPA's of one London plane and one Maple. A full case study is available for this project.
Installation date:	December 2014
Assessment date:	20th June 2017 and 22nd July 2020
Leaf, needle and bud coverage:	Leaf size and coverage was good on both trees.
Leaf and needle size shape and colour:	Leaf size, shape and colour is good.
Dead wood content:	A small quantity of deadwood was observed within the central canopy of the Maple. This can be considered normal.
Bacterial or fungal colonisation:	No evidence of fungal or bacterial colonisation was observed.
Other observations and comments:	The Maple exhibits a good crop of keys. Branch-tip extension of approximately 150mm was observed on the London plane. No signs of reduced vitality were observed.
Next assessment date:	Summer 2022



Installation - Year 2014



Assessment - Year 2017



Assessment - Year 2020

Calke Abbey

Tree species:

English Oak *Quercus robur*

Project details:

This 1200-year-old oak at the national trusts Calke Abbey had been retrenching on one side due to soil compaction caused by long term foot traffic on one side of the crown. A Cellweb® footpath was created to replace the existing footpath and a layer of mulch was placed below the Cellweb® system. This encourage the loosening and aeration of the compacted soil by decomposers and earth worms. The above pictures show the tree at the time of installation in 2014 and at the time of assessment in 2015, 2017 and 2020. A full case study is available for this project.

Installation date:

18th July 2014

Assessment date:

23rd August 2015, 5th July 2017 and 17th August 2020

Leaf, needle and bud coverage:

Leaf coverage and crown density continues to improve. This can be attributed to improved soil conditions but also the removal of several surrounding trees at the time of installation. The tree exhibits a good crop of acorns.

Leaf and needle size shape and colour:

Leaf size colour and shape was typical for species.

Dead wood content:

As could be expected of an ancient tree, there are significant quantities of dead wood, forming the typical Stag-headed characteristic. Deadwood content does not appear to have altered since the 2015 and 2017 assessments.

Bacterial or fungal colonisation:

The trees main stem and scaffold branches exhibit significant hollowing. This can be expected of a tree of this age.

Other observations and comments:

This tree continues to display an improvement in its vitality. This is likely to be a result of improved soil conditions, combined with reduced competition.

Next assessment date:

Summer 2022

Tree species:



Installation - Year 2014



Assessment - Year 2015



Assessment - Year 2017



Assessment - Year 2020



Installation - Year 2015



Assessment - Year 2017



Assessment - Year 2020

Castle Gardens

London Plane *Platanus x hispanica*

Project details:

In spring 2015 Leicester City Council constructed a new footpath linking St Nicholas Circle with the Castle Gardens. Due to natural changes in levels this required a multiple layer build up, utilising different depths of Cellweb®. The footpath passes through the RPAs of a number of trees, including the plane tree photographed. A full case study is available for this project.

Installation date:

April 2015

Assessment date:

13th June 2017 and 17th August 2020

Leaf, needle and bud coverage:

The crown is asymmetric, caused by a neighbouring tree to the north. Despite this, leaf coverage is good.

Leaf and needle size shape and colour:

Leaf size, shape and colour is normal for species

Dead wood content:

Minor deadwood was observed in the inner crown but this can be considered normal for the species.

Bacterial or fungal colonisation:

No bacterial cankers, exudates or fungal fruiting bodies were observed.

Other observations and comments:

No signs of reduced vitality were observed.

Next assessment date:

Summer 2022

Keats Way

Tree species:	Common Beech <i>Fagus sylvatica</i>
Project details:	<p>This project involved the construction of a new access road through the RPA of a Beech tree. The access road links an existing housing estate with a new development site in Rushden Northamptonshire. The project was unique at the time, in that it required the stacking of the Cellweb® system to overcome significant changes in levels within the RPA. In places the depth of Cellweb® exceeds 2m. The photos above show the tree at the time of installation in 2014 and at the time of the 2015, 2017 and 2020 inspections. A full case study is available for this project.</p>
Installation date:	26th June 2014
Assessment date:	14th August 2015, 13th June 2017 and 31st July 2020
Leaf, needle and bud coverage:	Leaf coverage was good and even throughout the crown.
Leaf and needle size shape and colour:	Leaf size, shape and colour was normal for species.
Dead wood content:	Minor deadwood was observed, evenly dispersed throughout the crown.
Bacterial or fungal colonisation:	No fruiting bodies or exudates were observed on inspection.
Other observations and comments:	The tree exhibits no signs of reduced vitality. It was observed that crown spread is greater than in the 2015 and 2017 assessments.
Next assessment date:	Summer 2022



69 Church Lane

Tree species:	English Yew <i>Taxus baccata</i>
Project details:	<p>In summer 2016 a new driveway was constructed within the RPA of a yew tree. Much of the RPA was located in a natural depression, which was in excess of 1m below the road level and the proposed drive beyond. The construction required a build-up of five layers of Cellweb 200mm to infill the depression and meet the existing road level. A full Case study is available for this project.</p>
Installation date:	June 2016
Assessment date:	6th July 2017 and 1st August 2020
Leaf, needle and bud coverage:	This tree has good needle coverage. As would be expected needle coverage is more sparse on the trees shade side.
Leaf and needle size shape and colour:	Needle size and colour is normal for the species.
Dead wood content:	No significant deadwood has formed since the 2017 inspection.
Bacterial or fungal colonisation:	No exudates or fruiting bodies were observed.
Other observations and comments:	The tree has been crown raised during the construction of the visual splays onto Church Lane. Crown spread is greater than that observed in 2016 and 2017.
Next assessment date:	Summer 2022



Weybridge Cricket Club

Tree species:	English Oak <i>Quercus robur</i>
Project details:	In March 2015 Elmbridge Borough Council began construction of a new car park at Weybridge cricket club. The carpark was constructed using a Cellweb no-dig subbase and was surfaced using the Geosynthetics Golpla gravel retention system. The new carpark was constructed over a large proportion of the RPA's of the two oaks photographed.
Installation date:	March 2015
Assessment date:	20th June 2017 and 22nd July 2020
Leaf, needle and bud coverage:	The combined crowns have good even leaf coverage.
Leaf and needle size shape and colour:	The leaf size and shape and colour is good.
Dead wood content:	Minor deadwood was observed throughout the crowns of both trees. This can be considered normal. The most northerly tree has a more substantial piece of deadwood in the inner crown (approximately 75mm diameter). This is likely to have formed due to shading within the inner canopy.
Bacterial or fungal colonisation:	No evidence of bacterial or fungal colonisation was observed.
Other observations and comments:	No signs of reduced vitality were observed and both trees exhibit a good crop of acorns.
Next assessment date:	Summer 2022



Installation - Year 2015



Assessment - Year 2017



Assessment - Year 2020

Montacute School

Tree species:	Scots Pine <i>Pinus sylvestris</i>
Project details:	As part of an overall redevelopment, Montacute school constructed additional parking for visitors and staff. The carpark is constructed using Cellweb® in order to protect the RPA's of trees which were retained around the peripheries of the carpark. The above Scots pine is one of those trees with its RPA partially covered by the new carpark.
Installation date:	August 2015
Assessment date:	5th July 2017 and 18th September 2020
Leaf, needle and bud coverage:	The tree has good even needle coverage in the upper canopy. Needle coverage is more sparse in the lower canopy which is like to be caused by shading and some minor storm damage at 7m south west.
Leaf and needle size shape and colour:	The needle size shape and colour is normal for the species.
Dead wood content:	Minor deadwood was observed in the central canopy, which can be considered normal.
Bacterial or fungal colonisation:	No evidence of bacterial or fungal colonisation was observed, although dense bramble prevented thorough basal inspection.
Other observations and comments:	This tree continues to exhibit good vitality.
Next assessment date	Summer 2020



Installation - Year 2015



Assessment - Year 2017



Assessment - Year 2020



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