



Geosynthetics
Tree Vitality Observations
Cellweb[®]TRP



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 (RPA's) and remains the only tree root protection system to have undergone independent testing. The system is specifically designed to prevent soil compaction within RPA's and is completely permeable. This enables continued water permeation and gaseous 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. The aim of the project in the long term is to run a programme of tree vitality assessments, pre installation with ongoing annual assessments thereafter. In the future this will provide a body of observational data and photographic evidence, that Cellweb®TRP maintains the physiological and biological wellbeing of the trees subject to the construction of new hard surfaces within their RPA's.

Photographs were taken at the time of installation which are used to give an indication of tree vitality and can be compared with our most recent assessments. These historic installations will be revisited, assessed and photographed annually. Various different historic installations were identified and revisited.



Methodology

Tree vitality assessments were carried out by Geosynthetics Limited's in-house LANTRA qualified tree inspectors. When assessing tree vitality, Visual Tree Assessment (VTA) techniques were used to assess crown condition. Observations were recorded and photos were taken. The key indicators of crown condition observed are below, changes in these key indicators can indicate that the tree is under stress 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 possibly from drought conditions caused by soil compaction or the introduction of new hard surfaces in the rooting area. Particular attention will be paid to coverage in the crown above the Cellweb®TRP installation and 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 deficiency. These can be caused by soil compaction and root death.

Presence of dead wood

The presence of a larger than normal quantity of deadwood in the crown would indicate die back. This is a trees natural response when it is unable to access the water and nutrients required to maintain its biological processes throughout the tree. Particular attention will be paid to the presence of die back in the crown above the Cellweb®TRP 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 become more prone to bacterial and fungal colonisation. Attention will be paid to the presence of both.



Lakeside Development

Tree species: Atlas Cedar *Cedrus atlantica*

Project details: This project involved the construction of a holiday park on the banks of Lake Windermere. 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 wearing course. The upper photo to the right is of a mature Atlas Cedar shortly after installation in 2011 while the photo below shows the same tree at the time of inspection.

Installation date: 18th March 2011

Assessment date: 18th August 2015

Leaf, needle and bud coverage: Needle cover is good and uniform throughout the crown.

Leaf and needle size shape and colour: Needle size and shape is normal for the species with good colour and no signs of curling or chlorosis.

Dead wood content: Minor deadwood was present throughout the crown which is typical for the species.

Bacterial or fungal colonisation: No evidence of bacterial or fungal colonisation was observed.

Other observations and comments: This tree is showing no ill effects from the installation of the Cellweb®TRP road through its RPA. A case study is available for this project.

Next assessment date: August 2017



Keats Way

Tree species: Common Beech *Fagus sylvatica*

Project details: This project involved the construction of a new access road through the RPA of a Beech tree to access a new development site in Rushden, Northamptonshire. The project was unique at the time, in that it required the stacking of the Cellweb®TRP system, to overcome changes in levels within the RPA in excess of 2M. The upper photo to the left is of the tree on the date of installation while the lower photo is of the tree over one year on.

Installation date: 26th June 2014

Assessment date: 14th August 2015

Leaf, needle and bud coverage: Leaf coverage was good and even throughout the crown and large quantities of Beech nuts were observed.

Leaf and needle size shape and colour: Leaf size, shape and colour was normal for species.

Dead wood content: No major dead wood was observed however low levels of minor deadwood were observed throughout the crown.

Bacterial or fungal colonisation: No fruiting bodies or exudates were observed on inspection.

Other observations and comments: In the top photo it can be seen that there is a recent pruning wound, where the tree was crown raised before the installation. On return it was observed that this wound is occluding well. Currently the tree exhibits no signs of reduced vitality or ill health caused by this system, which you may not expect from a species as sensitive to environmental or physiological change as Beech. A case study is available for this project.

Next assessment date: August 2017

Calke Abbey

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| Tree species: | English Oak <i>Quercus robur</i> |
| 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®TRP footpath was created to replace the existing footpath and a layer of mulch was placed below the Cellweb®TRP system, to encourage the loosening and aeration of the compacted soil by decomposers and earth worms. The top picture to the right is the Oak on the day of installation while the bottom picture shows the Oak just over one year on. |
| Installation date: | 18 th July 2014 |
| Assessment date: | 23 rd August 2015 |
| Leaf, needle and bud coverage: | Leaf coverage has improved when compared to the previous growing season and was as even as you would expect throughout the crown. A large number of acorns were observed and were evenly distributed throughout the crown. |
| Leaf and needle size shape and colour: | Leaf size colour and shape was typical for species. |
| Dead wood content: | As would be expected of a tree of this age and species there were significant quantities of major dead wood, most of which can be found on the footpath side of the crown. Although the tree is retaining its dead wood well, no additional deadwood was found suggesting a possible slowing in the trees retrenchment through an improvement in soil conditions. |
| Bacterial or fungal colonisation: | No fruiting bodies or exudates were observed. |
| Other observations and comments: | Large quantities of epicormic growth could be seen over most of the scaffold branches, possibly in response to increased light levels caused by the die back at the extremities of the canopy. A case study is available for this project. |
| Next assessment date: | August 2017 |



Harcourt Aboretum

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| Tree species: | Walnut <i>Juglans regia</i> |
| Project details: | Due to increased visitor numbers to the arboretum, there was a requirement for additional parking and vehicular access roads amongst the valuable trees to the north of the arboretum. In the top photo to the left a young Walnut can be seen at the time of installation and two years after installation in the bottom photo. |
| Installation date: | 13 th September 2013 |
| Assessment date: | 18 th August 2015 |
| Leaf, needle and bud coverage: | Leaf coverage is good and even throughout the crown. |
| Leaf and needle size shape and colour: | Leaf size shape and colour is normal for the species. |
| Dead wood content: | No deadwood was present which could be expected of the species at this early life stage. |
| Bacterial or fungal colonisation: | No evidence of bacterial or fungal colonisation was observed. |
| Other observations and comments: | To date the tree is exhibiting no signs of reduced vitality or ill health. |
| Next assessment date: | August 2017 |



Shelton Road Shrewsbury

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| 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 top photo is of the tree at the time of installation in 2008 while the lower photo was taken at the time of inspection. |
| Installation date: | 5 th December 2008 |
| Assessment date: | 3 rd February 2016 |
| Leaf, needle and bud coverage: | The tree has very good bud coverage which is even throughout the crown. |
| Leaf and needle size shape and colour: | Due to the inspection date the tree was not in leaf, however the extent of the bud coverage would suggest that this is a tree with good vitality. |
| 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: | Eight years on from the time of installation this appears to be a healthy tree with good vitality. |
| Next assessment date | February 2018 |





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