

## Tree Root Control Barriers

### The Problem

Tree roots growing underneath lawns, paths, drives, patios and roads can be a nuisance. Frequently they lift or crack the surface resulting in the need for expensive repairs. Boundary walls with shallow foundations can also be cracked if large roots grow under them.

Damaged underground pipes, or pipes with faulty joints, can become blocked if roots enter them and proliferate. Even after repairs damage may recur unless roots are prevented from growing back into the vulnerable area.

Tree roots can also contribute to building damage by undermining foundations and is related to the influence of roots on the soil. Damage of this sort only occurs on clay soils (so houses on non-clayey soils should be completely safe unless a tree is very close, i.e. within about 1-2 metres) and is usually confined to older buildings on shallow foundations. The problem is that clay's shrink and dry out.

Tree roots may dry soils beneath foundations to such a degree that the consequent soil shrinkage results in parts of the foundation no longer being supported. When this occurs the building may subside and crack and in these circumstances expensive underpinning may be needed. Where damage is caused the most obvious remedy is to remove the offending tree. However, this is not always a practical or desirable solution. A more environmentally responsible alternative may be to place a tree root control barrier in the soil between the tree and the structure at risk. However, creating an effective root barrier is not as simple as it appears since roots may be able to grow over, under, around or through it. Nevertheless, if a barrier is properly designed and installed and uses the right materials it can be a useful tool in controlling nuisance roots.

The first step to designing an effective barrier is to have a basic understanding of how tree roots grow.

### So, How Do Tree Roots Grow?

People often wrongly assume that tree roots are thick and grow down into the soil for many metres. In reality tree roots:

- Are usually only large near to the trunk and get thinner the deeper and further from the tree they go. At a distance of just 3-4 metres from the trunk most roots are no bigger than a few centimetres in diameter.
- Spread outwards from the trunk, more or less parallel with the soil surface, rather than growing downwards.
- Can spread horizontally in any direction for a distance equivalent to at least the tree's height.
- Are usually relatively shallow; 80-90% of a tree's roots are in the upper metre of soil. Few roots reach depths of more than about 2-3 metres and at this depth they are only a few millimetres in diameter.

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### A Solution

#### *Use the right materials*

Materials to be used as root control barriers should have the following qualities:

- Resistant to root penetration
- Resistant to puncturing
- Biologically inert
- Resistant to biodegradation
- Easily installed
- UV resistant

#### *Impermeable barriers*

The choice of materials for a root control barrier will depend upon the specific application. Experiments with high-density polyethylene have demonstrated that this material can withstand penetration by even the most vigorous of tree roots. Therefore in applications that do not need a permeable barrier use Terram Root-Guard Plus. This is a composite of Terram non-woven geotextile and HDPE and will give the greatest degree of protection afforded by a flexible barrier material.

#### *Permeable barriers*

In some instances it may be necessary to have a water permeable barrier, e.g. surrounding land drains (Figure 3). Although some permeable barriers may not provide the high degree of protection as HDPE, they still provide excellent resistance. In this case Terram Non-Wovens, made of bonded Polypropylene and Polyethylene, will provide excellent resistance to tree roots. Terram Root-Guard has been shown to be effective in resisting root growth in all experiments using this material. Terram Root-Guard has a high tensile strength, is resistant to puncturing and is capable of withstanding the differential forces that can develop in drying clay soils. Therefore where resistance to root penetration and permeability are required use Terram Root-Guard.

### Designing a Root Control Barrier

Whilst the material used for a barrier may resist root penetration, the barrier will only be effective if it is designed and installed properly. So make sure that it:

- **Extends below the likely depth to which roots will grow.** If a barrier is too shallow roots may grow under it and up towards the surface again.
- **Protrudes above ground level.** If the top is buried, roots may grow over it. It may be necessary to embed the above ground part in a durable material (e.g. concrete) to avoid it being damaged.
- **Is situated between the structure at risk and the tree.**
- **Is long enough so that roots don't grow round it.** It may be necessary for the barrier to extend either side of the tree a distance equivalent to its anticipated mature height. Building a barrier in an arc around a tree may be a possible solution.



- **Is free of any openings or joints through which roots might grow.** The barrier should, therefore, be sealed around every service or structure that crosses it. Or if a barrier is used to surround something (e.g. perforated drainage pipes) the barrier material should be overlapped and joined. Please refer to Terram for more information.

- **Is not torn or split during installation.**

### **What About the Tree?**

Digging trenches near to trees to install a barrier is likely to result in significant root severance – the closer to the tree, the worse the damage.

Generally, leave a distance of at least 3 metres between the tree and the trench, and a greater distance if the tree appears to be in poor health.

General advice is contained in BS5837 Trees in Relation to Construction and specialist advice may be obtained from an arboriculturist (a list of consultants is provided by the Arboricultural Association).

Also, if the tree has statutory protection, because it stands in a Conservation Area or is covered by a Tree Preservation Order (TPO), consult the council before carrying out the work. Failure to do so may result in a hefty fine.

### **Examples of Applications**

#### *Protection of surfaces*

Most damage to paved or tarmacked surfaces occurs within only a few metres of a tree and is caused by roots less than half a metre deep. Such surfaces may therefore be protected by relatively shallow barriers (approximately 1 metre deep). This will serve to prevent roots growing directly under the surface and will deflect roots to deeper soil levels where they will remain small and will therefore be less likely to cause damage. Even if roots grow under the barrier and towards the surface again they should have tapered sufficiently so that they no longer cause damage. In this case use Terram Root-Guard, where permeability is vital (perhaps if there are underground springs) or Terram Root-Guard Plus where permeability is not an issue.

#### *Protection of walls*

Where walls show early signs of cracking due to the influence of roots, severance of the offending roots and the installation of a root barrier to a depth of about half a metre between the tree and the wall should arrest the damage. Install the barrier immediately adjacent to the wall, inserting a layer of compressible material (such as polystyrene or clayboard) between the barrier and the foundation (in order to ensure that roots growing up to the barrier do not cause excessive referred pressure against the wall).

#### *Disclaimer*

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