

Arboricultural method statement to install a root barrier

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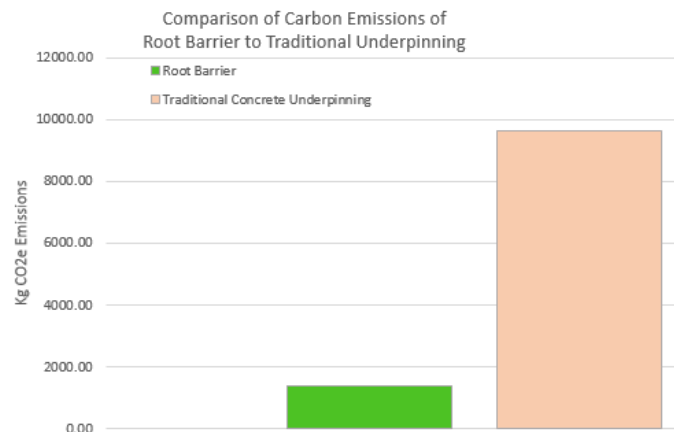
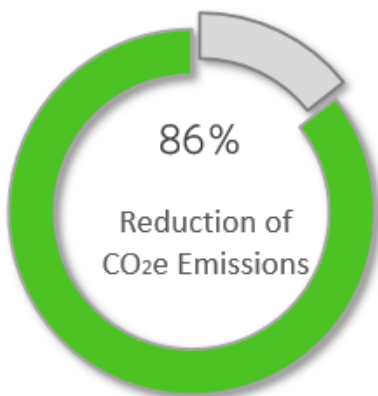
December 18, 2023

Services Performed For:

Questgates Ltd (Surveying Services)
Benchmark House, Folds Point, Bolton. BL1 2RZ
Tel: 01204 869 806

POLICY HOLDER ADDRESS: 31 Copse Wood Way, Northwood, Harrow. HA6 2TZ
CLIENT REFERENCE: QG1S1210326
OUR REFERENCE: 7962
PROJECT MANAGER: Paul Milliam

Specifications of Barrier					
Barrier Type	Length	Max Root Depth	Minimum depth to be achieved. with barrier	Distance between tree / Vegetation and barrier	Shortest distance between barrier and foundation
Copper	15m	1.3m	3m	5m+	1m+





Aerial plan indicating proposed 14m length and alignment of barrier.

This method statement provides details of methods to be used to install a root barrier between a protected tree at the front and the property.

Report

The cause of damage has been attributed to root nuisance from the oak tree to the front left corner.

Property Details

The property is a large two storey plus attic conversion, 5 bedroom detached property, with cavity brick external walls under a pitched tiled roof. The property has been extended to the rear. The house sits within a residential streets slightly elevated from the road.



Road side view of the property, note Oak tree to front left.

Site Investigation Results

Site investigations in February 2023 used one trial pit/borehole near to the front left corner on the front elevation. The main house has a concrete strip foundation extending 1300mm below ground level. The foundation to the property rests upon a very stiff gravelly clay proved to 3.3m depth. Roots were found under the main house to a depth of 1.3m.

Crack monitoring

Level monitoring of the property has shown most noticeable movement to the front left corner pt 4 with lesser movement recorded across the front. Monitoring demonstrates a downward movement over the summer months consistent with clay shrinkage. On-going monitoring is likely to show a cyclical pattern of movement further confirming root induced clay shrinkage to be the cause. It will also show the efficacy of the root barrier installed and confirm when stability has been regained.

Table 1 **Current Claim - Tree Details & Recommendations**

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T1	Oak	19.9	675 *	20.2	9.4	Older than Property	Policy Holder
Management history		No significant recent management noted.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					

Ms: multi-stemmed * Estimated value

Statutory Controls		Mitigation (Current claim tree works)	
TPO current claim	Yes – T1	Policy Holder	Yes
TPO future risk	No	Domestic 3 rd Party	No
Cons. Area	No	Local Authority	No
Trusts schemes	No	Other	No
Local Authority: -	London Borough of Hillingdon		

Tree Root barriers Explained in Brief

The location of the barrier is targeted at the roots between the implicated tree T1 and the foundations, and the act of excavation will sever them.

The barrier will need to be a hybrid scheme utilising a traditional barrier across the front and part compact barrier down the side. The traditional barrier is installed using a 5t excavator forming a 300mm wide trench that is lined with the barrier and then backfilled with 20mm stone well compacted with the barrier folded back over the trench and then covered with MOT type 1 and paved over.

Where the barrier extends down the side, restricted access promotes the use of a compact barrier. Optera developed the compact barrier that uses a modified mini piling rig that will fit through a standard gate.

The compact root barrier is installed with a tracked rig that is only 800mm in width and can be run along track boards reducing the impact on any landscape. The amount of excavated spoil is significantly reduced, allowing wheel barrows to be used for the removal of spoil and loaded directly into a skip positioned to the front of the property on the highway. However the haul route in this instances is extended due to the elevated position and need to track to the end of the pathway and back the skip. The working area is also reduced allowing the ground to be protected with boards, reducing the reinstatement cost.

The barrier is marked out along the proposed route, and CAT scanned for services. The top metre of soil is excavated under supervision to expose identified services and to any significant roots (with diameter > 25mm), prior to excavation of the barrier trench line. Roots are cut with a clean sharp saw on the side of the trench closest to the tree. The compact root barrier is then installed by drilling a secant trench that allows 600mm copper impregnated woven fabric sheets to be driven to the base of the trench. Each barrier sheet is lapped 100mm with the previous to provide a continuous barrier defence. The open void is then filled with pea gravel, compacted, with the barrier folded back across the trench. Topsoil is then laid over and the affected grass seeded or turfed, or where placed under hard landscaping the barrier will be topped out with MOT type 1 before paving is re-laid.

Barrier Design

The barrier will be 15m long and 3.7m deep running across the front and down the side of the property as shown in the plan above. Whilst roots were only found to 1.3m oak tree roots can extend to a significant depth and therefore the barrier design takes this into consideration.

To facilitate the barrier installation a section of the block paved driveway will need to be lifted and the blocks set aside. Down the left side passage the white porcelain tiles will need to be lifted and replaced.

Works in Brief

1 - Pre-Start:

- Undertake services search (Optera)

2 – Barrier Installation:

- Set up site, including compound area agreed with the customer. This area will be boarded, protected and secured with site fencing.
- The barrier will be marked out on the ground and the area CAT scanned prior to mechanical excavation.
- Any detected services within 1.0m are to be hand excavated and exposed prior to machine excavation.
- The top metre of soil across the front of the property will be excavated under supervision to identify significant roots with diameter greater than 25mm. Such roots found will be cut with a clean sharp saw on the side of the trench closest to the tree.
- Take down gate and section of fence to allow barrier installation.
- Carefully remove lift and set aside block paviors.
- Form a trench 300mm wide to the target depth of 3.7m across the front of the property as shown on the plan and remove arisings to compound area on driveway.
- Where drainage intersects the barrier at the front these will be cut and the barrier installed before being reconnected using rubber collars and surrounded in pea shingle.
- Once the first section has been dug and formed, line the trench with the copper impregnated bio barrier and backfill with 20mm angular stone to within 200mm of the surface.
- As the remaining section of barrier is to go down the side passage way that is narrow and restricted, we will revert to a compact barrier at this point. Mobilise auger rig and set up.
- Form barrier using a series of augered boreholes with a specialist auger rig to make a secant trench to target depth of 3.7m. Excavated material to be tracked barrowed to compound area.
- Insert copper cored geotextile backed fabric panels using tracked drop hammer rig. Fabric barrier panels to overlap 100mm to form continuous barrier defence.
- Backfill with pea shingle, well compacted and fold over barrier across trench.
- Backfill remaining 200mm with MOT type 1 where barrier runs below hard landscaping.
- Reinstall block paviors. Leave side passage to re-tiled by others.
- Reinstall fences, gates, etc. as specified and clean down the site.
- Once the barrier has been fully installed protective fencing, welfare and plant will be off hired and cleared from site and the area left tidy on completion.

Proposed Plan of Works for 7962

START DATE: Within 4 weeks of approval.

COMPLETION DATE: Within 2-3 weeks of starting the works.

Completion Criteria

Contractor shall have fulfilled its obligations when:

- Contractor accomplishes the Contractor activities described within this method statement
- The Policy Holder agrees that works have been conducted as per the agreed specification to an acceptable standard.
- Agreement that works have been carried out as per the agreed specification to an acceptable standard by the appropriate Engineer.
- Site has been vacated and all plant and materials removed.

Project Variation Procedure

The following process will be followed if a change to this method statement is required:

- A project variation request will be submitted to the handling adjustor. The variation must describe the change, the rationale for the change, and the effect the change will have on the project.
- The designated Technical Manager for OPTERA will review the proposed change and determine whether to submit the project arboriculturists.
- If variation works are agreed, works will be booked in at the request of the handling Adjustor/Engineer and OPTERA will seek formal approval via the adjusting company.

Intervention Explained

How do Copper Root Barriers work?

In the UK, the shrinkage and swelling of clay soils, particularly when influenced by trees, is the single most common cause of foundation movement that damages domestic buildings.

Trees are known to cause clay soils to shrink by drawing water through their roots, predominantly during spring and summer. This shrinkage results in both vertical and horizontal ground movements that, when transmitted to a building's foundations, cause damage to the building structure. The amount of shrinkage depends on the type of clay soil, the type and size of vegetation, and on climate. Trees growing under grass cover are forced to compete for their water and to extract water from greater depths than they might otherwise do, as is the case in this instance.

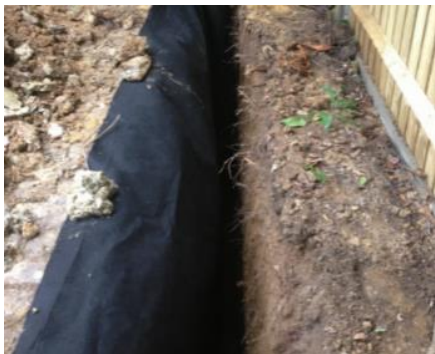
The water content of a shrinkable clay soil will vary with depth, remote from and near to a large tree. Near the ground surface there can be relatively large changes in soil water content between summer and winter as a result of evaporation from the ground surface and transpiration by the grass. Such variations are normally confined to the top 1-1.5m of the ground, possibly less adjacent to buildings. Where mature trees grow at the same location, then the water-content profiles will vary and the seasonal fluctuations in soil water content are both larger and extend to a greater depth. Soil volume changes and hence ground movements will be greater.

A crack due to differential foundation movement occurring after a tree has reached maturity, there being no cracks up to that time, means it is probable that an exceptionally long dry spell has also had an influence. But cracks will recover when ground moisture contents recover and will not recur to any greater width in future. BRE Cracking in Buildings. The intention of the Bio-root shield is to mitigate against this periodically damaging effect. The solution adopted in this case seeks to decrease water uptake by the trees thereby lessening subsidence risk by conserving soil moisture and reducing clay subsoil shrinkage. This aim is to achieve an impairment to root growth by the focused introduction of a proprietary Bio-root-shield that offers all the benefits of being both flexible and permeable. In addition, it works as a biological repellent.

The Copper signal barrier details a copper foil securely bonded between porous geotextile, releasing copper ions and forming copper carbonate (verdigris) that signals an adverse reaction to roots deflecting them away from the barrier. The presence of copper does not constitute an eco-system burden or impact on groundwater.



This solution is multipurpose and ideally suited to the current application. Traditional impervious barriers divert rather than stop roots and may block moisture movement. Also, roots getting under such barriers can grow back to the surface. Therefore, the use of this permeable barrier stops roots either by engaging and constricting them or by chemically inhibiting them.



The benefits of such a shield are its dual protection both physical and biological. The multi layered sheets can be welded together whilst retaining its flexible qualities, i.e. can be cut and effectively resealed to fit round services and foundations, inert with a 60 year service life expectancy. Equally the solution inhibits root growth on the barrier face which is often problematic with conventional barriers where increased moisture levels can cause root growth to become more prolific on the face of a traditional barrier. Research has shown that the use of the recommended style of copper based screening has greatly reduced the effects of root growth when compared to other traditional physical barrier installations



Following the installation of the shield the trench will be backfilled and compacted mechanically with 20mm single sized stone. Alternatively, dependent upon site conditions backfill using lean mix concrete will be utilised on the structure side of the shield. On occasions some natural settlement is anticipated following completion. In all instances the project envisages a return visit to the property to affect any required maintenance of the surface of the reinstatement routinely programmed within 6 months following completion of the installation.