

ENGINEERS REPORT – UPDATE

INTRODUCTION

This is an Engineers Report compiled by Malcolm Baldwyn based on the Video Survey conducted by MyHomeNeeds on 14th December 2022 as well as subsequent Site Investigations by Auger on 13th June 2023 and the SI Conclusion report by engineer Mark Lightbody.

DESCRIPTION OF RISK AND SITE

The property is a Victorian 3 storey house which has been separated into apartments approx. 4 years ago. It is of brick construction, with a pitched tiled roof with dormer windows. There is an extension to the rear.

There is a 15m high Monkey Puzzle tree approx. 2.4m from the front bay window.

The British Geological Map Survey indicates this area is made up of claygate member which is clay, silt and sand.

DAMAGE

At the time of our initial inspection our surveyor had access to the 1st Floor apartment, but the Ground Floor occupant was not home, we would expect there to be internal bay cracking like the 1st floor above. He could also not view the rear external as this was accessed through the GF property. Damage was recorded as follows:

Internal 1st Floor Apartment

Hairline crack to the LHS of the internal bay window (viewed as looking out the window) from the floor upto the ceiling.

No other internal cracking noted.

External

Bay Window

Stepped cracking to brickwork between GF and 1st floor, on RHS of bay (mirrored internally)

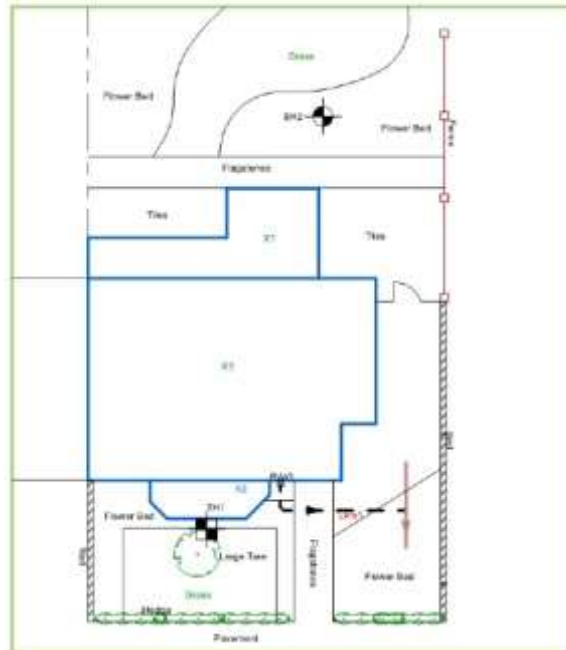
Cracking to rendered stone window surround where it joins the brickwork (LHS and RHS)

1.5mm Diagonal cracking to stone frame of window on LHS of bay.

Crack through rendered lower brickwork on LHS

The footpath paving slabs are very uneven and when lifted there is large roots below, showing the tree roots are causing the slabs to move.

We can confirm that site investigation work around the damaged property has been completed. The site plan, results and conclusions are presented below:



The trial hole was excavated to the front of the building. This revealed the structure is founded on a brick corbel supported by 200mm thick concrete 0.8m below ground level. The trial pit was then extended by a hand augered borehole.

Roots were found immediately to the underside of the footing and down as far as 2.8m depth. The same subsoil continued to the base of the borehole at 3m.

The hole was excavated to the rear of the building and revealed topsoil (bedding) while the underlying subsoil was a moist stiff brown, fine to medium gravelly, silty CLAY, becoming wet at a depth of 2.0. The borehole was then extended by hand auger to a depth of 3.3m.

2

Drainage

Drainage was not tested.

Laboratory Analysis

Table of results

	Foundation	Material	NHBC Class	Roots?	Heave	Comment
TP/BH01 Front	600mm below EGL	Silty Gravelly clay	HVCP	All depths, Spruce	High potential	Desiccated to 1.3m depth
BH02 Rear	NA	Silty Gravelly clay	MVCP	None	Mod potential	Onset of desiccation at surface only

Analysis of soil samples indicates the clay to be of high-volume change potential at the front but correspondingly medium volume change potential at the rear.

There was evidence of desiccation immediately below the underside of the footing in BH1 and down to 1.3m below existing ground level.

Desiccation is assessed using the Driscoll criteria as a guideline. The paper by Driscoll suggests that a London Clay soil is approaching desiccation when moisture content (MC) is at or below 50% of liquid limit (LL); desiccated when MC is at or less than 40% LL or plastic limit (PL) + 2. It should be noted that this is a rule of thumb only and other indicators are used to determine desiccation such as strength and consistency.

Root identification

Roots were identified as the family ABIES (Firs), PICEA (spruce) or LARIX (Larch)

TH1, 0.8m		
5 no.	Examined root: a conifer, similar in many ways to ABIES (Firs), PICEA (Spruce) and also LARIX (Larch).	Alive, recently*.
2 no.	Both samples revealed too few cells for microscopic identification.	
TH1, 1.3m		
4 no.	Examined root: could be ABIES (Firs), PICEA (Spruce) - or - LARIX (Larch).	Alive, recently*.
3 no.	Unfortunately all with insufficient cells for identification.	
TH1, 1.8m		
2 no.	Examined root: also like ABIES (Firs), PICEA (Spruce) - or - LARIX (Larch).	Dead*.
7 no.	Unfortunately all with insufficient cells for identification.	
TH1, 2.3m		
2 no.	Examined root: again, could be ABIES (Firs), PICEA (Spruce) - or - LARIX (Larch).	Alive, recently*.
2 no.	Both pieces of BARK only - insufficient material for recognition.	
3 no.	Unfortunately all with insufficient cells for identification.	

TH1, 2.8m		
2 no.	Examined root: as above, in many ways like ABIES (Firs), PICEA (Spruce) and also LARIX (Larch).	Alive, recently*.
2 no.	Both samples revealed too few cells for microscopic identification.	

Conclusion

Based on the above findings, we believe that the property has become damaged due to clay shrinkage caused by moisture extraction by roots from nearby trees/vegetation. In particular:

- The clay is highly shrinkable at the front
- There is evidence of desiccation
- There are roots co-incident with the desiccation.

Fortunately, the cause of the problem (dehydration) is reversible. Clay soils will rehydrate in winter months, causing the clay to swell and the cracks to close. There is a risk of heave in this situation and the advice of an arborist should be sought accordingly.

Given the proximity of the Monkey Puzzle tree, the roots evident below the paving slabs as well as those recovered during the soil investigation and the clay soil, the damage is most likely related to the Monkey Puzzle Tree causing clay shrinkage, resulting in damage to the property.

It was reported cracking got worse during September 2022, which points towards the hot summer we had during 2022 and increases the chance that the tree was looking for further moisture from the ground surrounding it.

ACTION TAKEN/ NEXT STEPS

We recommend that the Arborist's recommendations are followed, as well as ongoing monitoring so that following tree works, stability can be confirmed before repairs.

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