

**Arboricultural report on tree related subsidence  
at 1 Elsworthy Terrace London NW3 3DR**

September 2018

Sylvan Resources Ltd. forestry and arboriculture

Dog Field House, Abcott, Clungunford, Craven Arms, Shropshire SY7 0PX

tel: 01588 660547 e-mail: [jon@sylvanresources.co.uk](mailto:jon@sylvanresources.co.uk)

## **1.0 Introduction**

1.1 My instructions are to investigate the cause of subsidence in 1 Elsworthy Terrace, London NW3 3DR.

1.2 In preparing this report I have reviewed the following documents.

- Letter to Mrs R Harvey from Avia dated 24<sup>th</sup> April 2018.
- A drainage survey and report by Geocore Site Investigations Ltd dated 16/2/2016.
- Letter to Mountfield Estates Ltd., from Quest Gates Ltd dated 18<sup>th</sup> March 2015.

## **2.0 Background to this report**

2.1 The property is owned by Messers Yonatan Arbel and Ramit Maimon who purchased it in March 2018. Before this date, on behalf of a previous owner Mr Benjamin Philips, the property's freeholders Mountview Estates Ltd. submitted a claim for tree related subsidence damage to their insurers Aviva. Aviva's loss adjusters Quest Gates Ltd concluded that the damage had been caused by a Plane tree (*Platanus acerfolia*). The claim was successful, repairs were made to the building and the offending tree was reduced. A further claim for subsidence damage was also made before 2015. Quest Gates believed the damage which comprised subsidence below a bathroom window and adjacent to access steps and cracked tiles in a bathroom was caused by a nearby tree growing in the grounds to the property. This was refuted by Mountview Estates who alleged that the damage was caused by damaged drains. A survey by Geocore Site Investigations Ltd concluded that the drains were undamaged.

## **3.0 Designations**

3.1 A Hornbeam (*Carpinus betulis*) in the front garden to the property is protected by Tree Preservation Order Number C11952018 which was issued on the 20th July 2018. This is the unnamed tree referred to in Quest Gates letter dated 18th March 2015. The property is within the Elsworthy Conservation Area. Because the property's trees are protected either by the TPO and/or by the Conservation Area, permission is required from the local planning authority before any tree work is

undertaken.

## 4.0 Survey

- 4.1 The site was surveyed on the 21<sup>st</sup> August 2018. The property is a large terraced building divided into flats. It is situated on the junction of Elsworthy Terrace and Elsworthy Road. Number 1 is a garden flat, there are three floors above it.
- 4.2 In accordance with our instructions we inspected the Hornbeam Tree which is the subject of the Tree Preservation Order referred to in the preceding paragraph.
- 4.3 The site plan (Appendix A: Site Plan) and photographs (Appendix B: Figures 1 – 4) show the location of the Hornbeam and two street trees, both London Planes in Elsworthy Terrace.
- 4.4 The hornbeam tree, estimated to be over 60 years old, has a diameter of approximately 460mm, measured 1.2m from ground level. The tree is 20m high and its first major branch arises from its stem approximately 3m from ground level on its north east side. Its crown spread is 5.5m north, 6m east, 6.2m south and 5m west, part of its canopy is touching the building. Evidence of previous tree work is manifested by an occluding wound. Basal damage occurs on the south side of the tree, within the garden (Appendix B: Figure 3). We assessed the tree as being in good condition.
- 4.5 Although we had not been instructed to inspect them we noted the presence of two Plane Trees (*Platanus Acerfolia*) on the west side of the property in Elsworthy Terrace. One of these is likely to be the tree referred to by Quest Gates Ltd as having caused the first subsidence claim. Both trees are mature.
- 4.6 A trial pit was dug at the location indicated on the appended site plan. Soil and roots samples were taken from the pit. The root samples have been sent away for identification and the findings of which are pending.
- 4.7 The pit was excavated to a depth of 600mm and the soil down to this level was found to consist of made up ground comprising topsoil, brick and other building rubble. As such its plasticity was not tested. This decision was also influenced by the location of the pit. Ideally it should have been excavated against the wall of the building, but this would have required breaking a concrete path which could only have been done with the permission of the freeholder. Since we did not have this or the means to break the path and repair it afterwards, the pit was excavated in a garden area near to the site of the subsidence.
- 4.8 Although the findings from our trial excavation are limited we are satisfied that the

underlying geology is clay. The British Geological Survey (BGS) maps identify the underlying geology as a Claygate Member. The appended profiles of trial borings from nearby site off Elsworthy Road are reproduced from the BGS website (Appendix C). They confirm the BGS data. They and others close by show that the built-up ground excavated from our trial pit occurs throughout the area and that it overlays clay. This evidence confirms the conclusion that tree roots contributed to or were responsible for the first subsidence claim.

## 5.0 Discussion

5.1 Earlier subsidence was attributed to a London Plane tree. The recent claim is also being attributed to the Hornbeam situated within in the grounds of the property.

5.2 In my opinion, it is too simplistic to attribute blame to individual trees. Both Planes and the Hornbeam will be extracting water from the ground and given their proximities to the building all three will be contributing to the shrinkage of the clay. My opinion is based on the following observations.

- *Platanus acerfolia* has a high-water demand. Hipps, Davies et al (2014) quote research which indicates that these trees do not affect buildings when they are planted more than 15m away from them, 10% of damage cases occur when the trees are 10-15m from buildings, 90% of damage cases occur when the trees are less than 10m from buildings and 50% when they are within 5.5m of buildings. One of the Plane trees falls within 10m of the building, the other is slightly further away but within 15m of it.
- The Hornbeam is approximately 9m from the building, it has a low water demand.
- Although the hornbeam might be the nearest tree to the affected part of building all three trees have the capacity to damage it. Furthermore, since they are surrounded by hard surfacing on all sides except where they face the garden to the property it is likely that most of their feeding roots will be below the garden and in proximity to the building.

5.3 On this site I consider that the management of all three trees is relevant to the subsidence damage. Research by Hipps, Davies et al (2014) suggests that canopy reduction of 30% reduces the water demand in *Platanus acerfolia* but the

work needs to be done every three years since over this time the tree will restore the reduced area of canopy. Canopy reduction involves removing a third from every branch end, effectively this removes a third of the tree's foliage or the area over which it transpires. It is different from crown reduction which might remove whole limbs from a trees crown and thereby remove more of its branch wood.

- 5.4 From the information available to me it is not clear if the *Platanus* which was pruned following the earlier subsidence was crown or the canopy reduced. There is no reference to the work being repeated three years after the date at which it was first done. It is possible that the tree's canopy has not been reduced again and that it has reverted to its earlier size and water demand. From the evidence available to me it is not possible to determine precisely when the subsidence occurred and to relate this to the time interval between its occurrence and the tree's pruning.
- 5.5 O'Callagahn and Kelly (2005) argue that the only way to prevent damage from recurring is to remove trees. Although this pragmatic approach is likely to be unacceptable to the local planning authority should the hornbeam be removed as the loss adjusters suggest? Removing the tree will reduce the water demand exerted by the three trees in question but it will not eliminate it. In my opinion the tree's removal might provide a solution but the local planning authority would need to be convinced. Furthermore, they are likely to seek some form of compensatory planting but this might be acceptable if a younger tree can contribute to local amenities beyond the life spans of the two *Platanus*.
- 5.6 The alternative solution is to reduce the canopies of all three trees and repeat this process every three years as Hipps and Davies et al (2014) recommend. The cost of this work might be charged to Freehold company if the local authority is unwilling to bear the cost of pruning its trees.

## 6.0 Conclusions

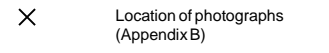
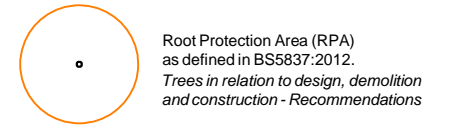
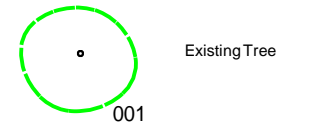
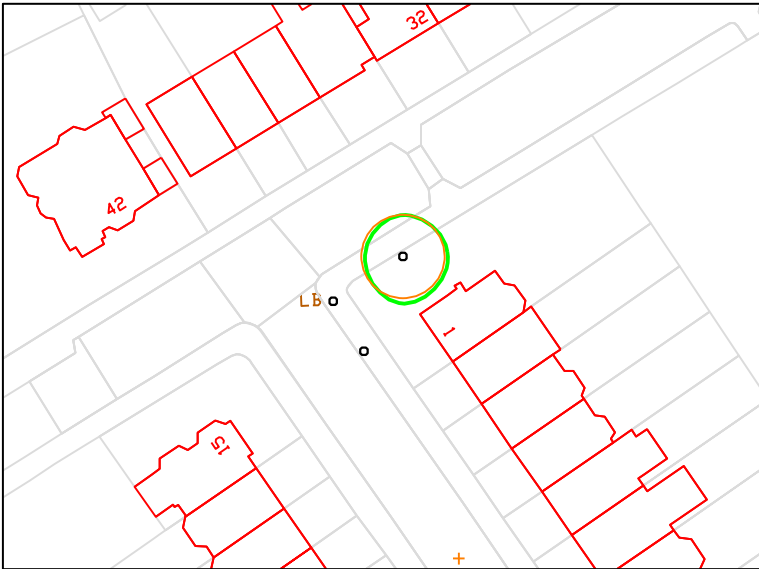
6.1 I conclude that on the balance of probabilities the damage is tree related. There may be a case for arguing that the earlier tree work was insufficient or not done competently but this might only be determined after further investigation. I do not consider it necessary to undertake any further site investigations to prove that the trees are the cause of the nuisance.

J C Terry  
Sylvan Resources Ltd  
10<sup>th</sup> September 2018

Hipps, Davies, Dunn, Griffiths, Atkinson (2014) "Effect of two different canopy manipulations on growth and water use of London plane (*Platanus acerfolia*) trees". Springer 2014

O'Callaghan, Kelly (2005) "Tree related subsidence: Pruning is not the answer". Journal of Building Appraisal Vol 1 No 2.

**Appendix A**  
**Site Plan**



<b>Sylvan Resources</b>			
Project/Site			
1 Elsworthy Terrace			
Drawing Title			
Site Plan			
Drawing no	Rev	Scale	Date
		1:150 (A3)	12/09/2018



## **Appendix B Photographs**

## Site Photographs



*Figure 1: Hornbeam (Carpinus betulis) as viewed from the pavement looking the northeast (Location 1)*



*Figure 2: Hornbeam (Carpinus betulis) as seen from the pavement (Location 2)*



*Figure 3: Hornbeam (Carpinus betulis) as seen from the property garden (Location 3)*



*Figure 4: Hornbeam and Plane Trees as viewed from the entrance path to the property looking southwest (Location 4)*



*Figure 5: Location of drain (Location 5)*



*Figure 6: Photos showing the changes in level around the edge of the property (Locations 6-8)*

**Appendix C**  
**Borehole Log**

# Norwest H, Ist Soil Engineering Ltd.

Borehole No. **1**

Contract No. .... J.f.e.Jl. ....  
 Location ... J."f.?.E! Y... Q.g .....  
 Client ... !? .. ff£\$!...?f.21g;t, . ervices Ltd  
 Method of Boring... P. ...?f.£R-.Hl!c;m  
 Diameter of Borehole...?.....

## BOREHOLE LOG

Sheet ... 1-: ... of ... ? .....  
 Chainage .....  
 Ground Level ..... m.A.O.D.  
 Date ..... 1;2/t/.'?Q.....

Description of Strata	Legend	Depth Below G.L. (m)	O.O. Level (m)	Casing Depth at Sampling	Sampling end Coring	"N"/ R.1.1 % Ddly Progress
TOPSOIL		0.40		150mm to 1.00m		15/2
Firm to locally soft, brown mottled orange brown and grey CLAY with occasional selenite crystals  ... becoming fissured with depth		3.00		1.00 (40) 2.00 (43)		
Firm brow fissured silty CLAY with orange brown staining and some selenite crystals				3.00 (45) 4.00 (45) 5.00 (50) 6.50 (50) 8.00 (SS)		
Firm to stiff brown grey laminated fissured CLAY		9.80			9.50 (60)	

Type of Sample	Remarks (Observations of Ground Water etc.)
Is S.P.T. <input checked="" type="checkbox"/> Undisturbed	Groundwater not encountered
le C.P.T. <input checked="" type="checkbox"/> Vane	
0 Jar <input type="checkbox"/> Water	
● Bulk <input checked="" type="checkbox"/> Piezometer	

( ) - U100 blows  
 British Geological Survey  
 WlttAr ' - ' ' arw whil Cf to 111 lamnal or tidal variations and should not bA talcen as constant

# Norwest Hplst Soil Engineering Ltd.

Borehole No.

# 3

Contract No. 93.7.1  
 Location: 9;ti¥... R<:1  
 Client: 9E?'. --- .?..?..E9.j£...services Ltd  
 Method of Boring: 9..-... ?:"c?H. . ;:pn  
 Diameter of Borehole: .+?.R.....

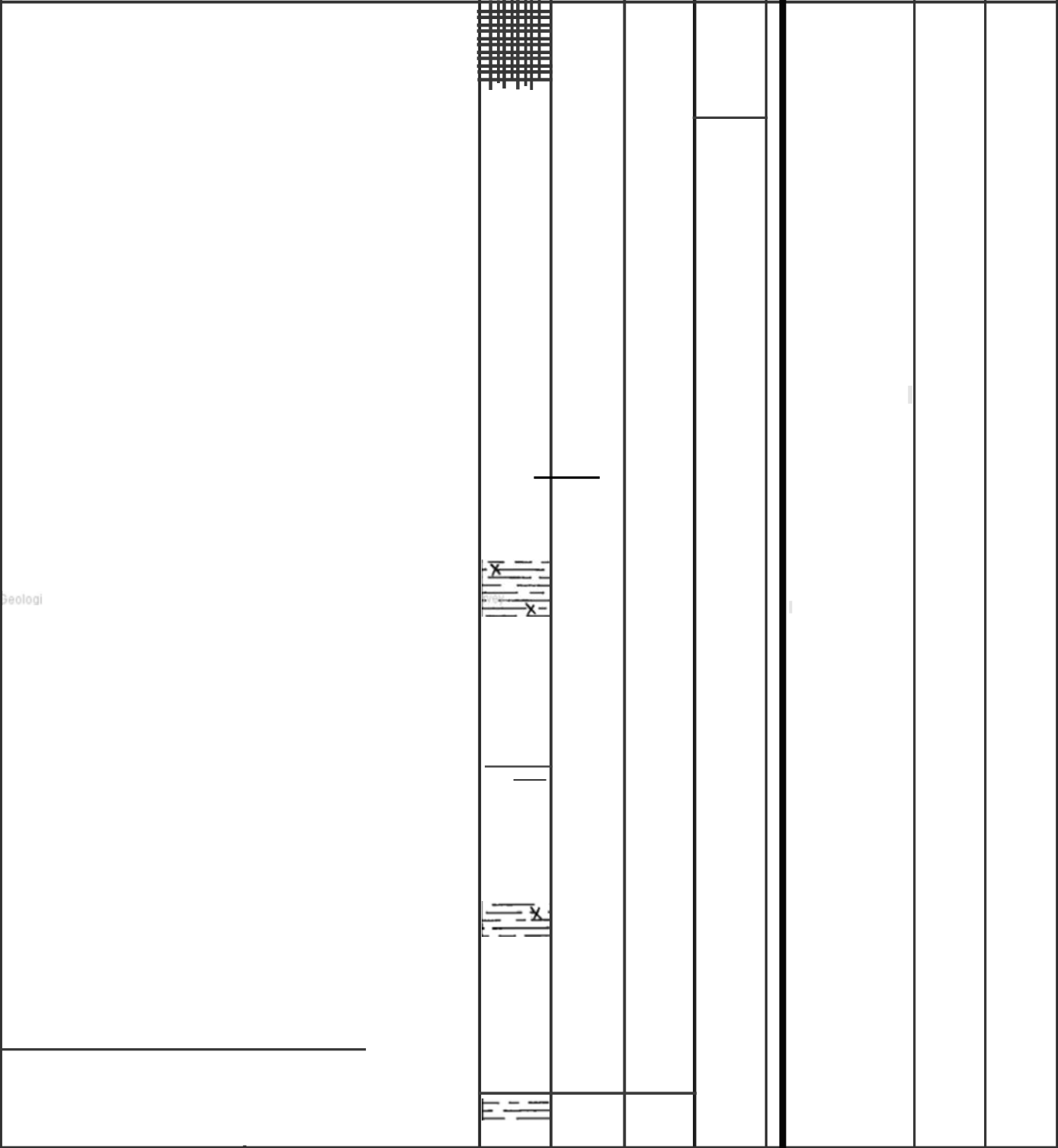
## BOREHOLE LOG

Sheet.....of... ..  
 Chainage.....  
 Ground Level..... m.A.o.o.  
 Date.....1'Jl.2/9.0.....

Description of Strata	Legend	Depth Below G.L.(m)	O.O Level (m)	Casing Depth at (Samolin)	Sampling and Corina	"N"/ R.Q.0.%	Oei(y Progress
MADE GROUND: Brick rubble with brown clay	-ICIOCIQQ_a	0.00	11.00	150mm to 11.00m	1.00		13/2
Soft to firm brown mottled green grey fissured CLAY with some to numerous selenite crystals	---	1.00	12.00		1.45		
Firm brown fissured silty CLAY with orange brown staining and occasional selenite crystals	---	4.00	15.00		3.45		
Firm to stiff brown grey laminated fissured CLAY	---	9.50	19.50		6.50		

Type of Sample      Remarks (Observations of Ground Water etc.)      ( ) - UIOO blows  
 Groundwater not encountered

- Is S.P.T.  Undisturbed
  - le C.P.T.  Vane
  - 0 Jar  Water
  - Bulk  Piezometer
- W - ..... ant subioict to \*asonal or tldal variations and dtnoJlti nnt ha tAl<ftn M constMt



British Geologi

