TECHNICAL REPORT ON A SUBSIDENCE CLAIM

Crawford Reference: SU1903345

[redacted]

Flats 1 & 3 Uplands Court,
19 Frithwood Avenue
Northwood, HA6 3LY

Prepared for

[redacted]

23rd August 2019

Subsidence Division
Cartwright House, Tottle Road,
Riverside Business Park, Nottingham, NG2 1RT
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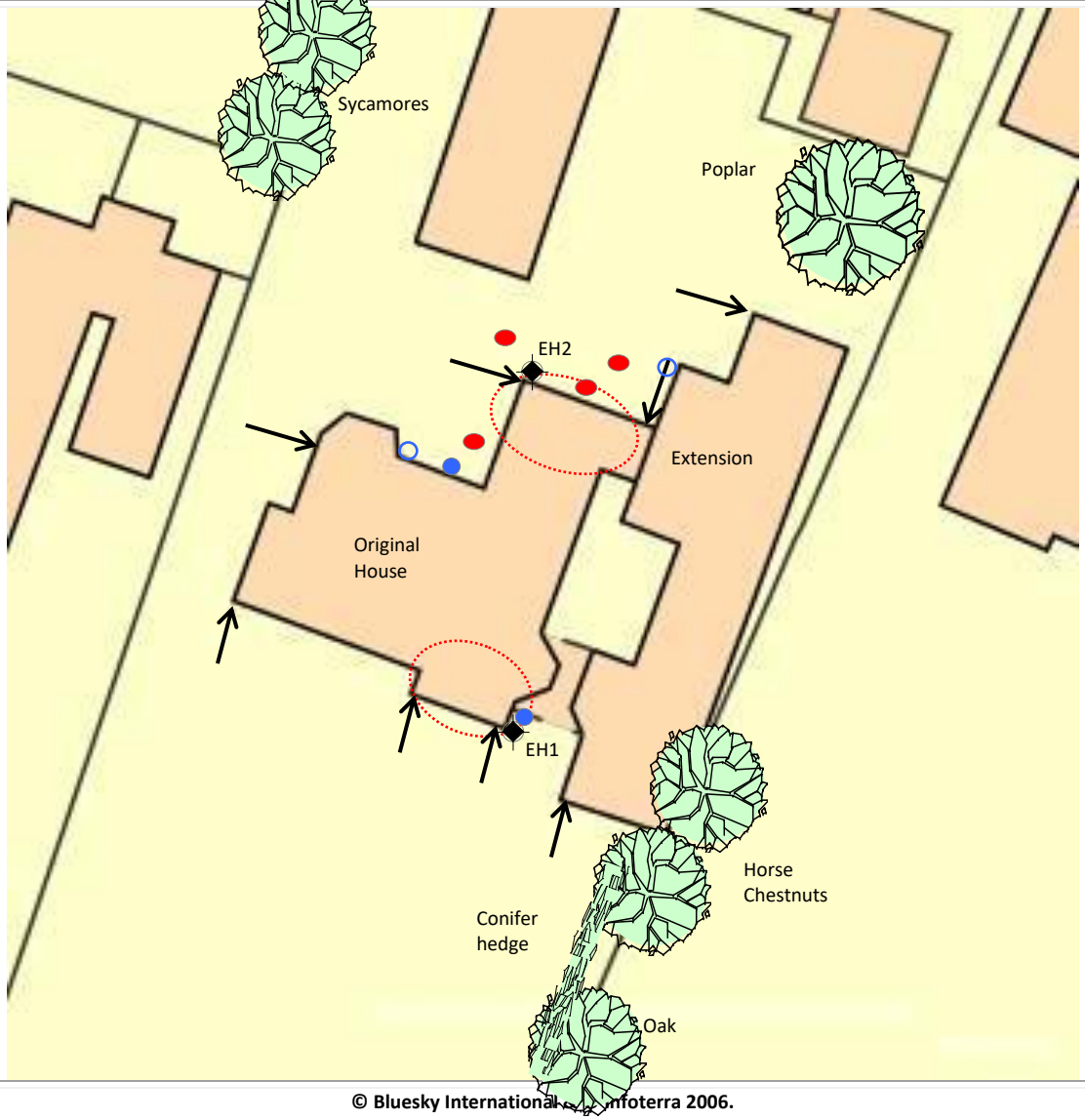
Site Plan

This plan is Not to Scale

This plan is diagrammatic only and has been prepared to illustrate the general position of the property and its relationship to nearby trees etc. The boundaries are not accurate, and do not infer or confer any rights of ownership or right of way. Position of utilities is only indicative and [illegible]s must satisfy themselves regarding actual location before commencing works.



Key:

	Tree: Deciduous		Tree: Conifer		Shrub
	Hedge		Area of Damage		Bore Hole
	Trial Hole		Trial & Bore Hole		Level Monitoring
	Rain Water Manhole		Rain Water Gulley		Rain Water Pipe
	Waste Water Manhole		Waste Water Gulley		Toilet Pipe

INTRODUCTION

We have been asked by Allianz Commercial to comment on movement that has taken place to the above property. We are required to briefly describe the damage, establish a likely cause and list any remedial measures that may be needed.

Our report should not be used in the same way as a pre-purchase survey. It has been prepared specifically in connection with the present insurance claim and should not be relied on as a statement of structural adequacy. It does not deal with the general condition of the building, decorations, timber rot or infestation etc.

The report is made on behalf of Crawford & Company and by receiving the report and acting on it, the client - or any third party relying on it - accepts that no individual is personally liable in contract, tort or breach of Statutory duty. Where works address repairs **that are not covered** by the insurance policy we recommend that you seek professional advice on the repair methodology and whether the works will involve the Construction (Design & Management) Regulations 2015. Compliance with these Regulations is compulsory; failure to do so may result in prosecution. We have not taken account of the regulations and you must take appropriate advice.

We have not commented on any part of the building that is covered or inaccessible.

TECHNICAL CIRCUMSTANCES

The owner of Flat 1 is recently deceased and we are dealing with the Executor who advised that damage was pointed out by a Surveyor engaged for probate purposes. The Surveyor highlighted a number of cracks which were considered to be due to subsidence. We also inspected Flat 3 above who advised that damage first occurred in Summer 2018 but they have only become concerned having heard that subsidence is affecting the flat below. Given the likely cause of subsidence, we suspect it occurred in both flats around Summer 2018.

PROPERTY

Two and three storey large detached house converted into flats. Construction is cavity brick wall, rendered at 1st floor level with Mock Tudor decoration. The roof is hipped and ridged tiled. To the right side is a newer extension of two and three storey to provide additional flats, with a link block at ground floor between. There is a conservatory on the rear of this extension. Flat 1 is on the ground floor right side of the original house with Flat 3 directly above it. The property is in a Conservation Area and there is an Area Tree Protection Order. We understand there are 10 flats in total.

HISTORY & TIMESCALE

- Temporary repairs to Flat 1 to enable it to be let.
- Site investigations, arboricultural report & level monitoring in order to submit TPO application for tree mitigation works.

Date of Construction	c.1930s
Purchased	Various
Policy Inception Date	03/04/2009
Damage First Noticed	July 2019
Claim Notified to Insurer	01/08/2019
Date of our Inspection	15/08/2019
Issue of Report	23/08/2019
Anticipated Completion of Claim	Autumn 2021

TOPOGRAPHY

The property occupies a reasonably level site with no unusual or adverse topographic features.

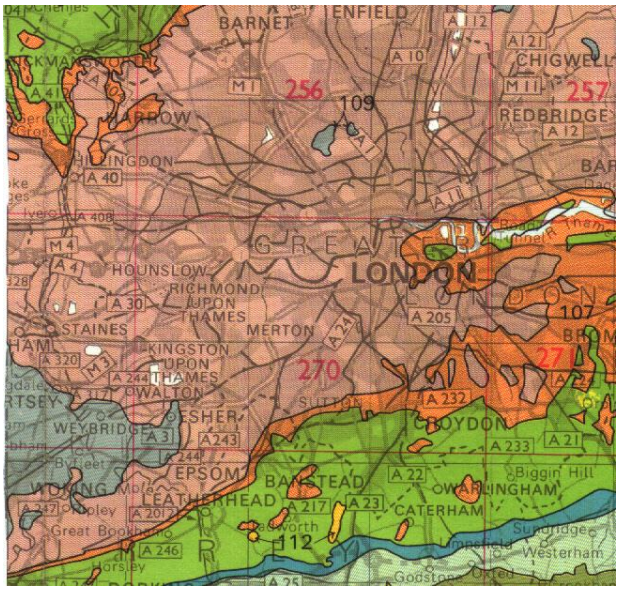
GEOLOGY

Reference to the 1:625,000 scale British Geological Survey Map (solid edition) OS Tile number TQNW suggests the underlying geology to be London Clay.

London Clays are marine deposits characterised by their silty, sandy composition. They are typically stiff, dark or bluish grey, weathered dark to mid-brown superficially with fine particle size (less than 0.002mm). Tomlinson[1] describes it as a 'fat' clay with high loadbearing characteristics due to pre-consolidation pressures in its geological history.

The upper horizon is often encountered at shallow depth, sometimes just below ground level. They have high shrink/swell potentials[2],[3] and can be troublesome in the presence of vegetation.

The solid geology appears to outcrop in this location, although we cannot rule out the presence of superficial deposits at shallow depth.



Geology. Reproduced with consent of The British Geological Survey at Keyworth. Licence IPR/34-7C CSL British Geological Survey. ©NERC. All rights Reserved.

VEGETATION

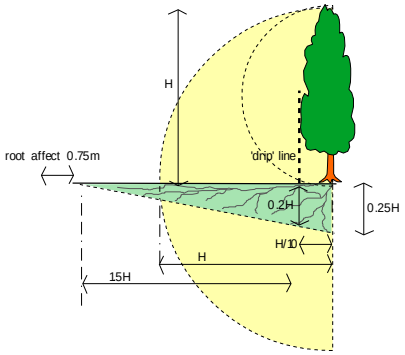
There are several trees and shrubs nearby, some with roots that may extend beneath the house foundations. The following are of particular interest:-

Type	Height	Distance	Ownership
Poplar	20 m	12 m	Owners
Sycamore	18 m	12 m	Neighbour on left
Horse Chestnut	18 m	10 m	Neighbour on right
Oak	16 m	18 m	Neighbour on right

[1] Tomlinson M.J. (1991) *"Foundations Design & Construction"* Longman Scientific Publishing.
[1] B.S. 5930 (1981) *"Site Investigations"*
[2] DriscollL R. (1983) *"Influence of Vegetation on Clays"* Geotechnique. Vol 33.
[3] Table 1, Chapter 4.2, Para. 2.3 of N.H.B.C. Standards, 1986.

See sketch. Tree roots can be troublesome in cohesive (clay) soils because they can induce volumetric change. They are rarely troublesome in non-cohesive soils (sands and gravels etc.) other than when they enter drains, in which case blockages can ensue.
Poplars (Populus) are deciduous and can reach heights between 20-30m depending on health, environment and soil conditions. They have a very fast growth rate of around 800mm per year and strong root activity[4].

Maximum tree-to-damage distance recorded in the Kew survey was 30mtrs, with 50% of all cases occurring within 11mtrs[5].

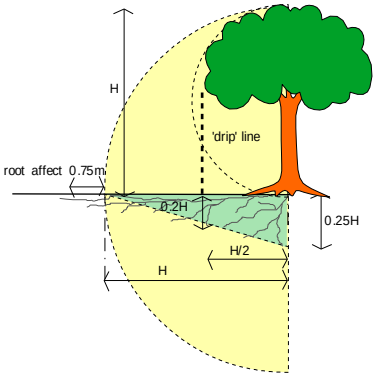


Typical proportions of a poplar, showing its possible rot zone.

They are deep rooting in clay soils, and have a life expectancy > 100 years. They are tolerant of heavy pruning and crown reduction (both old and young trees).

Sycamores (Acer) are deciduous and can reach heights between 20-30m depending on health, environment and soil conditions. They have a fast growth rate of around 600mm per year and medium root activity[6].

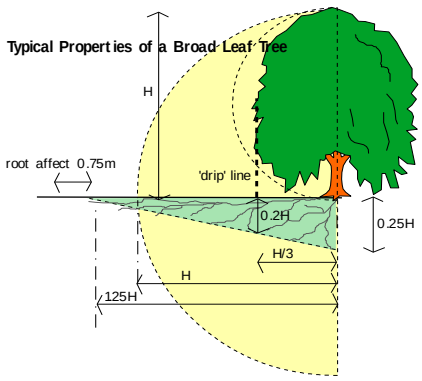
The Sycamore is a hardy tree, and can withstand quite aggressive environments. Maximum tree-to-damage distance recorded in the Kew survey was 20mtrs, with 50% of cases occurring within 6mtrs[7]. They are deep rooting on clay soils and have a life expectancy > 100 years.



They can usually tolerate quite heavy pruning or crown thinning, although this can create large wounds which decay rapidly.

[4] Richardson & Gale (1994) "*Tree Recognition*" Richardson's Botanical Identifications
[5] Cutler & Richardson (1991) *"Tree Roots & Buildings"* Longman Scientific
[6] Richardson & Gale (1994) "*Tree Recognition*" Richardson's Botanical Identifications
[7] Cutler & Richardson (1991) *"Tree Roots & Buildings"* Longman Scientific

Horse chestnuts and the less common buckeyes, Aesculus species, are mainly large growing trees reaching heights of between 20 - 27mtrs, that will tolerate heavy pruning, although the timber does not resist decay and this can lead to structural weakness unless regrowth is controlled.

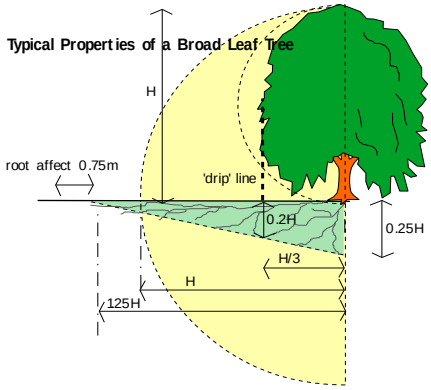


Typical proportions of a Horse Chestnut, showing the potential root zone.

The timber is also inherently brittle and even healthy tree can shed large branches in relatively calm conditions. They are moderate water demanders, but common in gardens so are quite frequently associated with subsidence damage.

Quite a fast growing tree (400mm per year) with medium water demand[8].

Oak trees (Quercus) are deciduous and native to Europe. They can reach heights in excess of 35m, but more typically grow to between 18 - 25m, depending on health, environment and soil conditions. They have a medium growth rate of around 250mm per year and strong root activity[9].



Typical proportions of an Oak showing the potential root zone. They have by far the most aggressive of root systems, often spreading considerable distances (1.5 x height or more).

Maximum tree-to-damage distance recorded in the Kew survey was 30mtrs, with 50% of all cases occurring within 9.5mtrs[10]. Life expectancy > 100 years, although they are vulnerable to insect and fungal attack. Old and young trees are tolerant of quite heavy pruning and crown reduction, although re-growth can be an ongoing problem.

Oaks are, in my experience, worthy of considerable respect when dealing with subsidence claims. Their root system extends for surprising distances and can be associated with particularly high soil suctions.

Because of difficulties in controlling the oak, and its vigorous root system, I regard it as being far more significant (in terms of a subsidence league table) than either the willow or poplar tree.

[8] Richardson & Gale 1994) "Tree Recognition" Richardson's Botanical Identifications
[9] Richardson & Gale (1994) "*Tree Recognition*" Richardson's Botanical Identifications
[10] Cutler & Richardson (1991) *"Tree Roots & Buildings"* Longman Scientific

OBSERVATIONS

The areas of damage are the front right elevation and the rear elevations of Flats 1 and 3.

The following is an abbreviated description. Photographs accompanying this report illustrate the nature and extent of the problem.

INTERNAL

Lounge - Flat 1 - front window

En-Suite - Flat 1

Flat 1 - Entrance Hall
Diagonal crack above front door.
Diagonal crack adjacent to rear bedroom wall and associated crack to coving and across ceiling.

Flat 1 - Lounge
Diagonal cracks below right side of front window.
Separation of coving with wall at front right corner and along right wall.
Vertical crack below left side of front window.
Vertical crack at external splay junction in alcove area and cracks at wall/ceiling junction

Flat 1 - Side Bedroom
Cracks at plasterboard joints in ceiling

Flat 1 - Rear Bedroom
Plasterboard joint crack across ceiling.
Diagonal crack above door to hall.

Flat 1 - En-Suite to Rear Bedroom
Diagonal crack above door to bedroom
Diagonal and stepped cracking above and below rear window including through wall tiles.

Flat 3 - Front Bedroom
Diagonal stress cracks above either side of front window.
Vertical and stepped cracks below window into skirting.
Slight crack to ceiling.

Flat 3 - Rear Lounge
Diagonal and horizontal crack above rear patio doors.
Slight crack above door to hall.

Flat 2
Inspected but cracking is not subsidence related.

EXTERNAL

Below En-Suite window

Stepped crack below Lounge window

Front Elevation
Stepped vertical crack below left and stepped crack below right of Lounge window (Flat 1). Cracks above both sides of window extending up to Flat 3 bedroom window above.
Vertical crack in porch of right internal splay which is reflected internally in the alcove (Lounge of Flat 1)

Rear Elevation
Vertical crack below Flat 1 rear bedroom bow window - not reflected internally.
Stepped crack below En-Suite window, open 2-3mm.
Laser level survey shows rear elevation is dropping towards the rear left corner. The left elevation is relatively level.

CATEGORY

In structural terms the damage falls into Category 2 of Table 1, Building Research Establishment[11] Digest 251, which describes it as “slight”.

Category 0	"negligible"	< 0.1mm

[11] Building Research Establishment, Garston, Watford. Tel: 01923.674040

Category 1	"very slight"	0.1 - 1mm
Category 2	"slight"	>1 but < 5mm
Category 3	"moderate"	>5 but < 15mm
Category 4	"severe"	>15 but < 25mm
Category 5	"very severe"	>25 mm

Extract from Table 1, B.R.E. Digest 251
Classification of damage based on crack widths.

DISCUSSION

The pattern and nature of the cracks is indicative of an episode of subsidence. The cause of movement appears to be clay shrinkage. There are two separate areas of subsidence, to the rear left of Flats 1/3 and to the front right of Flats 1/3.

The timing of the event, the presence of shrinkable clay beneath the foundations and the proximity of vegetation where there is damage indicates the shrinkage to be root induced. This is a commonly encountered problem and probably accounts for around 70% of subsidence claims notified to insurers.

Fortunately, the cause of the problem (dehydration) is reversible. Clay soils will re-hydrate in the winter months, causing the clays to swell and the cracks to close. Provided the cause of movement is dealt with (in this case, vegetation) there should not be a recurrence of movement.

No structural changes to the building have been carried out which has contributed to the current subsidence related damage under investigation. Furthermore, we are not aware of any previous underpinning.

RECOMMENDATIONS

Although the cause of the movement needs to be dealt with, we note the vegetation is subject to a Preservation Order. Unfortunately, current legislation requires certain investigations to be carried out to support an application for the tree works.

Typically, these investigations would involve trial pit(s) to determine the depth and type of footings, boreholes to determine the nature of the subsoil/influence of any roots and monitoring to establish the rate and pattern of movement. The monitoring data provided must be sufficient to show a pattern of movement consistent with the influence of the vegetation and therefore it may be necessary to carry out the monitoring for up to a 12 month period.

It will also be necessary to obtain a specialist Arboricultural Report.

We will report further once these investigations have been completed. In the interim, temporary repairs to Flat 1 can be carried out to enable it to be let. Any filling works should be carried out using flexible materials which allow the cracks to close.

Neil Crawford CEng BEng (Hons) MICE

Chartered Loss Adjusters

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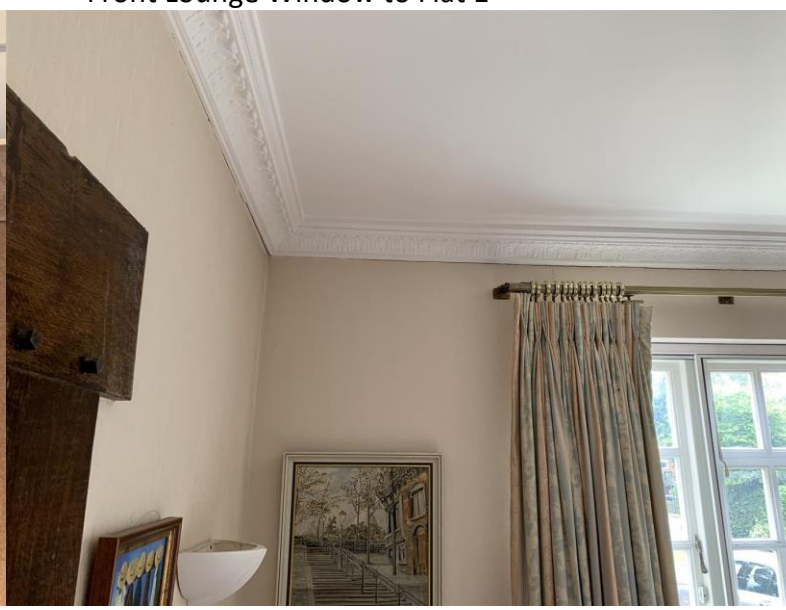
PHOTOGRAPHS

Horse Chestnut tree on right

Front Lounge Window to Flat 1

Hall - Flat 1



Lounge coving - Flat 1

Poplar Tree

En-Suite Flat 1

Rear elevation

Flat 3 - Bedroom above front window