TECHNICAL REPORT ON A SUBSIDENCE CLAIM

[redacted]

37 Lancaster Grove Limited
37 Lancaster Grove
London
NW3 4HB

Prepared for

RSA - Commercial

[redacted]

SUBSIDENCE CLAIM

DATE 6 February 2019

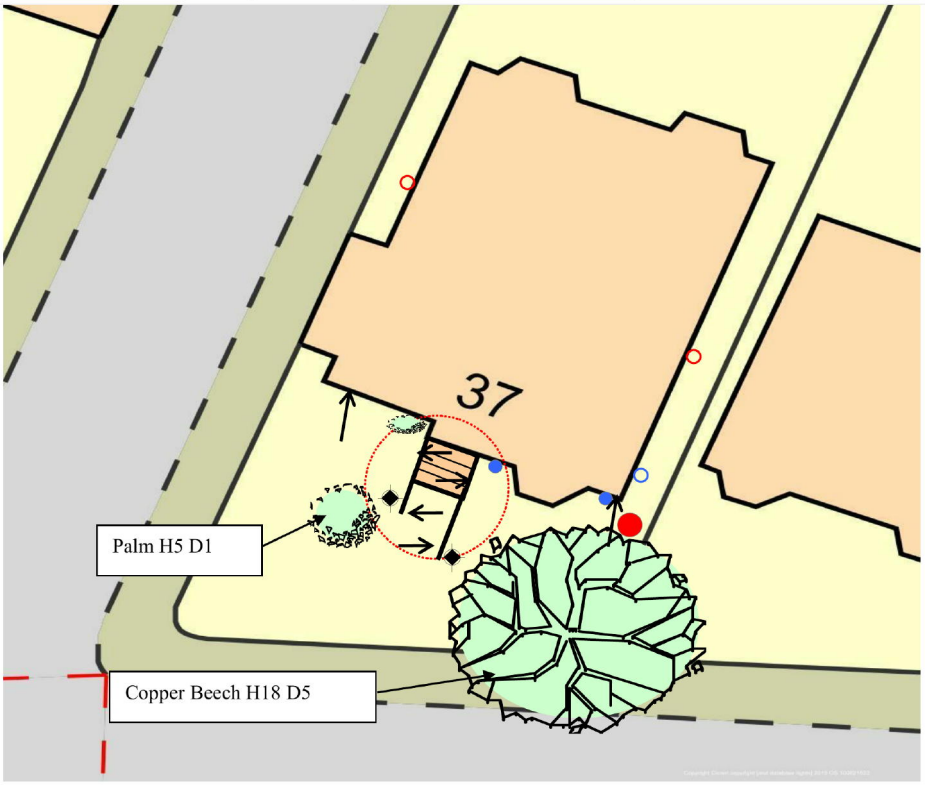
Crawford®

[redacted]

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 contractors 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
	Rain Water Drain		Waste Water Drain		Electricity Cable
	Water Supply Pipe		Gas Supply Pipe		Incoming Gas Pipe
	Incoming Water		Incoming Electrics		

[redacted]

INTRODUCTION

We have been asked by RSA - 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

We met with Mr Capel, the owner of flat 1 at our initial visit. Mr Capel has lived in the property for around 29 years. Mr Capel advised that there was some previous cracking noted to the front steps around 20 years ago. They were not unduly concerned by this at the time and simply arranged for the cracks to be re-pointed by their builder. The current cracking was noted to be appearing over the summer of 2018 and insurers were notified of a potential claim.

PROPERTY

The risk address is a four storey detached property of traditional construction with brick walls surmounted by a ridged slated roof. The property has been converted into four, self-contained flats. There is a detached block of garages to the rear of the property.

HISTORY & TIMESCALE

Date of Construction	Circa 1880
Purchased	Various
Policy Inception Date	18/10/2016
Damage First Noticed	October 2018
Claim Notified to Insurer	28/12/2018
Date of our Inspection	05/02/2019
Issue of Report	14/02/2019
Anticipated Completion of Claim	February 2021

TOPOGRAPHY

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

GEOLOGY

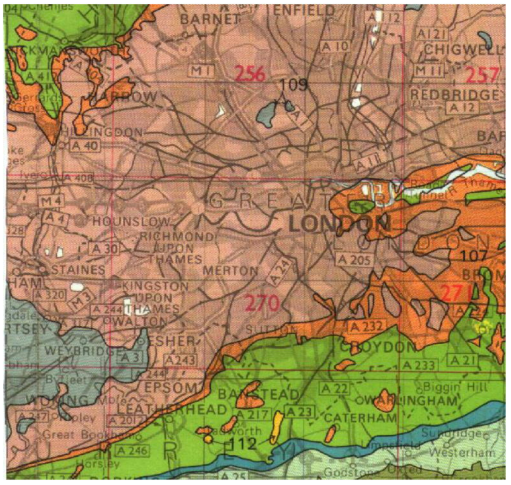
Reference to the 1:625,000 scale British Geological Survey Map (solid edition) OS Tile number TQNW suggests the underlying geology to be London Clay.

[redacted]

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.

[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.

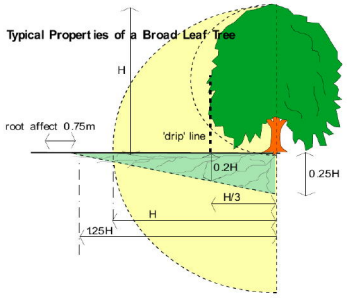
VEGETATION

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

Type	Height	Distance	Ownership
Beech	18 m	5 m	Owners
Shrubs	5 m	1 m	Owners

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.

Beech, (Fagus sylvatica) is a large growing deciduous species. Water demand is low, but it's size can lead to problems. It will tolerate pruning when young and can be a useful hedge species. However mature and older trees will not stand heavy pruning and can be killed by it. Lifespan is typically up to about 200 years after which they often decline rapidly.



Typical proportions of a Beech tree. Note the potential root zone.

The beech grows at a rate of 300mm a year to reach heights of between 20 - 28mtrs depending on soil and climate etc. It is regarded as having weak root activity[4].

Shrubs. Sometimes even small shrubs can cause localised subsidence damage. In the Kew Garden Survey data was collected between 1979 - 86 to record the number of roots of each species received for identification. Of the 1009 roots identified, 367 (36%) belonged to the family *Rosoideae* or Rose. Next came the family *Oleaceae* (Forsythia, Jasmin, Privet and Lilac) with 354 (35%) enquiries.

Berberis, Viburnum, Hedera (ivy), *Hydrangea and Pyracanthus* are also regularly associated with foundation movement, the latter having surprisingly large roots on occasions.

[4] Richardson & Gale (1994) *"Tree Recognition"* Richardson's Botanical Identifications

[redacted]

OBSERVATIONS

The movement to the front steps area is the focal point of the Insured's concerns.

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

INTERNAL

No internal cracking was advised to be affecting the main property at the time of our inspection.

EXTERNAL

View of cracking to front steps

Cracking to right hand side steps wall

Front Steps - 10mm previously repaired stepped cracking to right hand wall, 5mm separation on steps right hand junction and main house continues across top step junction, 10mm separation on steps left hand junction and main house, bottom step is cracked in two places, 2nd step is cracked and right hand section has dropped resulting in rear concrete infill section de-bonding and falling into void below steps, 2nd and 4th steps are loose and rocking, unrelated damp staining and bubbling to paintwork noted to right hand wall within the right hand basement well area.

Porch Area - 1mm vertical crack to left hand wall within porch, 13mm horizontal crack at base of left hand side porch pier.

Retaining and Boundary Walls - 5mm diagonal crack to right hand basement well lower retaining wall, lower retaining wall is bowing and leaning towards property, 9mm diagonal crack to left hand retaining wall of steps leading down to basement well, 10mm previously repaired vertical crack to right hand boundary wall, right hand boundary wall is bowing at low level to upper section, crack across top step.

[redacted]

CATEGORY

In structural terms the damage falls into Category 3 of Table 1, Building Research Establishment[5] Digest 251, which describes it as "moderate".

Category 0	"negligible"	< 0.1mm
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 cracking affecting the front steps and porch structure is indicative of an episode of subsidence. The cause of movement appears to be clay shrinkage.

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.

The damage noted to the basement well retaining walls and boundary walls is not the result of subsidence because the pattern and nature of the cracking and movement is not consistent with foundation movement. Whilst outside the scope of our instructions, the damage would appear to be the result of a build-up of lateral earth pressure within the retained soils behind the retaining and boundary walls. Given their proximity to the substantial beech tree, we cannot rule out that some of the movement may also be the result of gradual physical tree root growth pushing against the damaged areas.

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 any tree management 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.

[5] Building Research Establishment, [redacted]

[redacted]

We will report further once these investigations have been completed.

Further investigation of the damage affecting the retaining and boundary walls is beyond our brief which is to determine if the cause is due to subsidence or other events covered by the insurance policy. Consequently, you may wish to consider engaging the services of an appropriate construction professional to ensure the correct remedial action is taken in respect of these areas of damage.

Matt Deller BSc (Hons) MCIOB Dip CII
Subsidence Division
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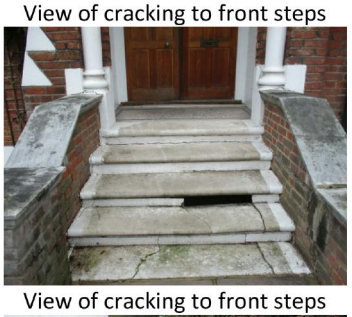
PHOTOGRAPHS

View of cracking to front steps

View of cracking to porch



View of cracking to front steps

View of Beech tree to front of property

View of cracking and leaning to retaining wall

Cracking to retaining wall

View of bulging and cracking to right hand boundary wall

Cracking to right hand boundary wall