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TECHNICAL REPORT ON A SUBSIDENCE CLAIM

[redacted]

Brookfield Mansions (Freehold) Limited
25-56 Brookfield Mansions
5 Highgate West Hill
London
N6 6AT

Prepared for

[redacted]

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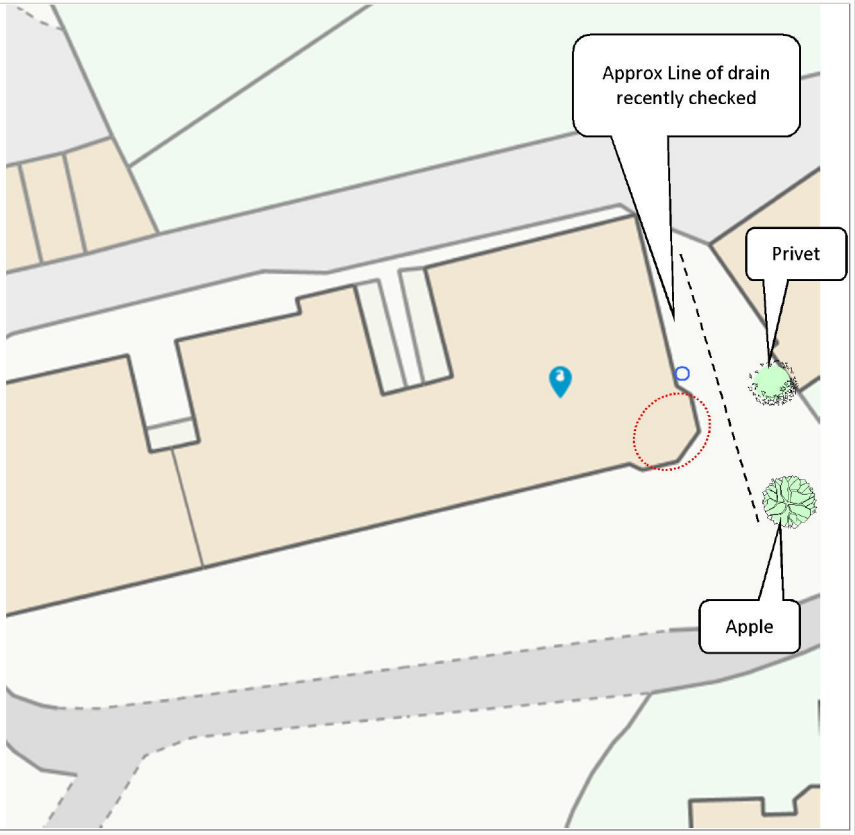
[redacted]

Site Plan	This plan is Not to Scale

[redacted]

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			

INTRODUCTION

[redacted]

We have been asked by Aviva 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

Brookfield Mansions (Freehold) Ltd had been aware of damage around the bay and internal in 2019 but as this was minor they were unaware of its significant. The damage worsened this year, and a surveyor was engaged who indicated vegetation was a factor. As there was a drain near by the residents arranged for this to be investigated to see if a leak was affecting the ground. The drains were found to be in working order.
The residents submitted a claim to have the matter investigated further.

PROPERTY

The property is a purpose built block of flats on a large Victorian development. The property is of traditional construction with solid walls surmounted by a tiled roof.

HISTORY & TIMESCALE

Insured to remove implicated vegetation and allow the property to recover before moving to repairs.

Date of Construction	Circa 1900s
Purchased	2006
Policy Inception Date	01/11/2019
Damage First Noticed	13/07/2019
Claim Notified to Insurer	13/11/2020
Date of our Inspection	04/12/2020
Issue of Report	23/12/2020
Anticipated Completion of Claim	Summer 2021

TOPOGRAPHY

The property occupies a site sloping from right down to the left/right (viewed from Highgate West Hill)

[redacted]

GEOLOGY

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

Claygate Beds are a sandy transition strata at the top of the London Clays and derive their name from Claygate in Surrey[1]. They are well defined alternations of sand and clay, with sand predominating above the clay below.

The formation, where present is about 45m thick. It forms much of the elevated ground in the middle of the London Basin, including Brentwood, Kelvedon Hatch and Havering-atte-Bower.

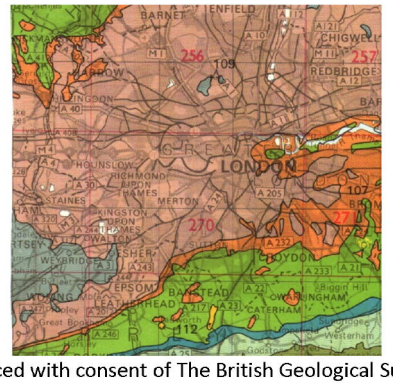
To determine the index properties of a heterogenous soil, it is recommended[2] that the index property of the clay sample should be multiplied by the clay fraction of the sample.

The modified Plasticity Index would therefore be:-

If the soil sample contains 50% clay (by dry weight), and that clay sample has an index property of 40%, the modified value for I_p would be 40% x 50% = 20%.
The superficial deposits are thought to be Clay Soils.

Clay soil superficial deposits are a cohesive soil characterised by their fine particle size and are usually derived from weathering of an underlying "solid geology" clay soil such as London Clay or Oxford Clay.

Like the solid geology sub-soil from which they are derived they shrink when dry, and swell when wet and can be troublesome when there is vegetation[3] nearby and Gypsum and selenite crystals can be encountered (particularly in the south east). Protection using Class II Sulphate Resisting cement is therefore recommended for buried concrete.



Geology. Reproduced with consent of The British Geological Survey at Keyworth.
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VEGETATION

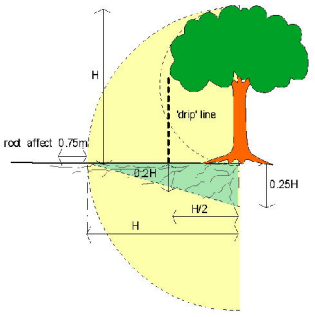
There are several trees and shrubs nearby, some with roots that may extend beneath the house foundations. The following are of particular interest:-

[1] SHERLOCK R.L. (1962) *"LONDON & THAMES VALLEY"* H.M.S.O.
[2] B.R.E. Digest 240 (1993). H.M.S.O.
[3] DriscollL R. (1983) *"Influence of Vegetation on Clays"* Geotechnique. Vol 33.

Type	Height	Distance	Ownership
Apple	5 m	4 m	Owners
Privet	3 m	4 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.

Apple trees, cultivated Malus varieties are common in gardens. Most are small to medium sized trees with lifespans of 40 - 60 years, but Bramleys seedling is far more vigorous, longer lived and larger growing than most of the others. They are moderate water demanders and tolerate pruning well if started when young. Traditional fruit tree pruning, consisting of regular light reduction and thinning can be effective in controlling water demand and root spread where there is a risk of damage in buildings, but long neglected trees often respond poorly.



Typical proportions of an Apple tree. Note the potential root zone.

The trees grow at a rate of 250mm a year to reach heights of around 7 - 10mtrs[4]. They have medium root activity and water demand, and can be associated with subsidence when planted close to the building, or in groups.

Privet (*Ligustrum).* Commonly encountered as a boundary definition hedge. Evergreen with medium root activity[5]. Can be associated with damage when situated close to a property. Tolerant of heavy pruning with quick regrowth. Along with other members of the Oleaceae (Forsythia, Jasmin, Privet and Lilac) family accounted for 354 enquiries, or 35% of the cards completed in the Kew Survey[6] between 1979 - 86.

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

[redacted]

OBSERVATIONS

The area of damage is to the main structure.

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

INTERNAL

Crack to bay in flat 26.

Crack to bay in flat 28

INTERNAL
Flat 26, Ground Floor.
Rear Bedroom.
Walls/Ceilings – emulsion.

- 3mm diagonal crack below the cill to right elevation of the south east bay.
- 0.5mm crack noted above head of the right elevation of the south east bay.
- 0.75mm crack below the cill to front elevation window of the south east bay.
- Cracking was noted to the junction between right and front elevations of the bay.
- Cracking was noted running along the cornice above bay.

Flat 28, First Floor
Lounge.
Walls/ceiling – emulsion.

- 0.5mm crack below the cill to the right elevation window of the south east bay.
- 0.5mm crack at junction of right elevation and front elevation of the south east bay.
- 0.75mm crack below the cill to the front elevation window of the south east bay.
- Hairline cracks were noted over the window heads to front and right elevation and balcony door of the south east bay.

[redacted]

EXTERNAL

Cracking to ground floor bay (Right Elevation)

Cracking to first floor bay (Right Elevation)

EXTERNAL
Bay, South East Corner.

- 8mm stepped cracking was noted to the right elevation window radiating from cill down to ground level through render plinth.
- A separation gap was noted between the window frame and brickwork.
- The window sash was noticeably out of square.
- 1-2mm crack was noted above head of the right elevation window running from the arch to underside of the cill to the first floor window.
- 1mm crack was noted below the cill to the front elevation of the bay.
- 1mm crack was noted above the front elevation bay window.

CATEGORY

In structural terms the damage falls into Category 3 of Table 1, Building Research Establishment[7] 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.

[7] Building Research Establishment [redacted]

[redacted]

DISCUSSION

The pattern and nature of the cracks 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.

RECOMMENDATIONS

The cause of the movement needs to be dealt with first. We have completed a soil risk analysis (VISCAT Assessment) and we are satisfied that your Apple Tree can be removed.

VISCAT models ground movement taking into account seasons, soil type, tree species, tree height and distance between the tree and the building. To accomplish this, it refers to a database of investigations and soil results.

It has been agreed that the insured is to remove their apple tree and then it was agreed the property will be monitored to make stability achieved prior to repairs being completed by the Insured as this will be within their £15,000.00 subsidence policy excess.

Luke Pipes Cert CILA
Subsidence Adjuster
[redacted]

[redacted]

PHOTOGRAPHS

Close up of cracking to first floor bay (Right Elevation)

Cracking to ground floor bay (Front Elevation)

Crack to bay area of flat 26.

Crack to bay area of flat 26.

Crack to bay and cornice flat 26.

Crack to bay flat 28

[redacted]