

TECHNICAL REPORT ON A SUBSIDENCE CLAIM

**33 Langbourne Avenue
London
N6 6PS**



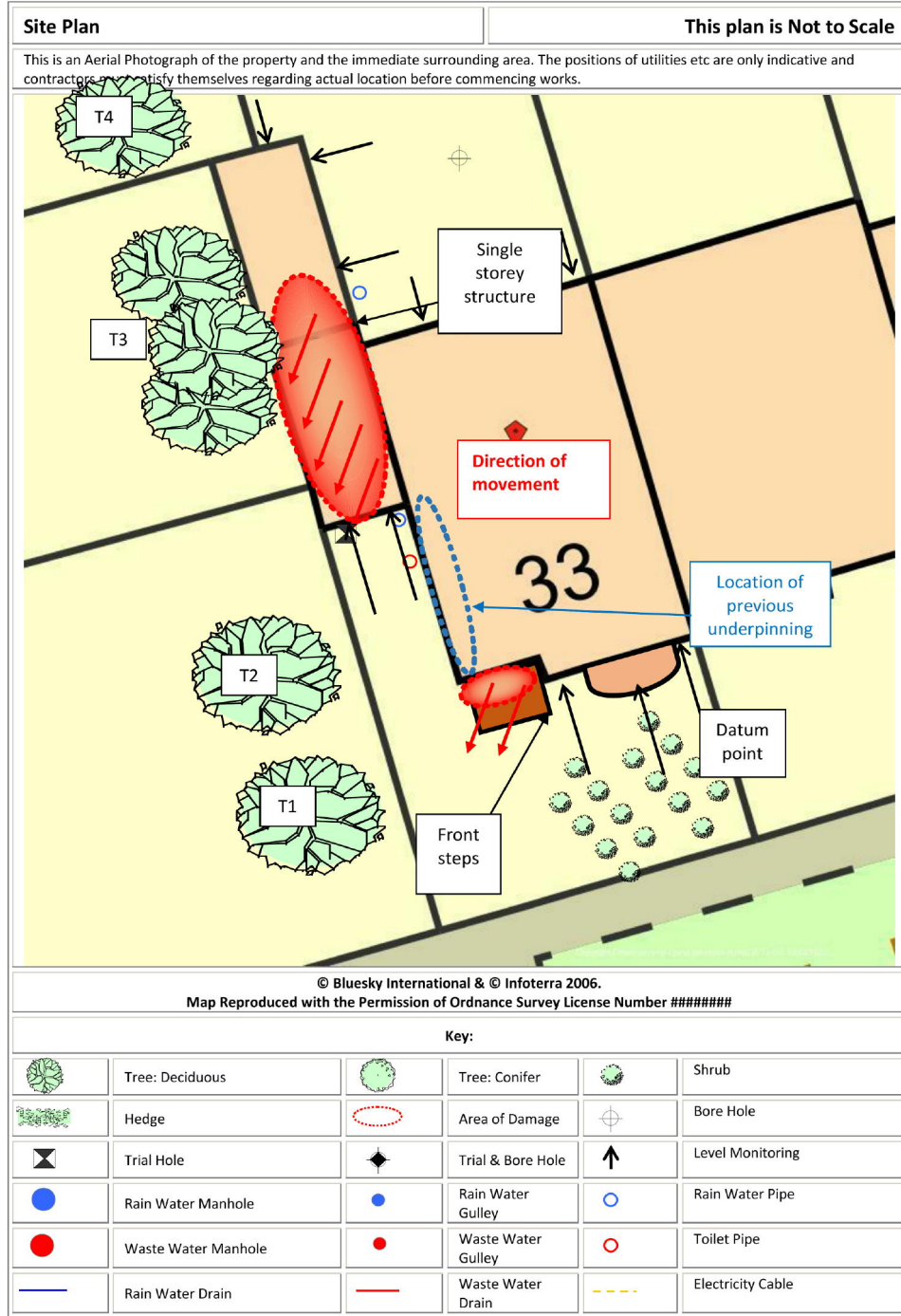
prepared for

SUBSIDENCE CLAIM

DATE 25 September 2018



[Redacted]
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[Redacted]
[Redacted]



INTRODUCTION

We have been asked by Midas Underwriting AXA 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.

PROPERTY

Three storey semi-detached house of traditional construction with rendered walls surmounted by a hipped, tiled roof.

HISTORY & TIMESCALE

Date of Construction	Circa 1900
Damage First Noticed	08 August 2018

TOPOGRAPHY

The property occupies a site sloping from front down to the rear

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). Tomlinson¹ describes it as a 'fat' clay with high loadbearing characteristics due to pre-consolidation pressures in its geological history.

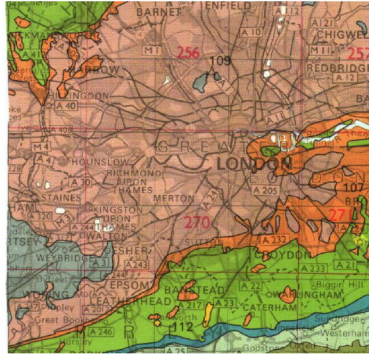
The upper horizon is often encountered at shallow depth, sometimes just below ground level. They have high shrink/swell potentials^{2, 3} and can be troublesome in the presence of vegetation.

¹ Tomlinson M.J. (1991) *"Foundations Design & Construction"* Longman Scientific Publishing.

² B.S. 5930 (1981) *"Site Investigations"*

³ Driscoll 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.



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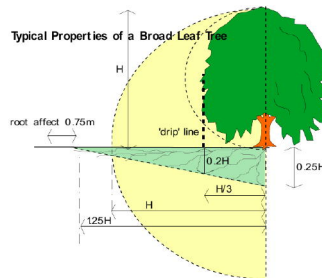
VEGETATION

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

Type	Height	Distance	Ownership
T1 Deciduous	10 m	6 m	Neighbour 1
T2 Oak	16 m	3 m	Neighbour 1
T3 Group of Deciduous	7 m	1 m	Neighbour 2
T4 Apple	7 m	2 m	Neighbour 3

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.

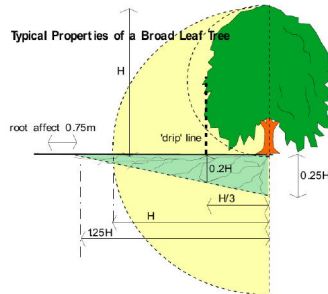
Broadleaf trees typically have wider spreading roots and higher water demands than coniferous species and many are better adapted to growing on heavy clay soils. Some are capable of sprouting from cut stumps or bare wood and most will tolerate pruning better than conifers.



Typical proportions of a broadleaf tree. Note the potential root zone. It must be noted that every tree is different, and the root zone will vary with soil type, health of the tree and climatic conditions.

However heavy pruning of any tree should be avoided if possible, as it stimulates the formation of dense masses of weakly attached new branches which can become dangerous if not re-cut periodically to keep their weight down.

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 activity⁴.

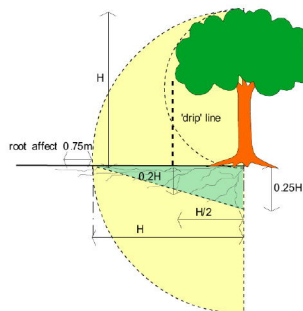


Typical proportions of an Oak showing the potential root zone. They have by far the most aggressive of root systems, often spreading considerable distances (1.5 x height or more).

Maximum tree-to-damage distance recorded in the Kew survey was 30mtrs, with 50% of all cases occurring within 9.5mtrs⁵. 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. 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.

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

⁵ Cutler & Richardson (1991) *"Tree Roots & Buildings"* Longman Scientific
Chartered Loss Adjusters

The trees grow at a rate of 250mm a year to reach heights of around 7 - 10mtrs⁶. They have medium root activity and water demand, and can be associated with subsidence when planted close to the building, or in groups.

OBSERVATIONS

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

INTERNAL



Study – vertical crack and separation of the roof structure



Study – separation to skirting board and crack

Utility room

Diagonal crack above left of door to study
Fine cracks below window
Door does not shut

Study

Separation along doorway to utility room floor tiles 2mm
Crack above door to side exit door 5mm
Series of cracks to left flank wall 2 to 10mm
Vertical crack above door to kitchen with separation along frame work 1 to 3mm
Separation crack around front door frame 2mm
Vertical separation top right corner to roof line 4mm
Separation to floor tiles along door way to kitchen
Separation to skirting board along left flank wall behind radiator

⁶ Richardson & Gale (1994) "Tree Recognition" Richardson's Botanical Identifications
Chartered Loss Adjusters

EXTERNAL

Front - vertical separation crack at junction of
single storey structure and main building



Cracks to front steps

Right return wall to the single storey structure

Unrelated minor crack below window

Minor crack above left of door to study

Front of single storey structure

Upward tapering vertical separation 5 to 45mm at junction to main building

Front steps

Dropping towards the front with several fractures

CATEGORY

In structural terms the damage falls into Category 5 of Table 1, Building Research Establishment⁷ Digest 251, which describes it as "very severe".

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, Garston, Watford. Tel: 01923.674040

DISCUSSION

The pattern and nature of the cracks is indicative 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

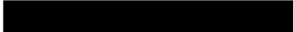
Although the cause of the movement needs to be dealt with, we note the nearby vegetation's is subject to a Preservation Order. Unfortunately, current legislation requires certain investigations to be carried out to support an application for the tree works.

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.

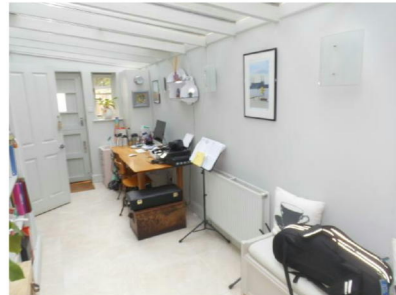
Matin Abdul BSC (Hons)
Subsidence Division



PHOTOGRAPHS



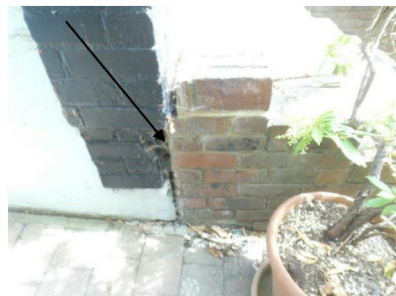
Rear of property showing single storey structure and neighbouring trees



Study



Neighbouring trees to front left of property



Separation crack to front steps