TECHNICAL REPORT ON AN ALLEGED SUBSIDENCE CLAIM

Crawford Reference: SU2004759

9 Rookwood Park
Horsham
West Sussex
RH12 1UB



Prepared for:

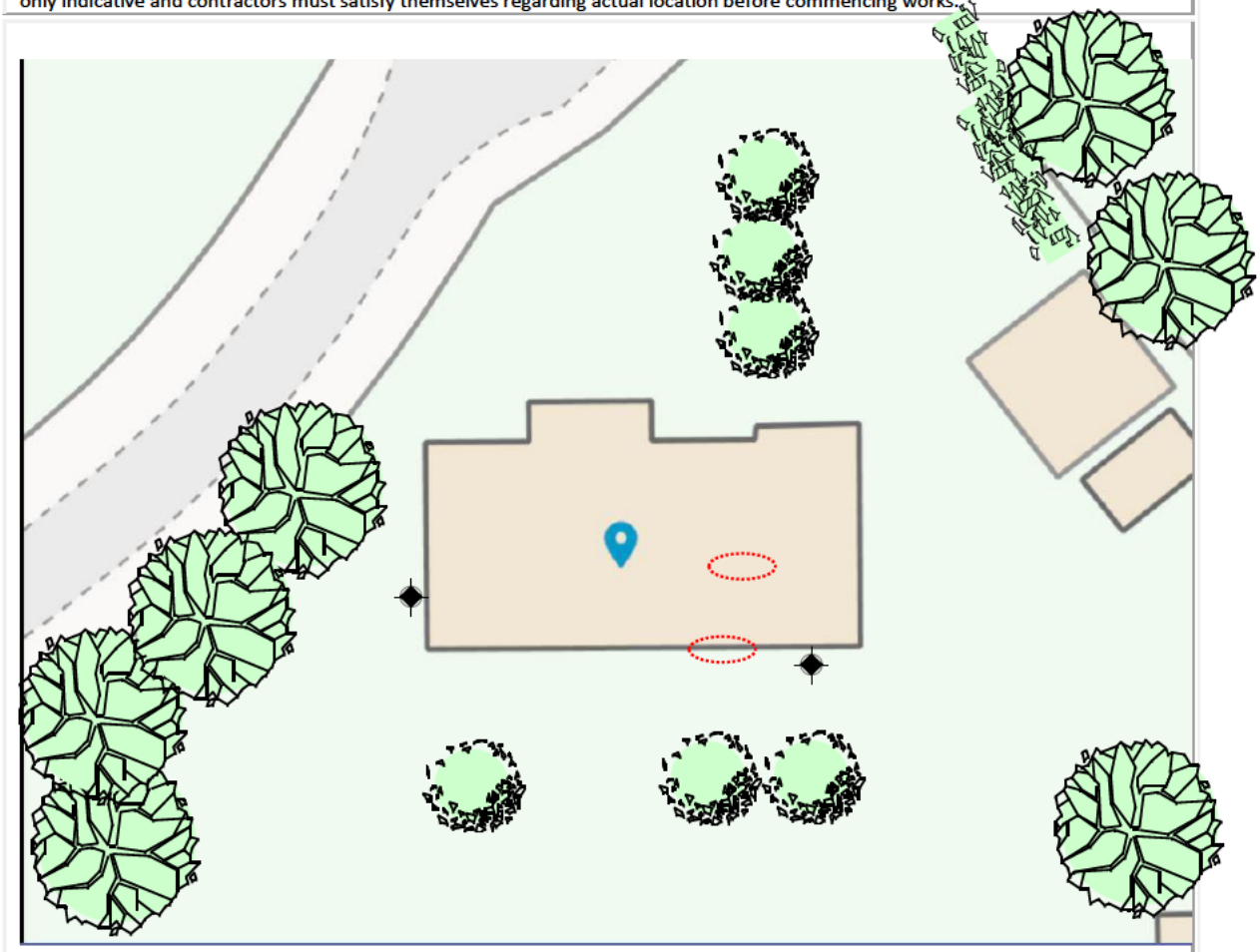
RSA - MORE TH>N
6th Floor,
Bowling Mill,
Dean Clough,
Halifax,
HX3 5WA

Claim Reference 202010008009
SUBSIDENCE CLAIM

Crawford & Company
Subsidence Division
Cartwright House,
Tottle Road,
Riverside Business Park, Nottingham, NG2 1RT

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.



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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

We have been asked by RSA - MORE TH>N 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 insured (nephew of the owners) noticed that cracks started to appear in the bathroom and hallway this year. On another visit to the property he noticed that the cracks grew larger. He decided to make a claim.

PROPERTY

Two storey detached house of traditional construction with brick walls surmounted by a hipped, tiled roof.

HISTORY & TIMESCALE

No further action

Date of Construction	1980
Purchased	1985
Policy Inception Date	27/07/2003
Damage First Noticed	06/10/2020
Claim Notified to Insurer	06/10/2020
Date of our Inspection	16/10/2020
Issue of Report	19/11/2020
Anticipated Completion of Claim	Spring 2021

TOPOGRAPHY

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

GEOLOGY

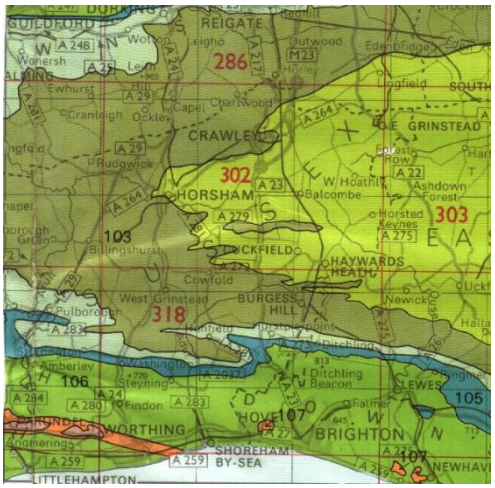
Reference to the 1:625,000 scale British Geological Survey Map (solid edition) OS Tile number TQSW suggests the underlying geology to be Weald Clays.
Weald Clays are marine deposits composed of shales and mudstones with sub-ordinate siltstones and sandstones. They are dark grey in colour, but weather to mottled yellow and brown near the surface[1].

Tomlinson[2] describes it as a 'fat' clay with high loadbearing characteristics due to pre-consolidation pressures in its geological history. Classified as being of high shrinkage potential by Driscoll[3], it may have a Plasticity Index of 50% or above, and suffers volumetric changes[4] in relation to its moisture content.

The superficial deposits are thought to be Sand and Gravel.
Sand is a detrital sedimentary rock (arenaceous - sandy) with a grain size in the range of 0.06 - 2mm in diameter. Individual [particles are mainly mineral fragments, and quart grains predominate[5]. Gravels on the other hand have particles in the range of 2 - 60mm in diameter. Above this, in size, are cobbles (60 - 200mm diameter) and boulders (200mm in dia. and above).

Generally a good bearing medium, but finer grained soils can suffer erosion in flowing water, and liquify when under the water table (quicksand). They can also be troublesome in earthquakes at shallow depth, and when loosely compacted.

Sands and gravels are termed non-cohesive soils, and apart from the above problems, tend to be stable. They do not suffer the shrink/swell problems of cohesive (clay) soils, and plants and trees are rarely troublesome when near to a property - apart from root infiltration to drains and services.



Geology. Reproduced with consent of The British Geological Survey at Keyworth.
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[1] Gallois R.W. (1992) *"British Regional Geology - The Wealden District"* BRITISH GEOLOGICAL SURVEY
[2] Tomlinson M.J. (1991) *"Foundations Design & Construction"* Longman Scientific Publishing.
[3] Driscoll R. (1983) *Influence of Vegetation on Clays"* Geotechnique. Vol 33.
[4] Table 1, Chapter 4.2, Para. 2.3 of N.H.B.C. Standards, 1986.
[5] B.S. 5930 (1981) *"Site Investigations"*

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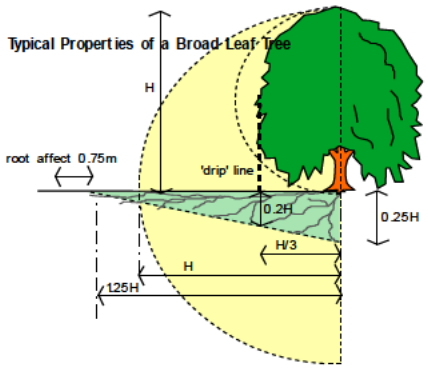
VEGETATION

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

Type	Height	Distance	Ownership
Deciduous	10 m	12 m	Owners
Deciduous	10 m	14 m	Owners
Shrubs	2 m	5 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.
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.
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.

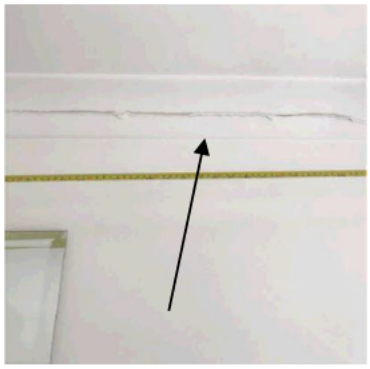
Berberis, Viburnum, Hedera (ivy), *Hydrangea and Pyracanthus* are also regularly associated with foundation movement, the latter having surprisingly large roots on occasions.

OBSERVATIONS

Bathroom and hallway

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

INTERNAL

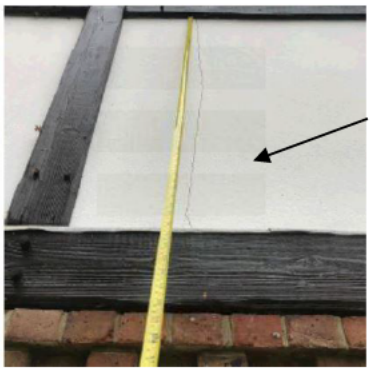




Internal cracks in bathroom along coving and wall. Also cracks in the hallway up to 2 mm wide.

EXTERNAL





A vertical hairline crack is visible around 1 mm wide.

CATEGORY

In structural terms the damage falls into Category 2 of Table 1, Building Research Establishment[6] Digest 251, which describes it as "**slight**".

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 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.

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

RECOMMENDATIONS

Due to close proximity of the trees it will be necessary to undertake further investigations.

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. We may also consider monitoring to establish the rate and pattern of movement.

We will report further once these investigations have been completed.

Colin Blackwood MSc MCIOB
Crawford & Company
Subsidence Division

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

PHOTOGRAPHS





