

ADDENDUM TPO REPORT

SUBSIDENCE CLAIM

Crawford Reference: 1784404

2 Greenside, Crowthorne, Berkshire, RG45 6EX

Prepared for

AXA Retail

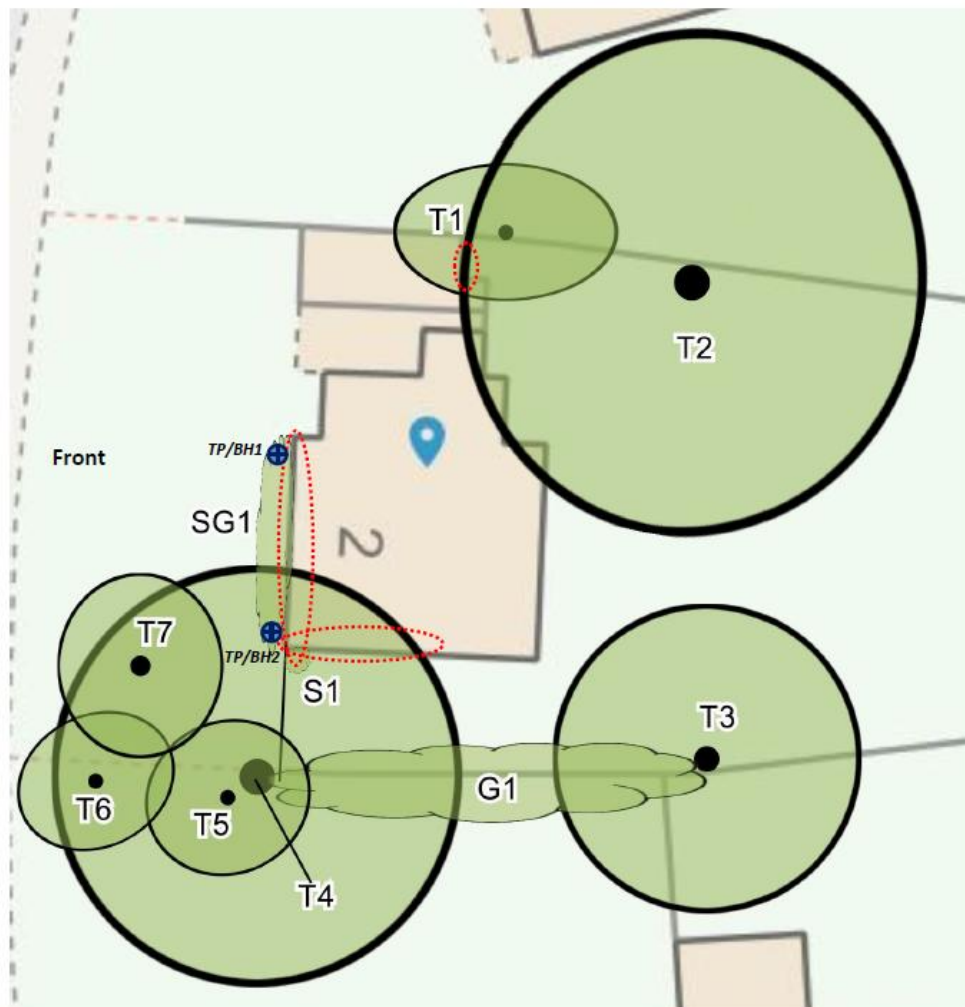


25 March 2026



Cartwright House, Tottle Road, Riverside Business Park, Nottingham, NG2 1RT

Site Plan



Plan not to scale – indicative only

 Approximate areas of damage

INTRODUCTION

We have been asked by AXA Retail Insurance to comment on movement that has taken place to the above property. We are instructed to describe the damage, establish a likely cause and list any mitigation or remedial measures required to stabilise the property.

Our report does not constitute a full structural survey of the property and 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. All locations are identified as if viewing from the front of the building.

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

TECHNICAL CIRCUMSTANCES

The damage was first noticed in July 2022 and hence Insurers were notified.

PROPERTY

The property consists of a two-storey detached house of traditional construction with brick walls surmounted by a gabled, tiled roof.

HISTORY

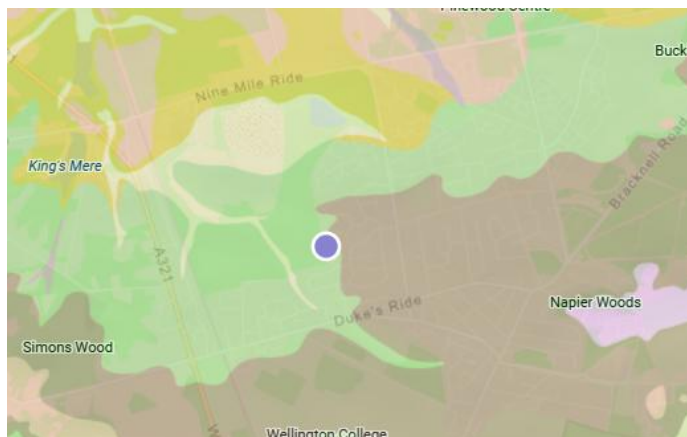
Date of Construction	C. 1960s
Date Purchased	2021
Date Damage First Noticed	01 August 2022
Claim Notified to Insurers	27 August 2022
Date of Initial Inspection	22 September 2022
Date of Site Investigation	8/11/2022

TOPOGRAPHY

The property occupies a site which slopes gently up from front to rear.

GEOLOGY & SOIL

Reference to the 1:625,000 scale British Geological Survey Map (solid edition) suggests the underlying geology to be Windlesham Formation-Sand, silt and clay. These sedimentary rocks are shallow-marine in origin. They are detrital, ranging from coarse- to fine-grained. Clay soil has been confirmed by the site investigations.



OBSERVATIONS

Following our initial inspection it was established that the damage to the property was caused by subsidence, believed to be as a result of root induced clay shrinkage. The area of damage is the front right.. Photographs of the initial damage reported are attached as an appendix to this report.

INTERNAL DAMAGE

There is no internal damage since the movement has occurred to the external walls below ground floor level.

EXTERNAL DAMAGE

Front Elevation

Horizontal crack 7 brick courses below DPC, extending from left corner of gable elevation tapering open to front right corner, max opening c.14mm. One vertical crack below this main horizontal crack about 2m from corner.

Right Flank Elevation

The horizontal crack noted above continues down the flank elevation, tapering to closure towards the rear but still open where the crack disappears below ground level (due to the sloping ground). The crack also shows there has been lateral movement to the right of c.5mm at the corner, tapering less to rear.

Garage

Stepped crack on rear wall at low level. Laser level indicates brick bed joints are level.

CATEGORY OF DAMAGE

In structural terms, with reference to Table 1, Building Research Establishment¹ Digest 251, the damage is categorised as Moderate (>5 but <15 mm) with maximum crack widths of mm.

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.

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 Building Research Establishment, Garston, Watford. Tel: 01923.674040

Table 1 **Current Claim - Tree Details & Recommendations**

Tree No.	Species	Ht. (m)	Dia. (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T4	English Oak	21	770	22 *	5	Older than Property	Joint Policy Holder & 1 Badgers Sett RG45 6EY
Management history		No significant recent management noted.					
Recommendation		Remove (fell) to near ground level. Owner to physically remove any regrowth (no chemical treatment due to translocation risk).					

Ms: multi-stemmed * Estimated value

Tree roots can be troublesome in clay soils because they can induce volumetric change.

INVESTIGATIONS

The following investigations were undertaken to identify the cause of movement. Two trial holes were excavated to expose the foundations of the front elevation (TH1) and (TH2). Boreholes were carried out through the base of the trial holes to confirm the soil profile at depth and provide soil and root samples for laboratory testing. Soil samples were retrieved from the excavations and wrapped in clingfilm before being bagged and deposited with a testing laboratory the same day. The laboratory had instructions to carry out Atterberg testing to confirm the plasticity index (PI) and shrinkage potential of the clay soil. See site plan for location and the table below for details.

TH/BH No.	Depth of Foundation	Depth of Borehole	Max. depth of Roots	PI Range	Shrinkage Potential
TH/BH1	600mm	3000mm	2500mm	24-45%	High
TH/BH2	810mm	3000mm	2500mm	21-31%	High

ROOTS

Roots retrieved from the beneath the foundations of the property in the area of subsidence damage were submitted to a botanist for identification, which confirmed the roots from Oak and Pine species.

ROOT IDENTIFICATION

2 Greenside, Crowthorne, RG45 6EX

Client Reference: 25253
Report Date: 22 November 2022
Our Ref: R48602

Sub Sample	Species Identified		Root Diameter	Starch
BH1:				
FL	<i>Quercus</i> spp.	1	12 mm	Abundant
1.5m	<i>Pinus</i> spp.		1 mm	Absent
2m	<i>Quercus</i> spp.	2	2 mm	Abundant
BH2:				
FL	<i>Pinus</i> spp.	3	2 mm	Absent
FL	<i>Quercus</i> spp.		2 mm	Abundant
1.5m	<i>Pinus</i> spp.		1 mm	Absent
1.5m	<i>Quercus</i> spp.	4	1.5 mm	Abundant
2m	<i>Pinus</i> spp.		1.5 mm	Absent
2m	<i>Quercus</i> spp.	5	6 mm	Abundant

Comments:

- 1 - Plus 2 others also identified as *Quercus* spp.
- 2 - Plus 1 other also identified as *Quercus* spp.
- 3 - Plus 1 other also identified as *Pinus* spp. Decayed roots.
- 4 - Plus 1 other also identified as *Quercus* spp.
- 5 - Plus 1 other also identified as *Quercus* spp.

Quercus spp. are oaks (both deciduous and evergreen).
Pinus spp. are pines.

Signed: G S Turner

Based on the above, the roots identified will have emanated from Oak T4 and from Pine T1, Oak T2, Oak T5, Oak T6 and Pine T7 noted in the Arboricultural report. The location of Oak T4 in relation to the damage indicates that this tree is the most likely dominant cause.

All of the Oak roots tested positive for starch meaning they were recently alive and active and will be having an influence on soil moisture at rooting depth.

DRAINS

The drainage survey completed at the time of the investigations has confirmed no evidence of damage or defect which could result in an escape of water to the underground drainage. The soil type and pattern of movement are also not consistent with damage which could be attributed to escape of water from damaged drains. Therefore, leaking drains can be dismissed as a possible cause of the subsidence damage affecting the property.

Analysis shows the borehole was dry on completion and no high moisture contents. Cyclic pattern of movement present as well as desiccation. There is nothing to suggest drainage as a mechanism. Uninspected drains are remote from the area of damage. The desiccated state of the soil confirms that leaking drains, an escape of water or soil softening were NOT factors in the damage.

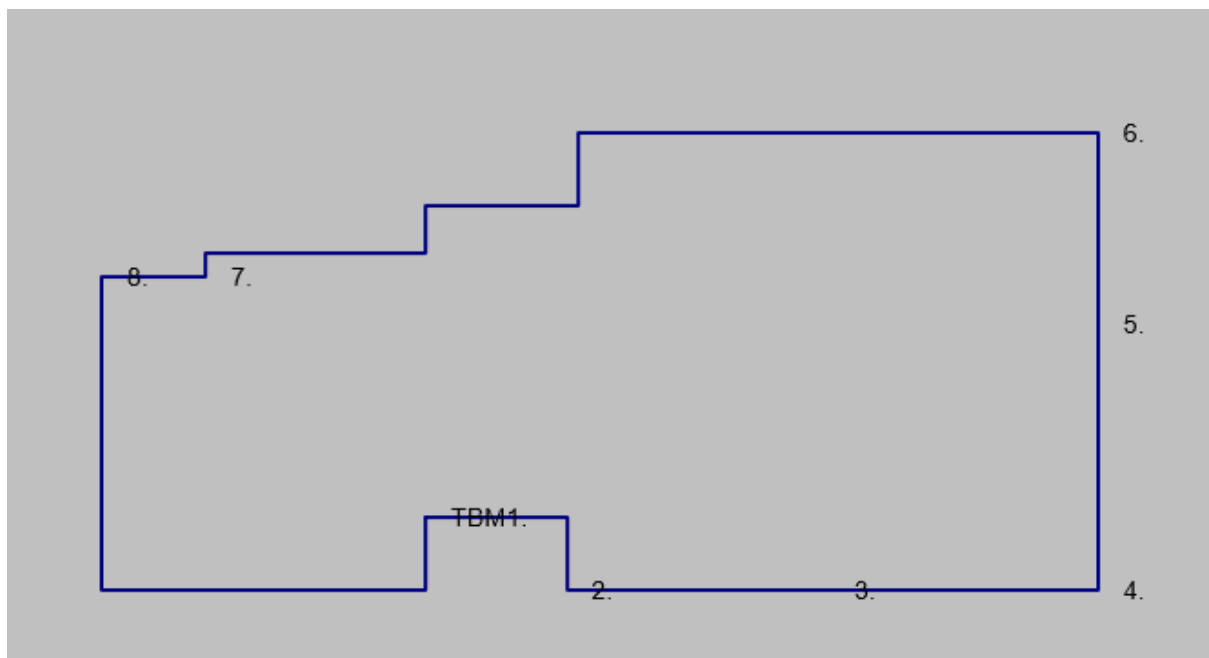
ARBORIST REPORT

The Arboricultural Consultants were appointed to provide their recommendations in relation to necessary tree management works to be undertaken in order to return long stability to the property. It is their opinion that the Oak tree T4 is judged to be exerting the principal vegetative influence in respect of the current damage and is, by virtue of its size and proximity, having a significant influence on soil volumes below the insured property due to localised moisture abstraction.

MONITORING

Level monitoring was undertaken between 14/10/2022 and 24/09/2024 which clearly shows evidence of cyclical seasonal movement consistent with root induced clay shrinkage, with downward movement during the summer and corresponding upward movement over the subsequent winter. The movement which is focused at points to the front and front right and shows movement of up to 4mm, is located in the area of subsidence damage affecting the property. This is characteristic of the seasonal pattern of foundation movement where vegetation is involved. No other cause produces a similar pattern.

The pattern of movement is not uniform around the property so 'nominal clay shrinkage' can be discounted as a cause; nearby vegetation is seen to be the source of the ongoing localised movement to the area of damage.

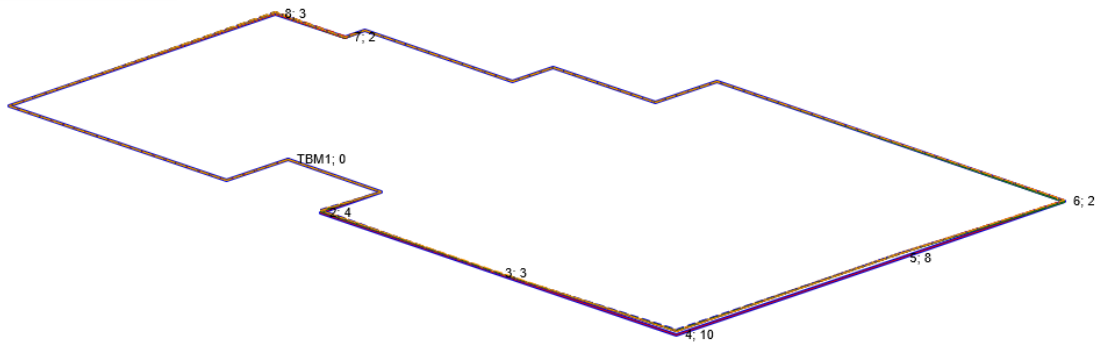


LEVEL MONITORING - RELATIVE MOVEMENT SKETCH

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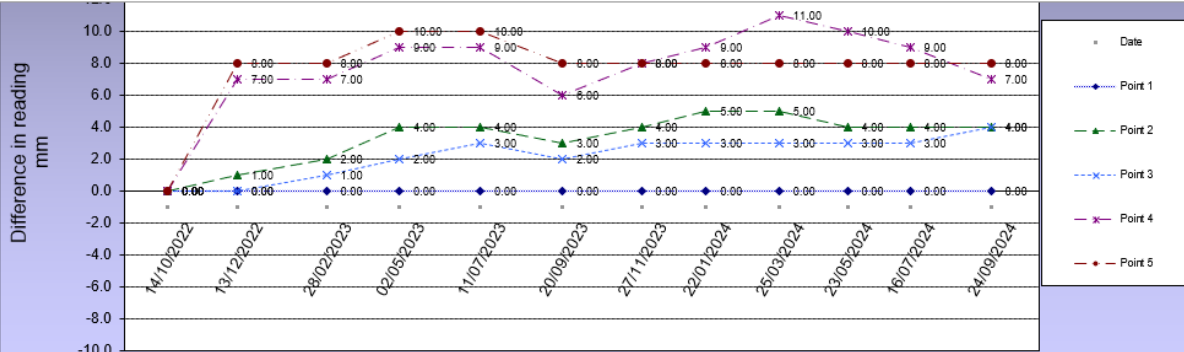


LEVEL MONITORING - RELATIVE SURVEY READINGS

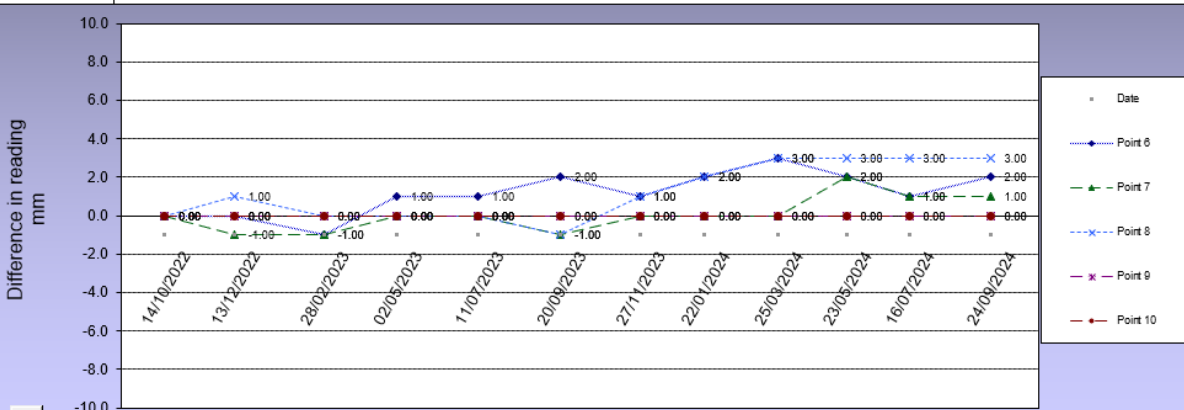
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Chart Scale 1:1000



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DISCUSSION

The results of the site investigations confirm that the cause of subsidence damage to the property is root-induced clay shrinkage. The clay is plastic and thus will shrink and swell with changes in moisture content. Roots have extracted moisture below the depth of the footings, thus causing differential foundation movement to occur. This is supported by the following investigation results:-

- Our initial site inspection and professional engineering opinion has identified damage to the property consistent with subsidence caused by root induced clay shrinkage.
- Atterberg limit testing indicates that the soil is plastic and hence will shrink and swell with changes in moisture content.
- The pattern of movement shown by level monitoring readings confirms seasonal cyclical movement with downward movement in the summer and upward movement over the winter / upward recovery of a desiccated clay soil consistent with root induced clay shrinkage. The movement is not uniform around the property so 'nominal clay shrinkage' can be discounted as a cause.
- Roots were found to the underside of the foundation and were identified as Oak and Pine. Starch was present in all Oak samples which indicates that the roots were alive at the time of retrieval.
- An expert Arboricultural report has confirmed that nearby vegetation is the cause of the subsidence related damage to the property and identified tree management works required to stabilise the property.
- The tree(s) can be felled without risk of heave related damage occurring to the building following a heave assessment by Crawford engineers.

MITIGATION OPTIONS

Tree removal – The removal of any trees that are causal or contributory will allow the soil beneath foundations to rehydrate and to recover its original moisture content. Once trees are removed the activity of roots is negated and foundations will stabilize and repairs can be undertaken. If appropriate tree removal is not undertaken then the damage is likely to continue and worsen.

Tree reduction option - Pruning is generally unreliable as a means of controlling water uptake. Whilst the tree remains, even if heavily pruned, damage is likely to continue or worsen, as the roots will continue to extract moisture from beneath foundations of the damaged building.

This is confirmed in the publications “CONTROLLING WATER USE OF TREES TO ALLEVIATE SUBSIDENCE RISK” © 2004 BRE on behalf of the Link Consortium for Horticulture Link Project No. 212 and the “Pilot study to determine the feasibility of using existing claims data to determine the impact of tree pruning on subsidence incidents on swelling clay soils” Hipps & Atkinson 2014. Conclusions of that publication are as follows:

Also, it is the case that when a building has suffered damage and its structural integrity has been compromised, the property remains at risk therefore (as in the “Delaware” judgement) measures need to be taken to ensure stability in the presence of active tree roots.

Once subsidence damage has occurred pruning is not a consistently reliable means of mitigation.

On page 98 of the BRE publication “Has your house got cracks?” Second Edition Freeman, Driscoll & Littlejohn 2002 it states “Removing the tree altogether will have the greatest and most immediate effect on the levels of desiccation in the soil.”

Also, from page 98 “In most cases there is no advantage in a staged reduction in the size of the tree and the tree should be completely removed at the earliest opportunity.

Root pruning option - Root pruning as a form of mitigation is inherently unreliable as the level of excavation required could include many cubic meters of soil to be guaranteed to have removed all roots causing a nuisance, to effect such a remedy might materially make the tree unsafe or so biologically damaged as to destroy the amenity being the subject of the attempted remedy. Also, new roots will immediately seek to colonise the soil subject to the root cutting and the nuisance will recur.

Root severance would cause the trees to become unstable as excavations would be well within the BS5837 root protection areas for this tree. (RPA = 12x stem diameter, 9.2m in this case)

Root barrier option – We have considered the feasibility of installing a root barrier within a deep trench. The excavations sever all roots, and a geotextile membrane provides a physical barrier to root growth and incorporates a repellent which diverts and inhibits roots. The severed roots then die and no longer absorb soil moisture, and the clay will then rehydrate, causing foundations to become stable again.

Due to the proximity of Oak T4 at 5m distance, any root severance would be within the BS5837 (2012) recommended Root Protection Area and is likely to cause the tree to become unstable. (RPA = 12x stem diameter, 9.2m in this case)

If a root barrier is not possible then the only alternative solution would be underpinning.

If the tree remains then the only appropriate solution would be underpinning to stabilise foundations, the cost of which have been quoted up to £350,000.

The “climate emergency” that has prompted the council to reduce its carbon footprint fails to address the fact that underpinning would have a negative effect and would have a far higher CO2 footprint than tree removal with replacement planting would do.

RECOMMENDATIONS

Tree Oak T4 – Fell to ground level (subject to TPO consent being granted)

Localised superstructure repairs shall proceed once all required tree management works have been completed and monitoring confirms stability of the property at a cost of circa £12,000. Should consent not be granted or third parties refuse to allow the required tree reduction works to be carried out, underpinning to the property will be required to arrest the movement, and we have been quoted costs up to £350,000 for these works.

Crawford and Company

Subsidence Division

Email: subsidence@crawco.co.uk

Appendix Photos

EXTERNAL



Front right

Front right corner



Garage rear wall – level brickwork

Garage rear wall crack



Rear elevation

Vertical crack on front elevation



Right flank looking towards front



Oak and pine trees