

ADDENDUM TPO REPORT

SUBSIDENCE CLAIM

Crawford Reference: 1875934

4 Teal Drive, Northwood, Middlesex, HA6 2PT

Prepared for

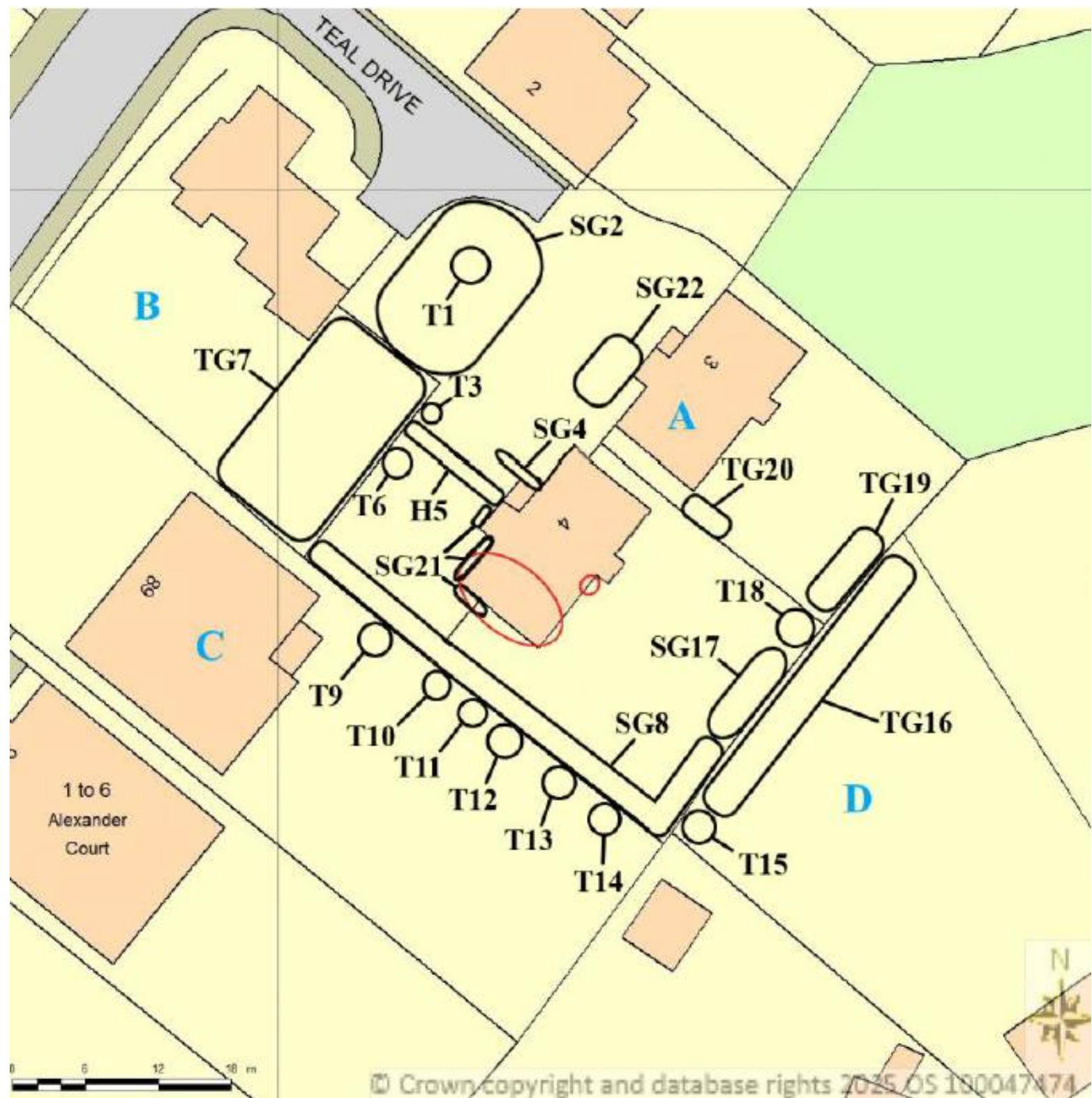
AXA Retail
AXA Direct House



6 March 2026



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



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

Significant cracking both internally and externally. You can see tree roots coming up through the lawn. Structural engineer has commented - As mentioned, there is a strong possibility that the cracks beneath the window and upstairs are related to subsidence, given that the property is surrounded by vegetation and the drainage line is close to the front elevation. In addition, the separation at the junction of the wall and terrace is most likely the result of foundation movement affecting the terrace structures

PROPERTY

The Property is a part 2 storey and part 3 storey detached house.

HISTORY

Date of Construction	1990
Date Purchased	01 November 2000
Date Damage First Noticed	26 August 2025
Claim Notified to Insurers	01 September 2025
Date of Initial Inspection	01 October 2025
Date of Site Investigation	October 2025

TOPOGRAPHY

The site is steeply sloping with different slopes but mainly down 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 Bedrock.

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. Front right, rear patio, left bed over garage. Photographs of the initial damage reported are attached as an appendix to this report.

INTERNAL DAMAGE

The insureds engineer apparently looked inside but provided no comments.

In the order that the insured took us round and hence our photos. All rooms decorated with emulsion paint to walls and ceiling;

First floor front right en suite Bathroom - 2.25L x 1.55W x 2.38H is above the Lounge and both rooms over the position of the external "front elevation -Living area window" crack.

Sink and WC on front elevation wall. Bottom left window corner 5mm crack extending down to the tiled boxing

Adjacent to Bathroom is front right full width L shaped "Master Bedroom" - 8.03L x 4.40W x 2.38H
3 crack positions seen;

Front right corner dressing area has front elevation and corner multiple crack lines 1/3mm in the upper walls

Further into the room 1/2mm ceiling crack and to top of walls around a 90 degree corner

Back elevation back right position a 1/2mm short crack over top right window corner

Back elevation central small bedroom - 3.50L x 2.69W x 2.42H

A single 1mm crack centrally under sill and behind radiator

Front left first floor bedroom - 3.02L x 4.68W x 2.40H

A single 1mm bottom right corner window crack.

Back left corner First floor bedroom- 4.61L x 3.40W x 2.39H

Under back elevation windowsill glazed type 1mm cracking

1mm cornice crack above the same window

Ground floor right side through lounge runs front to back- 7.99L x 4.35W x 2.38H

The front elevation left side of window was the position of an engineer described external vertical crack

Front elevation large window;

Top right 3/4mm curved crack

Bottom right feint crack ridge

Top left 1mm short jagged crack

Bottom left sill end crack 1/2mm

Also front right corner high-level wall cracks hairline to 1mm. One horizontal around corner and one mid height vertical. Cracking and separation to cornice

Rear elevation bi-fold doors;

Top left 1mm crack slightly away from windows corner

Bottom left no cracks

Top right 6mm crack from window corner tapering down the side of the window to mid height before fading out

EXTERNAL DAMAGE

Rather than duplicate the Engineer's comments we enclose below their external observations which are accompanied by our own annotated photos and cross referenced to any internal damage at the same positions;

Ground conditions & context

British Geological Survey mapping indicates the local subsoil comprises clay, silt and sand. The property is also surrounded by several mature trees (including conifers, silver birch and oak). On clay-dominated ground, nearby trees can drive seasonal shrink/swell, and long-term drainage defects can soften or wash out supporting soils-both mechanisms capable of causing cracking and differential movement.

Structural Engineer

Key observations

1. Front elevation - living area window

A vertical crack of ~3 mm is present beneath the living-room window. It starts at the window sill and continues down toward the DPC.

The window in this location is stiff, consistent with minor distortion of the opening.

Similar cracking is also visible above this window to the first-floor front bedroom and the adjacent toilet.

On the BRE scale, a 3 mm crack is Category 2 (Slight).

2. Rear elevation - junction with raised terrace

At the junction between the left-hand wall forming the retaining structure to the raised terrace/garden access and the rear end wall of the property, there is a significant vertical separation extending through the full height of the joint.

The separation measures approximately 40 mm, indicating the two walls are moving independently (differential movement).

Whilst not mentioned in the engineer report we also observed;

Front left corner over the garage entrance a vertical joint crack 1mm in the upright brick course then extending up through a further 5 brick courses in stepped 1mm line. Nothing adverse was seen internally over the garage door and no change to the up and over metal door operation

Centrally in front of the house a 2m high double skin brick retaining wall has full height stepped vertical cracking 3/5mm gaps. A conifer hedge is directly behind

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.

VEGETATION

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

Ref.	Species & estimated age	Hight DBH (m)	Dist. to area of damage (m)	Vitality & previous works	Tree owner/ location	Recommendation	TP O CA
H5	Leylandii	2	4.5 #	Good Regular pruning	Insured	Remove stems within 5 metres of area of damage and maintain remainder at no greater than current size through regular pruning.	No
T9	Oak 100 Early-mature	12 (0.50)	8.5 #	Poor Reduced	Neighbour (see plan)	Remove close to ground level and treat stumps with herbicide to inhibit regrowth.	TPO
T10	Oak 120 Early-mature	14 (0.60)	6.7 #	Good Reduced	Neighbour (see plan)	Remove close to ground level and treat stumps with herbicide to inhibit regrowth.	TPO

¹ Building Research Establishment, Garston, Watford. Tel: 01923.674040

Ref.	Species & estimated age	Hight DBH (m)	Dist. to area of damage (m)	Vitality & previous works	Tree owner/ location	Recommendation	TP O CA
SG21	Choisya, Pyracantha, Acuba, Camilia , Mixed shrubs	2	0.5 #	Good	Insured	Remove close to ground level and treat stumps with herbicide to inhibit regrowth.	No

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. 3 Trial holes were excavated to expose the foundations of the left front corner of the property (TP/BH1), right hand side of the property (TP/BH2) and the rear of the property (TP/BH3). 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	1100mm	1300mm	1100mm	41%	High
TH/BH2	1200mm	3000mm	-	40-42%	High
TH/BH3	1100mm	3000mm	-	42%	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 Quercus spp. (oaks – both deciduous and evergreen).

Based on the above, the root identified will have emanated from T9 Oak and T10 Oak noted in the Arboricultural report.

(Starch present) Some of the 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 CCTV drainage survey completed at the time of the investigations has revealed some accidental damage to the underground drainage. The soil type and pattern of movement are not consistent with damage which could be attributed to escape of water from damaged drains. The damage to the drains is therefore attributed to the ground movement also affecting the foundations of the property. Therefore, leaking drains can be dismissed as a possible cause of the subsidence damage affecting the property. Whilst leaking drains are not a factor in the movement to the property it would be prudent to repair them, and we have requested this work is carried out.

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 H5 Leylandii, T9 Oak, T10 Oak and SG21 Choisya are judged to be exerting the principal vegetative influence in respect of the current damage and are, by virtue of their size and proximity, having a significant influence on soil volumes below the insured property due to localised moisture abstraction.

PREVIOUS TREE WORKS

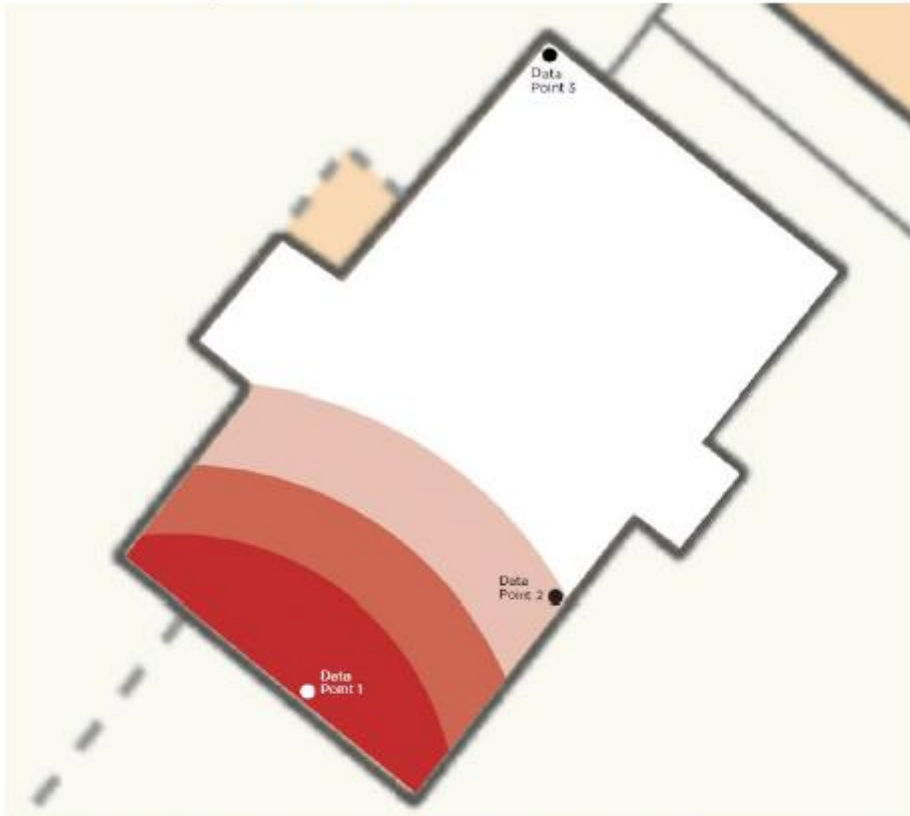
None at present.

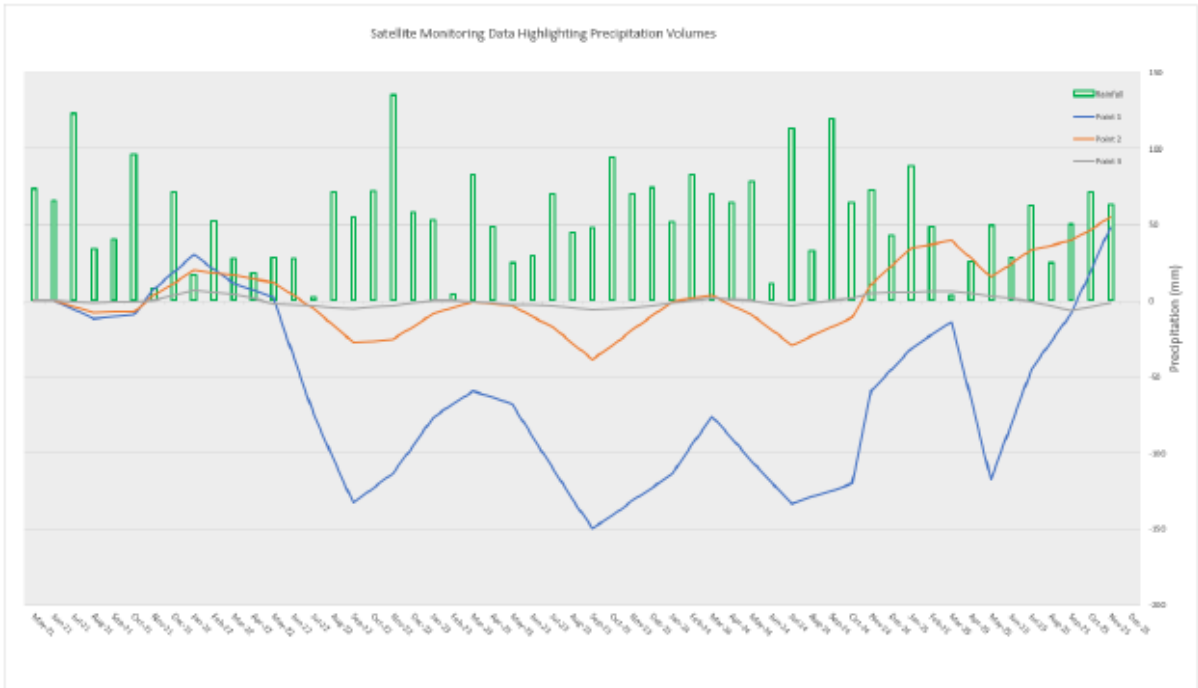
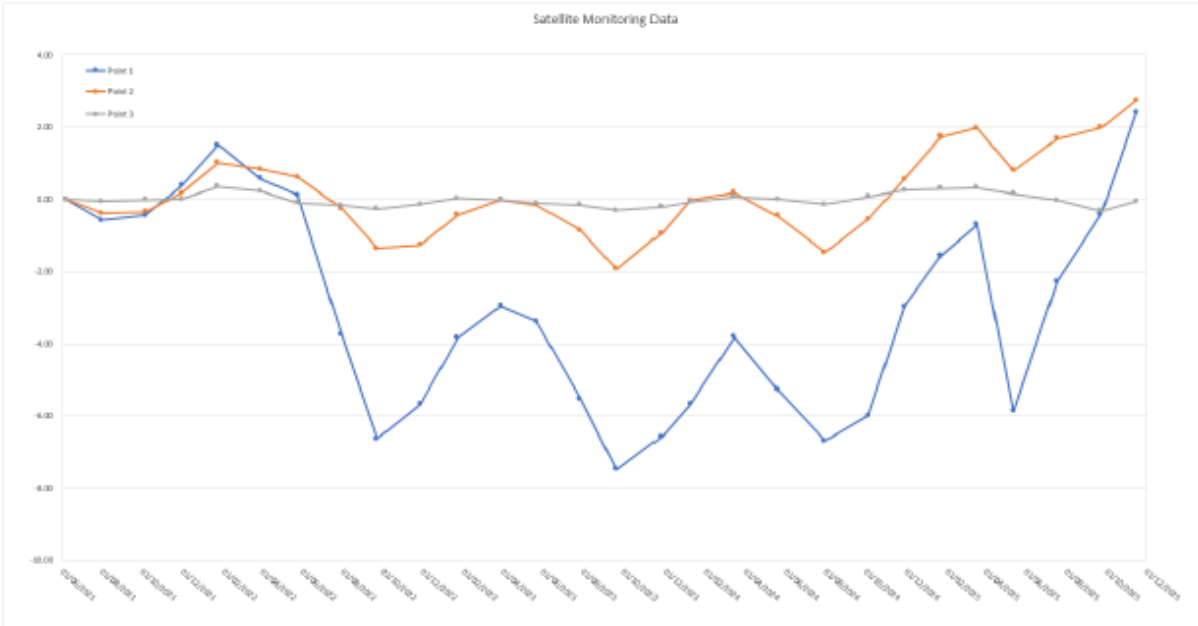
MONITORING

Satellite monitoring was undertaken between 07/06/2021- 16/11/2025 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 1 and 2 and shows movement of up to 7.49mm, 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 front right, rear Patio and the left bend over the garage.

Figure (i) – Site plan denoting areas of varying movement
(Darker Red denoting increase in movement)





Note – If Seasonal movement continued following the removal of previous vegetation. Add the following (but amend as necessary) E.G Following the removal of T1 ongoing movement has been recorded confirming the influence of the remaining tree T2. The movement is not uniform around the property so nominal clay shrinkage can be discounted as a cause; the movement is prominent nearest the remaining tree.

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 satellite 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 *Quercus* spp. Starch was present 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 risk of heave related damage occurring to the building will have to be considered as the implicated trees (T9 Oak and T10 Oak) are older than the affected structure.

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/these tree(s).

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 T9 Oak and T10 Oak any root severance would be within the BS5837 (2012) recommended Root Protection Area and is likely to cause the tree to become unstable.

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

RECOMMENDATIONS

Hedge H5 – Remove stems within 5 metres of area of damage and maintain remainder at no greater than current size through regular pruning.

Tree T9 – Remove close to ground level and treat stumps with herbicide to inhibit regrowth (subject to TPO consent being granted).

Tree T10 – Remove close to ground level and treat stumps with herbicide to inhibit regrowth (subject to TPO consent being granted).

Shrub Group SG21 – Remove close to ground level and treat stumps with herbicide to inhibit regrowth.

Crawford and Company

Subsidence Division

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Enviro Trees

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Appendix Photos



H5



H5



T9



T9



T10



T10



SG21



SG21