ADDENDUM ARBORICULTURAL REPORT

SUBSIDENCE CLAIM

Crawford Reference: 1780041

Insurer Claim Reference: Bh/2/bw/103190

180 Camden Road, London, NW1 9HG

Prepared for

Allianz Insurance

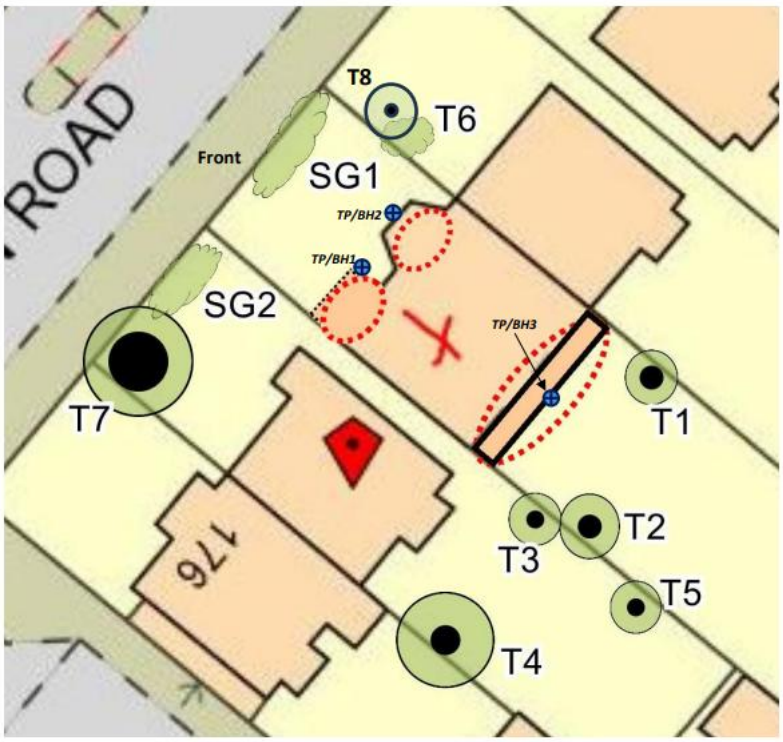
28 November 2024

Crawford Claims Solutions – Subsidence

Cartwright House,

Tottle Road,

Riverside Business Park, Nottingham, NG2 1RT



INTRODUCTION

We have been asked by Allianz 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.

This report outlines the arboricultural issues and should be read in conjunction with the Arboricultural Report dated 09 November 2023 and the site investigations including soil and root testing and level monitoring, which are summarised within this report.

TECHNICAL CIRCUMSTANCES

The insured has owned the leasehold the 2nd floor flat since 1995. The freehold to the building was later purchased in 2015.

The leasehold to the garden basement flat and the first floor flat is separately owned.

We understand cracking to the front bay was discovered in August 2018. Damage to the front entrance porch was identified in August 2019.

An inspection by local Engineers, SB Consulting Engineers was undertaken on 20th September 2019 which recommends a subsidence claim is reported to Insurers.

PROPERTY

The property is a semi-detached three storey block consisting of traditional construction with part rendered masonry walls surmounted by a pitched tiled roof. The property incorporates three self contained flats.

HISTORY

Date of Construction	Circa 1840
Date Damage First Noticed	September 2019

TOPOGRAPHY

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

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 main areas of damage affect the front bay, front porch and rear elevation. Photographs of the initial damage reported are attached as an appendix to this report.

Cracks to first floor flat

Cracking to bay

INTERNAL DAMAGE

Garden Basement Flat:

Entrance hall

- Slight cracking was noted above the lounge door.

- Slight horizontal cracking was noted to the rear wall at head height.

Front lounge

- Slight cracking was noted to the left hand side of the bay at its junction with the main house.

- To the right hand wall cracking was noted either side of the hall door head.

Rear bedroom

- To the right hand wall slight cracking was noted above the corridor door (seen both sides).

- To the rear wall, 3mm wide cracking was noted to the top right of the window.

1st Floor Flat:

Front lounge

- Slight cracking was noted to the left hand side of the bay at its junction with the main house.

- To the right hand dividing wall, a slight diagonal crack was noted to the front corner which extends upto the rear.

EXTERNAL DAMAGE

Front Entrance Porch:

- Cracking, upto 10-15mm in width, was noted at the junction between the porch and main house/extension.

- Stepped cracking, upto 6mm in width was noted the right hand wall of the porch.

Front bay

- Stepped cracking / displacement of flat brick lintels were noted to the left hand return wall of the bay.

Rear elevation

- Diagonal / stepped cracking was noted to above and below door and window openings.

NOTE: The damage to the rear has been addressed by vegetation management. The remaining area of damage to be dealt with is to the front, relating to the front bay and front entrance porch.

Cracking to porch

Cracking to bay

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

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

GEOLOGY & SOIL

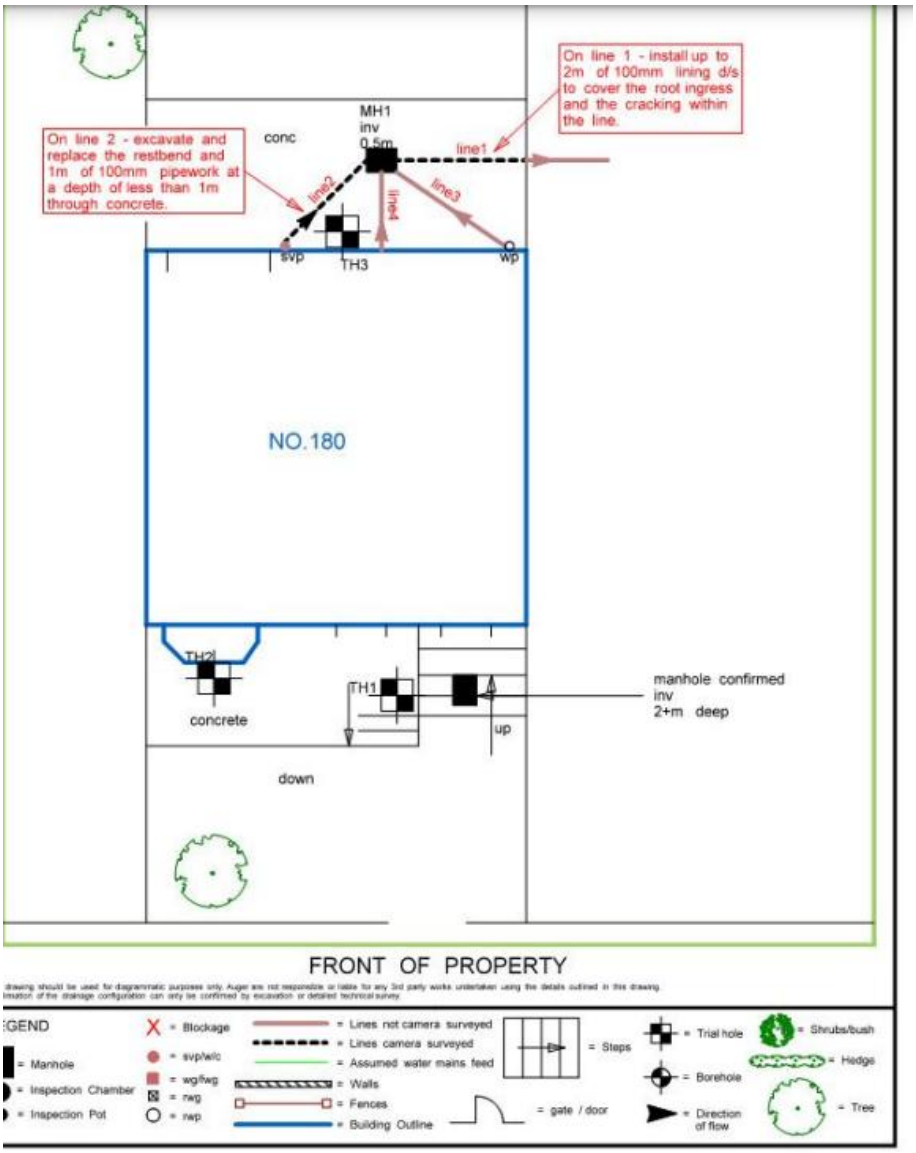
Reference to the 1:625,000 scale British Geological Survey Map (solid edition) suggests the underlying geology to be London Clay. The superficial deposits are thought to be Clay Soils. Clay soil is also confirmed by the site investigations.

Two site investigations have been undertaken and are summarised below:

SITE INVESTIGATIONS - January 2020

The following investigations were undertaken in January 2020 to identify the cause of movement.

Foundation depths confirmed at 600mm (front) to 1000mm (rear) bearing onto clay soil that has high plasticity, meaning it can significantly shrink and seal seasonally due to fluctuations in moisture content.



Laboratory tests confirm (significant) desiccation has occurred where roots were observed, the moisture contents being at or significantly less than 0.5x the Liquid Limit, this indicates abnormal soil drying in the presence of tree roots.

Sample Soil Suction in TH1 and TH2 to the front range from 31kPa (very slight desiccation) to 448kPa (sever desiccation) according to BRE Digest 412 “Desiccation in Clay Soils” 1996:

Table 1 Severity of desiccation related to excess suction

Severity of desiccation	Excess suction kPa
Very slight	0 – 50
Slight	50 – 100
Moderate	100 – 250
Severe	250 – 500
Very severe	500+

It is notable that the sampling was undertaken at a time of year when soil moisture deficits due to root activity would be at their lowest and we would expect significantly drier soil during summer months when roots are active.

Note: The greatest desiccation is within TH2, which is closest to the neighbour’s Ailanthus tree T7, covered by a Tree Preservation Order.

TH Trial Hole	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing .425mm %	NHBC Chapter 4.2	Remarks
TH1	D	0.60	23	55	21	34	70	MEDIUM VCP	CH High Plasticity
TH1	D	1.10	30						
TH1	D	1.60	33	52	20	32	73	MEDIUM VCP	CH High Plasticity
TH1	D	2.10	29						
TH1	D	2.60	27	59	23	36	81	MEDIUM VCP	CH High Plasticity
TH2	D	0.60	31	63	25	38	84	MEDIUM VCP	CH High Plasticity
TH2	D	1.10	31						
TH2	D	1.60	30	66	23	43	78	HIGH VCP	CH High Plasticity
TH2	D	2.10	29						
TH2	D	2.60	28	61	21	40	87	MEDIUM VCP	CH High Plasticity

Roots were recovered from depths of up to 1.6m

ROOTS

The recovered roots were sent for laboratory testing and the results are as follows:

Root ID

The samples you sent in relation to the above have been examined. Their structures were referable as follows:

TH1, 1.1m		
2 no.	Examined root: most referable to MORUS (Mulberry), or the related BROUSSONETIA (a tree with fig-like leaves and, when flowering, small round clusters of orange flowers). In their absence, we would suggest RUBUS (scrambling shrubs, mostly prickly, this group includes Raspberries and Blackberries).	Alive, recently*.
TH1, 1.6m		
1 no.	Examined root: a POOR sample, also without bark. We cannot rule out MORUS and the related BROUSSONETIA (see above). The next best suggestion would be the family LEGUMINOSAE (a group of closely related trees: Robinia (False Acacia), Laburnum, Sophora (Pagoda tree), Gleditsia (Honey Locust), Cercis (Judas tree/Redbud), Albizia (Silk tree), Acacia (Mimosa), as well as such shrubs as Wisteria, Lupins, Gorse and Brooms).	Alive, recently*.
1 no.	Although examined microscopically, this was found to be only a section of either twig, stem or sucker - NOT a root. Not identified.	
TH2, 1.1m		
1 no.	Examined root: again, could be either MORUS, the related BROUSSONETIA - or - the family LEGUMINOSAE (see previous lists). As above, this was a POOR sample, without bark.	Alive, recently*.

Click here for more information: LEGUMINOSAE MORUS

I trust this is of help. Please call us if you have any queries; our Invoice is enclosed.

Yours faithfully

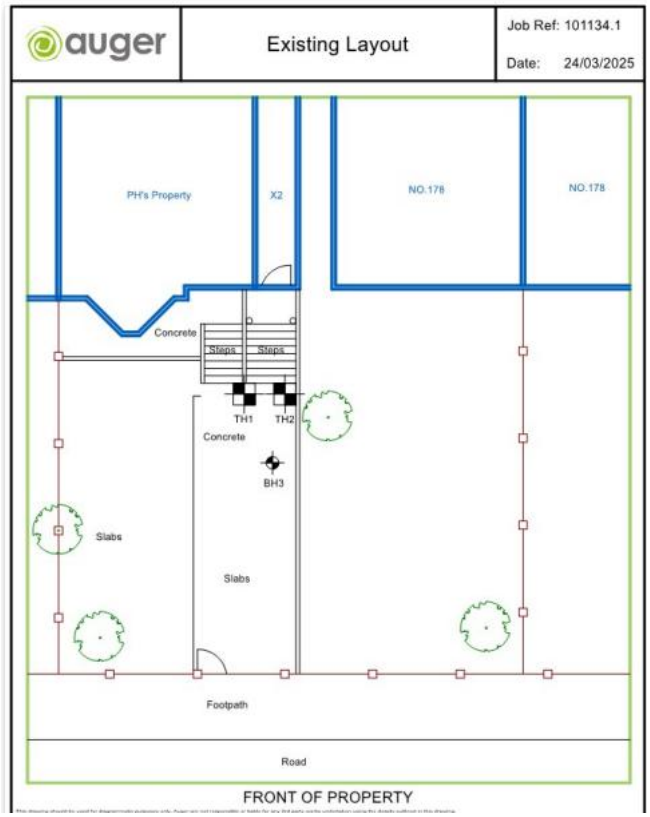
Dr Ian B K Richardson

Based on the above, the root identified is inconclusive due to small sample sizes. As there are no items of vegetation nearby that relate to the species suggested in the root identification, it is considered that the roots are most likely emanating from the Ailanthus tree T7 to the front right of the building, within a neighbour's front garden.

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.

The test borehole is a limited sampling exercise that is mainly to determine soil conditions. The sampling of roots can be a "hit and miss" affair as it is the microscopic hair roots emanating from small diameter fibrous roots that absorb soil moisture. It is not always possible to retrieve root samples, however it does not mean that there are no roots of larger diameter nearby. This will depend on the species involved and the distance for the area of damage, see later within this report.

Site investigations – March 2025



GSTL — GEOTECHNICAL SITE & TESTING LABORATORIES

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX
(BS 1377:1990 - Part 2 : 4.4 & 5.3)

auger

GSTL Contract Number	77896
Report Date	31/03/2025
Auger Reference	101134.3.2.RSS
Remarks	NP - (Non-Plastic), # - (Liquid Limit and Plastic Limit Wet Sieved)

TH Trial Hole	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing 425mm %	NHBC Chapter 4.2	Remarks
TH1	D	0.15	30	66	25	41	93	HIGH VCP	CH High Plasticity
TH1	D	0.65	29						
TH1	D	1.15	30	62	25	37	94	MEDIUM VCP	CH High Plasticity
TH1	D	1.65	30						
TH1	D	2.15	29	69	25	44	94	HIGH VCP	CH High Plasticity
TH1	D	2.65	24	62	17	45	95	HIGH VCP	CH High Plasticity
TH2	D	0.45	28	63	23	40	90	MEDIUM VCP	CH High Plasticity
TH2	D	0.95	28						
TH2	D	1.45	30	67	23	44	91	HIGH VCP	CH High Plasticity
TH2	D	1.95	29						
TH2	D	2.45	26	67	20	47	93	HIGH VCP	CH High Plasticity
TH2	D	2.95	21	58	18	40	94	MEDIUM VCP	CH High Plasticity
TH3	D	0.50	30	67	24	43	89	HIGH VCP	CH High Plasticity
TH3	D	1.00	27						
TH3	D	1.50	25	65	21	44	92	HIGH VCP	CH High Plasticity
TH3	D	2.00	29						
TH3	D	2.50	23	62	19	43	93	HIGH VCP	CH High Plasticity

There are indications of the onset of desiccation, despite sampling having occurred at a time of year when soil moisture deficits would be at their lowest and we would expect significantly drier soil during summer months when roots are active.

Roots

Roots were recovered from depths of up to 1.45m.

Root ID

The samples you sent in relation to the above on 24/03/2025 have been examined. Their structures were referable as follows:

TH1, 0.15m		
5 no.	Examined root: AILANTHUS (Tree of Heaven).	Alive, recently*.
TH1, 0.65m		
1 no.	Examined root: AILANTHUS (Tree of Heaven). Only 0.4mm in diameter.	Dead* (this result can be unreliable with such thin samples).
1 no.	Examined root: also very THIN. Most like PRUNUS (Cherries, Plums and Damsons, Almonds, Peaches and Apricots, Blackthorn/Sloe, as well as the shrubby Cherry-laurel and Portugal-laurel).	Dead*.
3 no.	All pieces of BARK only - not enough material for identification.	
3 no.	Unfortunately all with insufficient cells for identification.	
TH2, 0.45m		
4 no.	Examined root: AILANTHUS (Tree of Heaven).	Alive, recently*.
4 no.	All pieces of BARK only - not enough material for identification.	
TH2, 0.95m		
6 no.	Examined root: AILANTHUS (Tree of Heaven).	Alive, recently*.
6 no.	All pieces of BARK only - not enough material for identification.	
TH2, 1.45m		
8 no.	Examined root: AILANTHUS (Tree of Heaven).	Alive, recently*.

TH3, 0.50m		
4 no.	Examined root: AILANTHUS (Tree of Heaven).	Alive, recently*.
4 no.	Unfortunately all with insufficient cells for identification.	
TH3, 1.00m		
4 no.	Examined root: AILANTHUS (Tree of Heaven).	Alive, recently*.
2 no.	Both samples revealed too few cells for microscopic identification.	

Click here for more information: AILANTHUS PRUNUS

I trust this is of help. Please call us if you have any queries; our Invoice is enclosed.

Yours faithfully

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Dr Ian B K Richardson

The recovered roots will relate to Ailanthus T7, many of the roots tested positive for starch thus confirming their influence on soil moisture.

DRAINS

No drain defects have been identified.

The desiccated condition of the soil indicates that soil softening due to an escape of water is not a factor in the damage.

VEGETATION

There are trees and shrubs nearby, some with roots that may extend beneath the foundations. The following are of particular interest and recommendations have been made to provide a remedy to the damage:-

Note: Works to vegetation at the rear were undertaken during September 2022 and April 2023 and all related to damage at the rear.

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

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T7	Tree of Heaven	17 *	650 *	13 *	12 *	Younger than Property	Third Party 178 Camden Road NW1 9HG
Management history		Subject to past management/pruning.					
Recommendation		Remove (fell) to near ground level and grind out stump to inhibit regrowth.					
T8	Cherry	9*	200 *	5*	6*	Younger than Property	Third Party 182 Camden Road NW1 9HG
Management history		Subject to past management/pruning.					
Recommendation		Remove (fell) to near ground level and grind out stump to inhibit regrowth.					

Ms: multi-stemmed * Estimated value

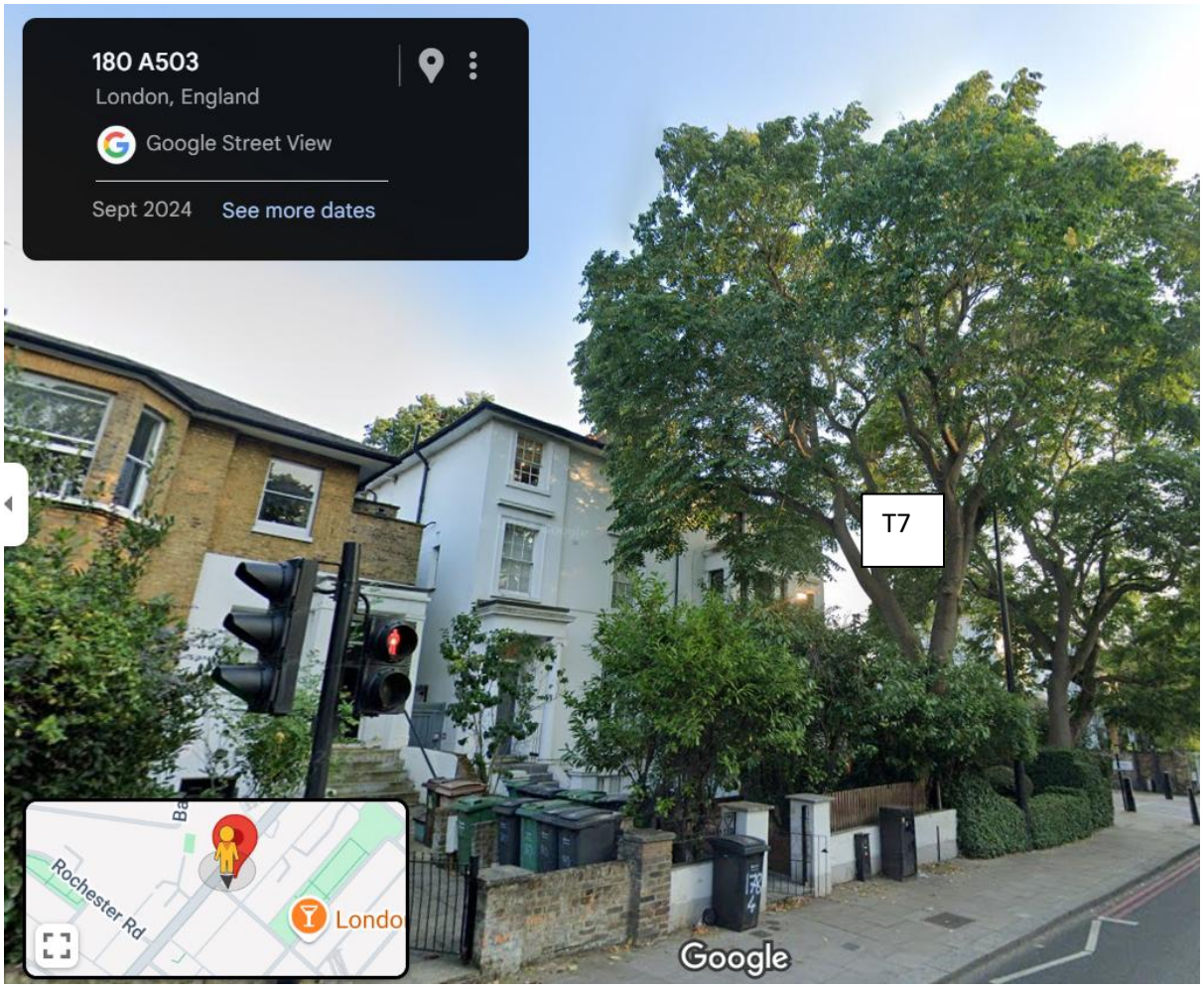
Cherry T8 was within the front of a council owned property and the removal of Cherry T8 appears to have been undertaken.

The grinding of the stump of T7 has been recommended due to the translocation risk if herbicide treatment was to be used as roots from the adjacent Ailanthus to T7 are likely to have grafted to roots from T7.

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.

PHOTOGRAPHS

View of T7 and SG2



T7 in September 2024, note a further Ailanthus within a neighbouring front garden adjacent T7.

VEGETATION INFLUENCE

According to the standard published work on the subject (Cutler, D.F. and I.B.K. Richardson, (1989) further confirmed by Mercer, Reeves & O'Callaghan (2011) in shrinkable clay soils, Tree of Heaven (Ailanthus) species are capable of causing subsidence damage at distances up to 3m (however this is based on very limited sampling as only 2 cases were recorded).

Ailanthus T7 at 17m height and 12m distance is therefore within its species' potential rooting and influencing distance of the building and would be capable of causing seasonal soil drying beneath foundations.

We would also refer to the publication BRE Guidance Note "Cracking in Homes"

https://www.nhbc.co.uk/binaries/content/assets/nhbc/homeowners/guidance-docs/cracking-in-homes.pdf

"Trees and shrubs

If you have clay soil, it's best to avoid planting trees nearer to your home than a distance equal to three-quarters of the mature height of the tree."

Also, according to NHBC guidelines, a moderate water demand species such as Ailanthus, which has an expected mature height of 20m, would be capable of influencing soil moisture at distances up to 15m (three quarters of mature height).

This further reinforces the ability of roots emanating from T7 to cause soil drying beneath foundations of a structure that is 12m distance from the tree.

Tree of Heaven (Ailanthus) is an Invasive Species:

This plant is listed on Schedule 9 of the UK Wildlife & Countryside Act as an **invasive non-native species**. Across the EU, UK and NI it is an offence to plant or cause to grow in the wild plants listed on Schedule 9 of this order. These plants should not be planted or caused to grow in the wild and in addition are banned from sale. Gardeners possessing them should undertake measures to control them.

If you already have these species in your garden or on your land, you are not likely to be prosecuted simply for having them. However, you are advised to control them and, for those 36 plants listed by EU, you are required to take all possible steps to remove them, even if you didn't plant them. It is also your responsibility to ensure that they are not allowed to spread.

Below is a list of invasive non-native plants covered by regulation:

Key

EU – **applies across EU, including the UK and Republic of Ireland:** it is an offence to plant or cause these to grow in the wild. These are also banned from sale and gardeners possessing them should undertake measures to control them:

Ailanthus altissima (tree of heaven) **EU**

Based on the above, the owner of Ailanthus T7 is required take all possible steps to remove it.

PATTERN OF MOVEMENT

Damage was observed to worsen during late summer 2019 during a time of year when soil moisture deficits due to tree root activity would be reaching their peak.

The area of movement and damage is consistent with the locations of the subject tree.

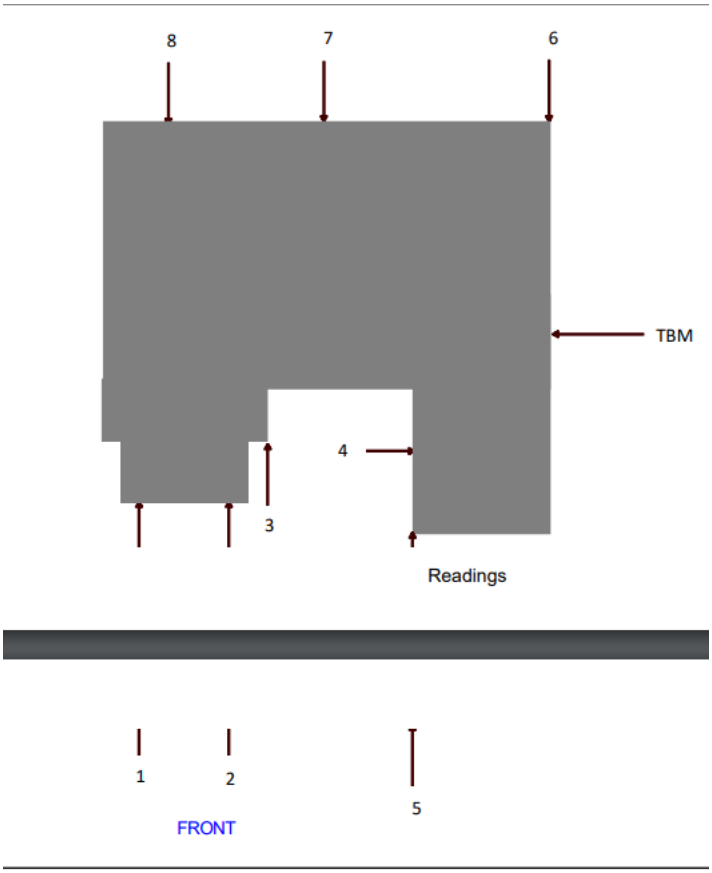
The pattern of movement is entirely consistent with the seasonal, cyclical influence of tree roots on soil moisture, foundations moving down during summer months when roots are active and extracting soil moisture, then returning to recovery and uplift as soil moisture increases during winter when tree roots are inactive.

Precise Level Monitoring

The results are as follows:

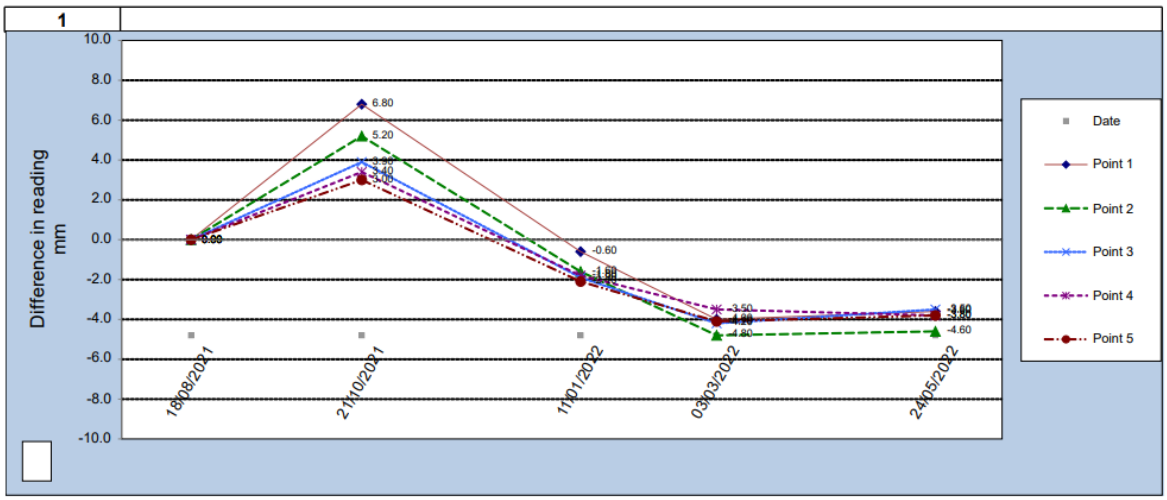
Level monitoring clearly shows evidence of cyclical seasonal movement consistent with root induced clay shrinkage, with downward movement during the summer and corresponding upward movement over the subsequent winter. The movement which is focused at points 1-5 at the front and shows downward movement of up to 10mm during 2022, with 30mm upward movement to December 2023, indicating at least that degree of downward movement occurred during 2022, is located in the area of subsidence damage affecting the property.

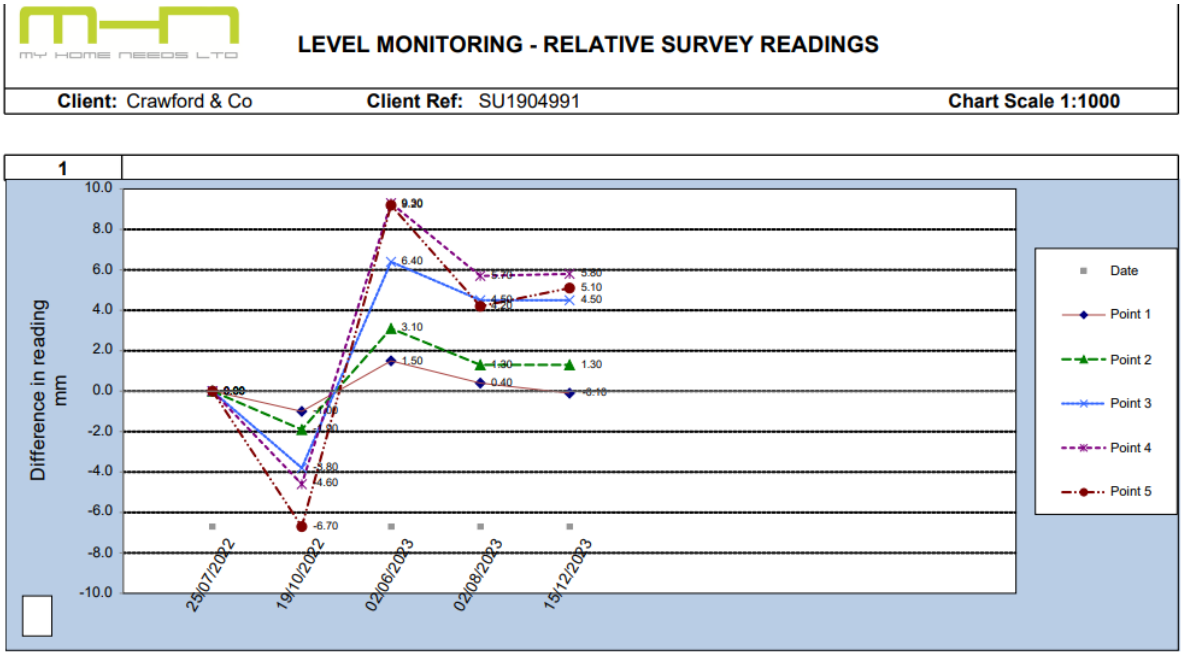
The pattern of movement is not uniform around the property so ‘nominal clay shrinkage’ can be discounted as a cause.



LEVEL MONITORING - RELATIVE SURVEY READINGS

Client: Crawford & Co **Client Ref:** SU1904991 **Chart Scale 1:1000**





The level monitoring indicates a clear seasonal and cyclical pattern of movement consistent with root induced clay shrinkage with the greatest amplitude of movement being consistent with the location of Ailanthus T7. Downward foundation movement also occurred during the wet summer of 2023.

The level monitoring indicates a cyclical pattern of movement which shows both downwards movement during the drier summer months; when trees are in leaf and actively demanding moisture from the ground; and subsequent recovery and upward movement during the wetter winter months when the trees lose leaf and become dormant. Patterns of movement such as those observed at the risk address are consistent with clay shrinkage subsidence and are only consistent with the effects of shrinking and swelling of clay soils exacerbated by the presence of roots.

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. as a cause.
- Roots were found to the underside of the foundation and were not positively identified, however the Ailanthus tree T7 is the main item of vegetation nearby that would be capable of causing the pattern of seasonal foundation movement to the extent confirmed. Subsequent

extensive root identification confirmed the presence of Ailanthus roots, T7 being the only likely source.

- 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 can be felled without risk of heave related damage occurring to the building as the implicated trees are not significantly older than the affected structure.
- **Ailanthus T7 is classed as an invasive species and Government guidance indicates that the owner of the tree is required take all possible steps to remove it.**

As per the recommendations of the Arboricultural Report and Government guidance, the Ailanthus tree T7 requires removal. The implicated tree benefits from Tree Preservation Order and an application should be made to allow the recommended works to be carried out.

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 £9,332. Should consent not be granted or third parties refuse to allow the required tree reduction works to be carried out a root barrier or partial underpinning to the property will be required to arrest the movement, with costs rising over £50,000.

MITIGATION OPTIONS

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. In any event, the tree is sufficiently close to the structure that even heavy pruning is very unlikely to reduce root moisture uptake. There is no linear relationship between foliage volume and the amount of water lost. Being dynamic organisms, trees react to pruning by trying to restore the root to shoot ratio by producing as many leaves as they can. These new leaves are usually juvenile leaves with a larger surface area and generally more pores on the underside, these pores stay open for longer compared to an unpruned tree and increase the degree of water uptake by the roots. Research has shown that even a heavily pruned tree will quickly return to absorbing soil moisture and the seasonal movement and damage will continue. This is particularly the case with the subject trees due to their size, age and species characteristics, and this species grows back successfully following pruning. These trees are so close to the area of damage that root activity would continue even if the trees were to be heavily pruned.

The publication “CONTROLLING WATER USE OF TREES TO ALLEVIATE SUBSIDENCE RISK” © 2004 BRE on behalf of the Link Consortium for Horticulture Link Project No. 212 concluded that:

• For practical soil moisture conservation, severe crown-reduction 70-90% of crown volume would have to be applied. Reduction of up to 50% crown volume is not consistently effective for decreasing soil drying.

• To ensure a continued decrease in canopy leaf area and maximise the period of soil moisture conservation, crown reductions should be repeated on a regular managed cycle with an interval based on monitoring re-growth.

For trees of the age and proximity of the subject trees, a severe crown reduction would diminish its amenity value and would cause decays in the large pruning cuts that would be required. Also,

repeated regular pruning (bi-annually) would be an expensive but not necessarily effective means of controlling above ground growth of the tree that would not be guaranteed to negate root activity beneath foundations.

Therefore, if the trees remain (even in a heavily pruned state) roots beneath foundations will remain active and seasonal subsidence damage is likely to continue to the damaged part of the property (and possibly more extensively in future).

We would also refer to 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

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

However, if pruning rather than felling is desirable then 40 – 50% linear crown reduction is required."

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.

We would also refer to the comments made by Dr Biddle on page 5 of Arboriculture Research Note 108/92/EXT 'Tree Roots and Foundations', specifically "*Greatest benefits will be achieved if the building is near the outer limits of influence of the tree; pruning a large tree which is only a few metres from a building will probably have little benefit. If reducing the amplitude of movement is unacceptable, complete felling may be needed*".

Therefore, taking all reasonable tests the insured property is within the likely zone of influence of the subject trees.

From Dr Biddle's comments it would appear that even an eminent proponent of pruning as a remedy to subsidence appears to agree that in instances where species, such as Ailanthus, are growing within close proximity to damaged properties, felling is the only appropriate action.

Previous crown reduction of T7 has failed to reduce its water use and roots from this tree have continued to cause seasonal foundation movement within a short period of time since it was substantially reduced in size.

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.

If the subject tree is not removed, then damage will almost certainly continue and worsen. Roots from these trees have almost certainly encroached beneath foundations and caused seasonal soil drying that has led to the damage.

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. Due to the proximity of T7 to the damaged structure along with site conditions, root severance would cause T7 to become unstable.

Root severance would cause the tree to become unstable as it would occur well within the BS5837 (2012) Root Protection Area distance of 7.8m.

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 T7 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.

Underpinning – if the tree remains then the only appropriate solution would be underpinning to stabilise foundations, the cost of which is currently estimated at £50,000

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.

Drains - There are no apparent issues in relation to drains, and soil softening/washing by an escape of water is not considered to be a factor in the damage. This is confirmed by the desiccated condition of the soil.

Heave Potential – The subject tree does not significantly pre-date the construction of the house therefore there would be no risk of adverse soil heave occurring after the trees are removed.

Our investigations also confirm that the risk of adverse heave occurring is within acceptable tolerances, based on the calculations within the site investigation report.

RECOMMENDATIONS

T7 Ailanthus - Fell to near ground level (subject to consent being granted under the TPO)

Statutory Controls – The tree Ailanthus T7 is covered by a Tree Preservation Order administered by Camden Council, therefore an application is required and consent needs to be granted prior to any tree works occurring.

The tree T7 is located within 178 Camden Road.

RESERVES

Superstructure repairs - **£9,332**
Estimated Engineering solutions and superstructure repairs - **£50,000**

Yours faithfully

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