Arboricultural Appraisal Report

Subsidence Damage Investigation at:

113 North Street
Crowland
PE6 0EG



CLIENT:	Crawford & Company
CLIENT REF:	SU2205333
MWA REF:	SUB230428-12997
MWA CONSULTANT:	John Graham B.Sc. Hons PhD
REPORT DATE:	07/06/2023

SUMMARY

Statutory Controls			Mitigation (Current claim tree works)	
TPO current claim	No		Policy Holder	Yes
TPO future risk	No		Domestic 3rd Party	No
Cons. Area	Yes		Local Authority	No
Trusts schemes	No		Other	No
Local Authority: -	South Holland District Council			

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Introduction

Acting on instructions from Crawford & Company, the insured property was visited on 16/05/2023 to assess the potential role of vegetation in respect of subsidence damage.

We are instructed to provide opinion on whether moisture abstraction by vegetation is a causal factor in the damage to the property and give recommendations on what vegetation management, if any, may be carried out with a view to restoring stability to the property. The scope of our assessment includes opinion relating to mitigation of future risk. Vegetation not recorded is considered not to be significant to the current damage or pose a significant risk in the foreseeable future.

This is an initial appraisal report and recommendations are made with reference to the technical reports and information currently available and may be subject to review upon receipt of additional site investigation data, monitoring, engineering opinion or other information.

This report does not include a detailed assessment of tree condition or safety. Where indications of poor condition or health in accessible trees are observed, this will be indicated within the report. Assessment of the condition and safety of third-party trees is excluded and third-party owners are advised to seek their own advice on tree health and stability of trees under their control.

Property Description

The property comprises a detached 2 storey house, built circa 1830, with rear 2 and 1 storey extensions. There is a detached garage to the right. External areas comprise gardens to the front and rear. The site is generally level with a pond in the rear.

Damage Description & History

The current damage affects the left of the building and was first noticed in 05/10/2022. For a more detailed synopsis of the damage please refer to the building surveyor's technical report.

At the time of the building surveyor's inspection (14/12/2022) the structural significance of the damage was found to fall within Category 3 (moderate) of Table 1 of BRE Digest 251. We have not been made aware of any previous claims.

Site Investigations

Site investigations were carried out by FASTRACK on 07/02/2023, when a single trial pit was excavated to reveal the foundations, with a borehole sunk through the base of the trial pit to determine subsoil conditions.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP/BH1	Concrete	1,000

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	Brown silty CLAY	28 - 41	Medium - High

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1	2,500	*Hedera* or *Fatsia* spp.	Absent

Hedera spp. include ivy; Fatsia spp. are shrubs closely related to ivy

Drains: Drain surveys have been carried out and no significant defects detected.

Monitoring: No information available at the time of writing.

Discussion

Opinion and recommendations in this report are made on the understanding that Crawford & Company have identified clay shrinkage subsidence as a cause of building movement and damage.

Site investigations and soil test results have confirmed a plastic clay subsoil susceptible to undergoing volumetric change in relation to changes in soil moisture.

Roots were observed to a depth of 2,500mm bgl in TP/BH1 and recovered samples have been positively identified (using anatomical analysis) as ivy, the origin of which will be SG1 or ivy on T1 confirming their influence on the soils below the foundations. Irrespective of the identification of recovered root samples, the roots of the holly, T1, are also likely to be present below foundation level in proximity to the area of movement/damage and influencing soil moisture and volumes.

Based on the technical reports currently available, engineering opinion and our own site assessment we conclude the damage is consistent with shrinkage of the clay subsoil related to moisture abstraction by vegetation. Having considered the information currently available, it is our opinion that T1 and SG1 are the principal cause of or are materially contributing to the current subsidence damage.

If an arboricultural solution is to be implemented to mitigate the influence of the implicated trees/vegetation we recommend that T1 and SG1 are removed. Other vegetation recorded presents a potential future risk to building stability and management is therefore recommended.

Consideration has been given to pruning alone as a means of mitigating the vegetative influence, however in this case, this is not considered to offer a viable long-term solution due to the proximity of the responsible vegetation.

Recommended tree works may be subject to change upon receipt of additional information.

Conclusions

- Conditions necessary for clay shrinkage subsidence to occur related to moisture abstraction by vegetation have been confirmed by site investigations and the testing of soil and root samples.
- Engineering opinion is that the damage is related to clay shrinkage subsidence.
- There is significant vegetation present with the potential to influence soil moisture and volumes below foundation level.
- Roots have been observed underside of foundations and identified samples correspond to vegetation identified on site.
- Replacement planting may be considered subject to species choice and planting location.

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

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T1	Holly covered in ivy	6	400 Ms *	5	3	Younger than Property	Policy Holder
Management history		Subject to past management/pruning.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
SG1	Mixed species including; holly and ivy	2	20 Ms	1.5	3	Younger than Property	Policy Holder
Management history		Recently reduced/pruned.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					

Ms: multi-stemmed * Estimated value

Table 2 **Future Risk** - Tree Details & Recommendations

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T2	Plum (Purple leafed)	8	400 Ms *	6	4.5	Younger than Property	Policy Holder
Management history		Subject to past management/pruning.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
T3	Apple	6	550 Ms *	6	9	Older than extension(s)	Policy Holder
Management history		Subject to past management/pruning.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
T4	Tree of Heaven	18	840 Ms *	16	8	Older than extension(s)	Policy Holder
Management history		Subject to past management/pruning.					
Recommendation		Reduce crown all round by 2.0m balancing the crown and prune on a triennial cycle to maintain broadly at reduced dimensions.					
T5	Apple	6	550 Ms *	6	25	Older than extension(s)	Policy Holder
Management history		Subject to past management/pruning.					
Recommendation		None at present.					
TG1	Poplar	8	350 Ms *	3	27	Younger than Property	Policy Holder
Management history		Reduced in past.					
Recommendation		No works required at present (subject to review if movement persists).					

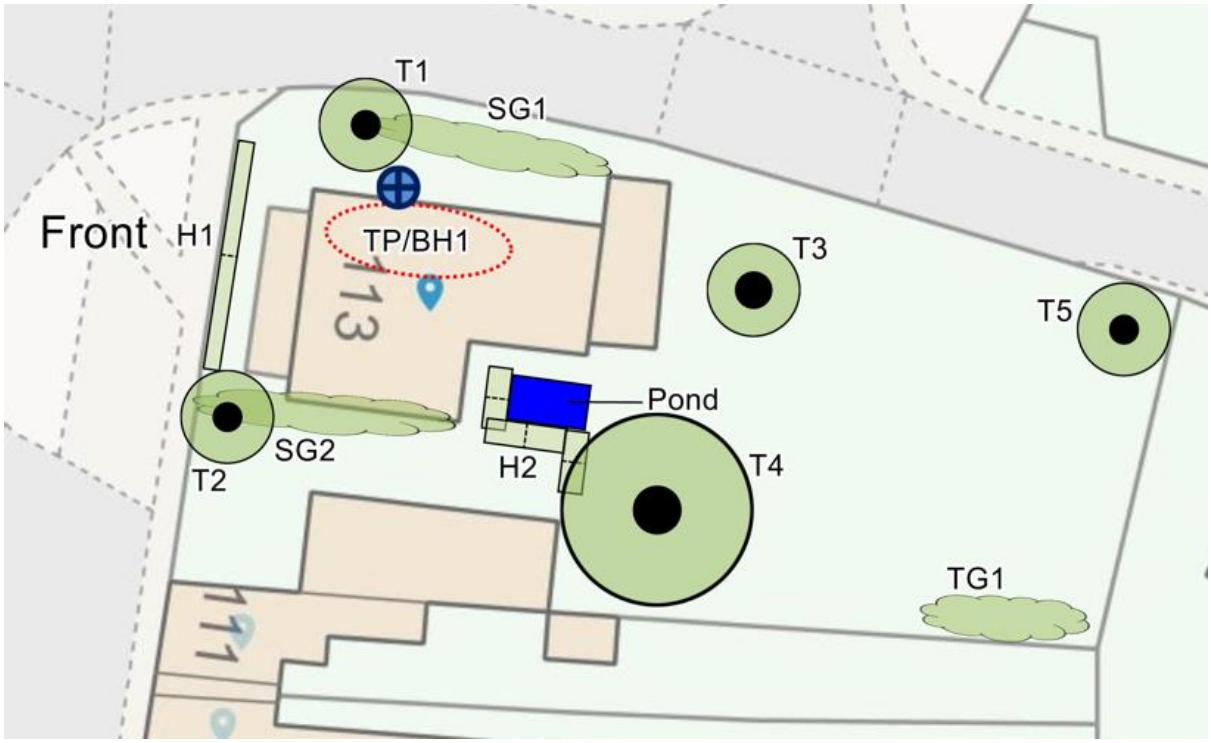
Ms: multi-stemmed * Estimated value

Table 2 **Future Risk** - Tree Details & Recommendations Cont'd

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
SG2	Mixed species including; holly, box, pyracantha and ivy	2	20 Ms	1.5	0.5	Younger than Property	Policy Holder
Management history	Subject to past management/pruning.						
Recommendation	Maintain broadly at no more than current dimensions by periodic pruning.						
H1	Box	1	10 Ms	1	2.5	Younger than Property	Policy Holder
Management history	Pruned on a regular basis.						
Recommendation	Maintain broadly at no more than current dimensions by periodic pruning.						
H2	Privet	2	10 Ms	1	1.5	Younger than Property	Policy Holder
Management history	Pruned on a regular basis.						
Recommendation	Maintain broadly at no more than current dimensions by periodic pruning.						

Ms: multi-stemmed * Estimated value

Site Plan



Plan not to scale – indicative only

Approximate areas of damage

Images



View of front left.



View of left.



View of front.



View of rear.

Management of vegetation to alleviate clay shrinkage subsidence.

All vegetation requires water to survive which is accessed from the soil. Clay soils shrink when water abstracted by vegetation exceeds inputs from rainfall, which typically occurs during the summer months. When deciduous vegetation enters dormancy and loses its leaves and rainfall increases during the winter months, soil moisture increases and the clay swells. (Evergreen trees and shrubs use minimal/negligible amounts of soil water during the winter).

Buildings founded on clay are susceptible to movement as the clay shrinks and swells which can result in cracking or other damage.

Where damage does occur, pruning (reducing leaf area) can in some circumstances be effective in restoring stability however, removal of the influencing vegetation (trees, shrubs, climbers) causing the ground movement offers the most predictable and quickest solution in stabilising the clay and hence the building and for this reason is frequently initially recommended as the most appropriate solution.

Often this is unavoidable due to the size or number of influencing trees, shrubs etc and their proximity to the building. Very heavy pruning of some species to a level required to effectively control its water use can result in the trees decline and ultimately death and is one factor considered when making recommendations for remedial tree works. Pruning alone, whilst reducing soil moisture uptake is often an unpredictable management option in restoring building stability either in the short or long term.

In some circumstances however, where vegetation initially recommended for removal is subsequently pruned and monitoring indicates the building has stabilised, removal becomes unnecessary with decisions based on best evidence available at the time.