

Arboricultural Appraisal Report

Subsidence Damage Investigation at:

Heath Farm, Ram Hill
Coalpit Heath
Bristol
BS36 2TX



CLIENT:	Crawford & Company
CLIENT REF:	SU2204195
MWA REF:	SUB230331-12825
MWA CONSULTANT:	David Williams (N.D.Arb MArborA)
REPORT DATE:	16-05-2023

SUMMARY

Statutory Controls		Mitigation (Current claim tree works)	
TPO current claim	Yes – W1	Policy Holder	Yes
TPO future risk	Yes – T1, G2	Domestic 3 rd Party	No
Cons. Area	No	Local Authority	No
Trusts schemes	No	Other	No
Local Authority: -	South Gloucestershire Council		

Introduction

Acting on instructions from Crawford & Company, the insured property was visited on 03/05/2023 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 two-storey dwelling dating back to c.1987.

External areas comprise gardens to the front and rear.

The site is generally level with no adverse topographical features.

Damage Description & History

The current damage affects the rear right-hand corner of the main dwelling.

For a more detailed synopsis of the damage please refer to the building surveyor's technical report.

We have not been made aware of any previous claims.

Site Investigations

Site investigations were carried out Auger over two separate visits (December 2022 and February 2023) when two trial pits were excavated to reveal the foundations (only February TH2 reached full depth), with a borehole sunk through the base of the trial pit to determine subsoil conditions.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TH2	Concrete	1900

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
BH1 – BH2 (Dec 2022)	Dry hard brown silty CLAY	15 - 35	Low - Medium

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1-2	None recovered	N/A	N/A

Drains: No information available at the time of writing.

Monitoring: Level monitoring is in progress with a single comparative reading to date.

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. A comparison between moisture content and the plastic and liquid limits suggests moisture depletion at the time of sampling at depths beyond normal ambient soil drying processes such as evaporation indicative of the soil drying effects of vegetation.

No root samples were recovered during the two site investigations.

Irrespective of the identification of recovered root samples, the roots of the two closest oaks in W1 are almost certain 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 the drying action of oak 1 and oak 2 in W1 will be the principal cause of the current subsidence damage.

If an arboricultural solution is to be implemented to mitigate the influence of the implicated trees/vegetation we recommend that the two oaks be 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 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.
- 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
W1	Oak	19-23	<300	650	11.0-13.7	Older than property	Policy Holder
Management history		No significant recent management noted.					
Recommendation		Remove oak 1 and oak 2 (refer to plan) to ground level. Owner to remove any regrowth should it develop.					

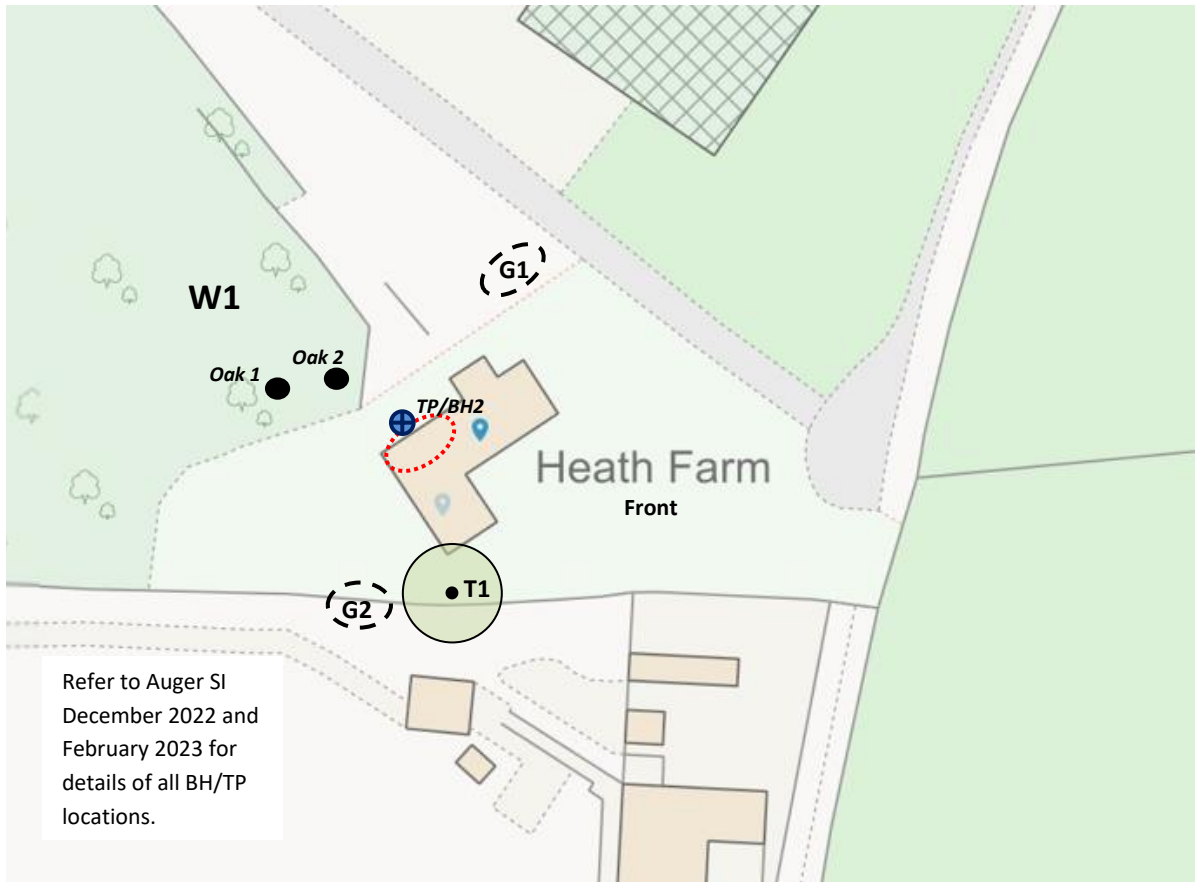
Ms: multi-stemmed * Estimated value

Table 2 Future Risk - Tree Details & Recommendations


Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
G1	Ash	6.0-8.0	M/S 120	7.0	7.0	Younger than property	Policy Holder
Management history		No recent management noted. Self-set trees.					
Recommendation		Do not allow to exceed current dimensions.					
T1	Ash	16.0	750	13.0	7.1	Older than property	Policy Holder
Management history		No recent management noted.					
Recommendation		Do not allow to exceed current dimensions.					
G2	Cypress	6.0-8.0	M/S 150- 200	8.0	7.0-9.0	Younger than property	Third Party Coalpit Heath Cricket Club BS36 2TT
Management history		No recent management noted.					
Recommendation		Do not allow to exceed current dimensions.					

Ms: multi-stemmed * Estimated value

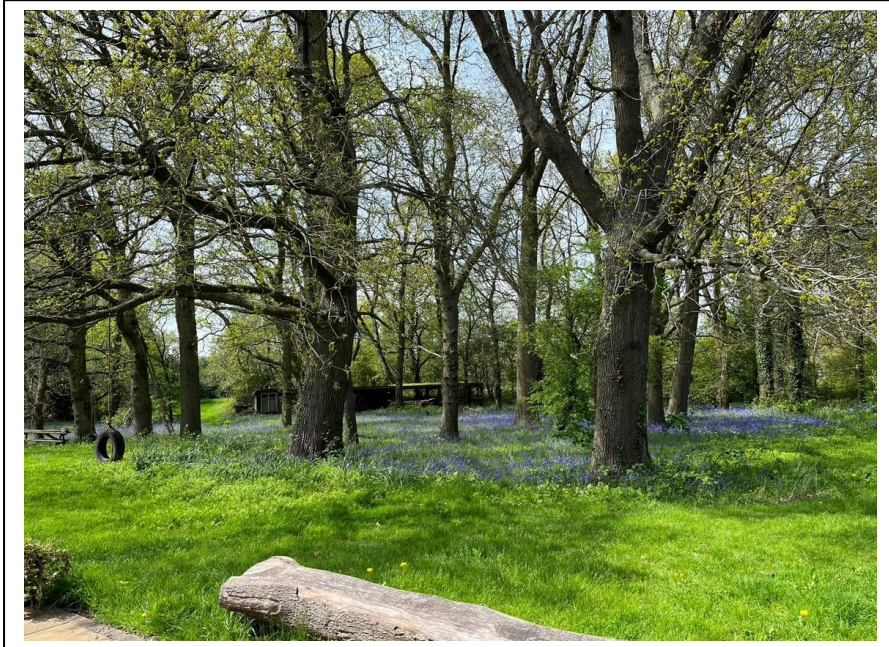
Site Plan



Plan not to scale – indicative only

 Approximate areas of damage

IMAGES



View of W1



View of oak 1 and oak 2 in W1



View of rear RH corner and two implicated oaks in W1



View of rear elevation, W1, T1 and G2



View of T1 and G2



View of G1

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.