Arboricultural Appraisal Report

Subsidence Damage Investigation at:

16 Nassington Road
Hampstead
London
NW3 2UD

CLIENT:	Crawford & Company
CLIENT REF:	[redacted]
MWA REF:	
MWA CONSULTANT:	Giles Mercer (BSc Hons)
REPORT DATE:	06/08/2021

SUMMARY

Statutory Controls			Mitigation (Current claim tree works)	
TPO current claim	No		Policy Holder	Yes
TPO future risk	No		Domestic 3rd Party	Yes
Cons. Area	Yes		Local Authority	Yes
Trusts schemes	No		Other	No
Local Authority: -	London Borough of Camden			

[redacted]

Introduction

Acting on instructions from Crawford & Company, the insured property was visited on the 23/07/2021 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 three storey (plus a small part front basement) semi-detached dwelling (built circa 1880) of solid loadbearing brickwork supporting suspended wooden floors and pitched roof elevations overlaid with slates. A single storey rear flat roof extension was added before the policy holder's purchase and 20 years ago the policy holder converted part of that extension to a conservatory by adding extensive skylights. A Velux window partial loft conversion was also added 20 years ago.

External areas comprise gardens to the front and rear.

The site is generally level with no adverse topographical features.

Damage Description & History

Damage relates to the front elevation of the insured dwelling and takes the form of cracking which is evident both internally and externally.

At the time of the engineer's inspection (06/04/2021) the structural significance of the damage was found to fall within Category 2 (slight) of Table 1 of BRE Digest 251. For a more detailed synopsis of the damage please refer to the surveyor's technical report.

We have not been made aware of any previous claims.

[redacted]

Site Investigations

Site investigations were carried out by CET on 30/04/2021, when 2 trial pits were hand excavated to reveal the foundations, with a borehole sunk through the base of the trial pit to determine subsoil conditions. A drains survey was also undertaken.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP/BH1	Concrete	1420
TP/BH2	Concrete	1100

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	MADE GROUND over silty CLAY	40 - 56	High
TP/BH2	MADE GROUND over silty sandy CLAY	28 - 57	Medium - High

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1	1420	Prunus spp.; Betula spp.	Present
	2700	Betula spp.	Present
TP/BH2	1100	Pomoideae group	Present
		broadleaved species, too decayed for positive identification	Absent
TP/BH2	1900	too small and juvenile for identification	Absent

Prunus spp. include blackthorn, cherry, cherry-laurel, Portuguese laurel, peach, plum, and related species.
Betula spp. are birches.
Pomoideae gp include apple, cotoneaster, hawthorn, pear, pyracantha, quince, rowan, snowy mespil and whitebeam.

Drains: The drains have been surveyed and defects identified although leaking drains are concluded not to be a cause of the current damage.

Monitoring: Level monitoring is in progress. Insufficient readings have been taken to date from which to draw any conclusions.

[redacted]

Discussion

Opinion and recommendations are made on the understanding that Crawford & Company are satisfied that the current building movement and the associated damage is the result of clay shrinkage subsidence and that other possible causal factors have been discounted.

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 liquid limits suggests moisture depletion at the time of sampling in TP/BH1 and TP/BH2 at depths beyond normal ambient soil drying processes such as evaporation indicative of the soil drying effects of vegetation.

Roots were observed to a depth of 2.7m bgl in TP/BH1 and to a depth of 1.9m in TP/BH2 and recovered samples have been positively identified (using anatomical analysis) as Prunus spp., Betula spp. and a member of the Pomoideae group, the origins of which will be the Cherry (T1), the Birch (T4), the Flowering Crab (T2) and potentially the Rowan (T3) confirming their influence on the soils below the foundations.

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 Cherry (T1), the Birch (T4), the Flowering Crab (T2) and the Rowan (T3) 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 the Cherry (T1), the Birch (T4), the Flowering Crab (T2) and the Rowan (T3) 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.

[redacted]

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.

[redacted]

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	Cherry	7.2	160 Ms	6.8	3.3	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - previously crown reduced (regrowth appears 3 yrs age).					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
T2	Malus sylvestris (flowering crab)	6.7	200 *	6	3.7	Younger than Property	Third Party 14 Nassington Road NW3 2UD
Management history		No significant recent management noted.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
T3	Rowan	2	30 Ms *	1.5	3	Younger than Property	Policy Holder
Management history		Regrowth from large Rowan tree removed at some point between 10/2009 and 06/2012.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
T4	Birch	13.3	265	7.5	5.95	Younger than Property	Local Authority
Management history		No significant recent management noted.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					

Ms: multi-stemmed * Estimated value

[redacted]

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

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T5	Apple	4	225 *	5	3.6	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - appears regularly pruned.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
T6	Holly	3	80 Ms *	3.25	2	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - appears regularly pruned.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
T7	Sycamore	15.5	550 Ms *	12	14.5	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - appears regularly pruned.					
Recommendation		Do not allow to exceed current dimensions.					
S1	Rose	3.5	15 Ms *	2	0.3	Younger than Property	Policy Holder
Management history		Managed shrubs.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
S2	Rose	3.5	15 Ms *	2	0.3	Younger than Property	Policy Holder
Management history		Managed shrubs.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					

Ms: multi-stemmed * Estimated value

[redacted]

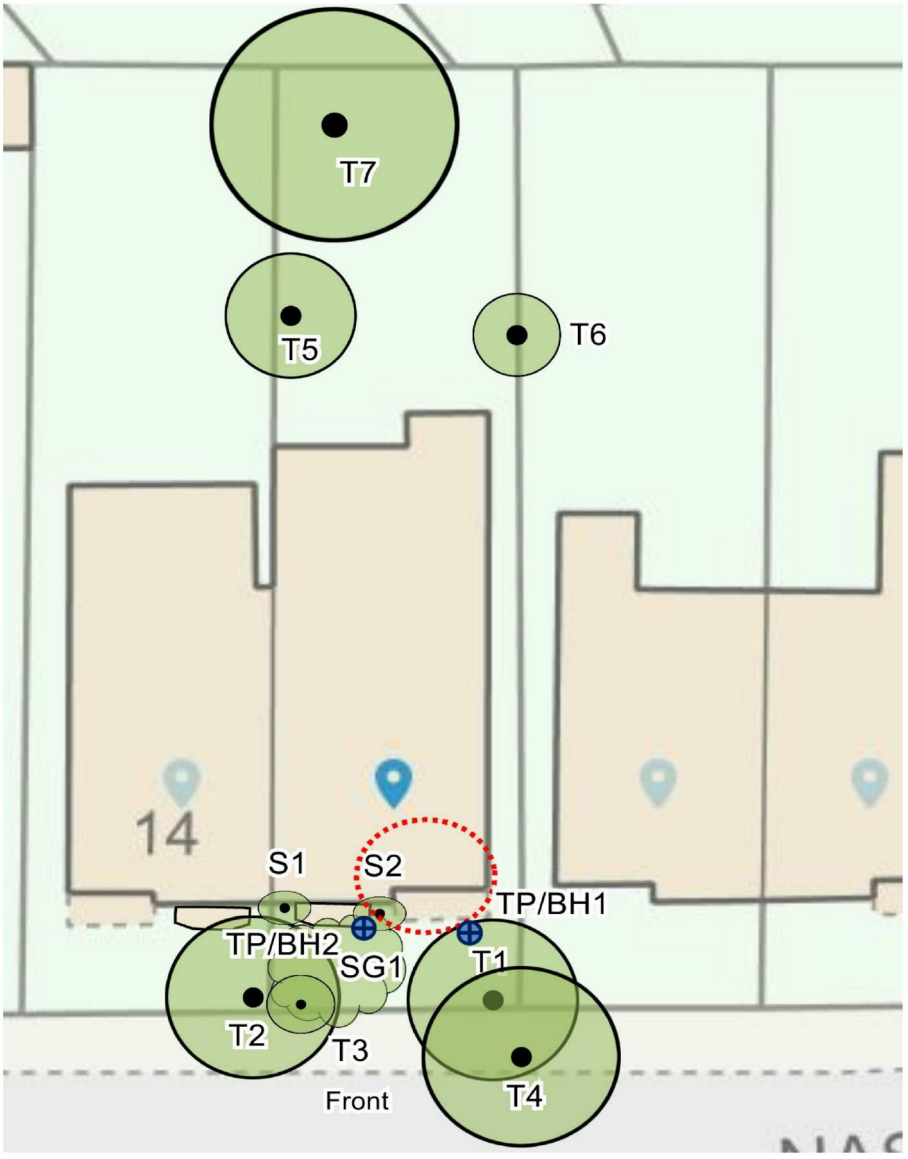
Table 2 **Future Risk** - Tree Details & Recommendations Cont'd

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
SG1	Mixed species shrubs including choisya, cornus, aucuba, myrtle	1.7	20 Ms *	1.5	0.75	Younger than Property	Policy Holder
Management history		Managed shrubs.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					

Ms: multi-stemmed * Estimated value

[redacted]

Site Plan



Plan not to scale – indicative only

Approximate areas of damage

[redacted]

Images

View of S1 & SG1

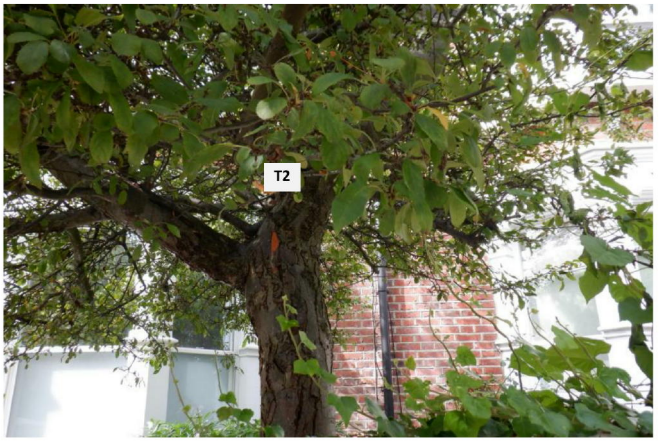
View of S2 & SG1

[redacted]

View of SG1 & T2

View of T1

[redacted]



View of T2

View of T3

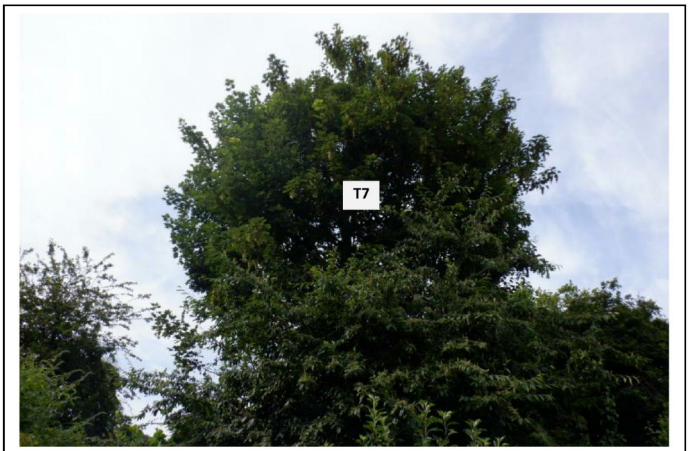
[redacted]

View of T4

View of T5

[redacted]

View of T6



View of T7

[redacted]

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.