Arboricultural Appraisal Report

Subsidence Damage Investigation at:

Flats 1 - 9
8 Compayne Gardens
London
NW6 3DH

CLIENT:	Crawford & Company
CLIENT REF:	[redacted]
MWA REF:	
MWA CONSULTANT:	Andy Clark
REPORT DATE:	15/09/2021

SUMMARY

Statutory Controls			Mitigation (Current claim tree works)	
TPO current claim	Yes – T4		Policy Holder	Yes
TPO future risk	Yes – TG3 (holly)		Domestic 3rd Party	Yes
Cons. Area	Yes		Local Authority	No
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 26/08/2021 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 4 storey semi-detached house of traditional construction, built C.1900 and since converted into 9 self-contained flats. The property includes a partial basement to the rear left corner of the property.

External areas comprise communal gardens to the front and rear.

The site is generally level with no adverse topographical features.

Damage Description & History

Damage relates to the front left-hand corner of the building, with cracking noted over several floors. Damage is reported to have first been observed during 2018/19 which worsened becoming a concern during 2020.

At the time of the engineer's inspection (27/04/2021) 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 building surveyor's technical report.

We have not been made aware of any previous claims.

[redacted]

Site Investigations

Site investigations were carried out by Auger on 05/07/2021, 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	600
TP/BH2	Concrete	670

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	Dry stiff brown fine to medium gravelly silty CLAY	38 – 47	Medium – High
TP/BH2	Dry stiff brown fine to medium gravelly silty CLAY	29 – 38	Medium

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1	2100	Tilia spp. and similar to Magnoliaceae spp.	Present
		Possibly Tilia spp. and similar to Magnoliaceae spp. [thin samples]	Absent
TP/BH2	2170	Similar to Caprifoliaceae spp.	Present
		Tilia spp.	Absent

Tilia spp. are Limes
Magnoliaceae spp. includes Magnolia and Liriodendron
Caprifoliaceae spp. includes Viburnum, Weigela, Symphoricarpos and Lonicera

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

Monitoring: No information available at the time of writing.

[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.

Roots were observed to a depth of 2.1m bgl in TP/BH1 and to 2.17m bgl in TP/BH2, and recovered live samples (positive Starch test) have been positively identified (using anatomical analysis) as Tilia spp., similar to Magnoliaceae spp. [tentative] and similar to Caprifoliaceae spp. [tentative].

The origins of the Tilia spp. roots will be the Lime T4. The tentatively identified shrub. Spp. roots will be from the nearby shrubs of SG2 and T2 Bay.

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 T4 Lime is the principal cause of the current subsidence damage, combined with a localised contributory influence from SG2 group and T3 Bay.

If an arboricultural solution is to be implemented to mitigate the influence of the implicated trees/vegetation we recommend that T4 and T3 are removed and that SG2 group is subject to significant crown reduction works in order to reduce the groups collective moisture uptake.

Other vegetation recorded presents a potential future risk to building stability and management is therefore recommended. Recommended tree works may however be subject to change upon receipt of additional information.

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.

[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.
- Replacement planting may be considered subject to species choice and planting location.

[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
T3	Bay with understorey of various small shrubs	3.5	110 Ms	1.5	1.0	Younger than Property	Policy Holder
Management history	Subject to past management/pruning - appears regularly trimmed.						
Recommendation	Remove (fell) Bay to near ground level and treat stump to inhibit regrowth.						
T4	Lime	17.0	720 *	10.0	12.1	Younger than Property	Third Party 10 Compayne Gardens NW6 3DH
Management history	Subject to past management/pruning - previously pollarded at approx. 4.0m and 14.0m.						
Recommendation	Remove (fell) to near ground level and treat stump to inhibit regrowth.						
SG2	Mixed spp. shrub group of mostly Aucuba and Choisya	3.5	50 Ms *	2.0	2.0	Younger than Property	Policy Holder
Management history	Subject to past management/pruning - appears regularly trimmed.						
Recommendation	Reduce height of group to 2.0m and cut back sides to leave crown spread of no more than 1.0m. Trim thereafter on an annual cycle to maintain at broadly reduced dimensions.						

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
T1	Maple	14.5	360	8.0	15.3	Younger than Property	Policy Holder
Management history		No significant past management noted.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
T2	Bay	4.0	60 Ms	2.0	1.6	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - appears regularly trimmed.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
TG1	Apple and Ivy group	5.0	240 Ms *	5.0	3.9	Younger than Property	Third Party 6 Compayne Gardens NW6 3DH
Management history		No significant past management noted. Appears to be causing direct damage to boundary wall.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
TG2	Mixed spp. group of mostly Cypress, Birch, Ash, Spruce and Holly	8.5	90 Ms *	5.0	12.5	Younger than Property	Policy Holder
Management history		No significant past management noted.					
Recommendation		None at present.					
TG3	Aucuba, and Holly group	6.5	220	3.0	0.6	Younger than Property	Third Party 6 Compayne Gardens NW6 3DH
Management history		Subject to past management/pruning - appears regularly pruned.					
Recommendation		Reduce height of group to 2.0m and cut back sides to leave crown spread of no more than 1.0m. Trim thereafter on an annual cycle to maintain at broadly reduced dimensions.					

Ms: multi-stemmed * Estimated value

[redacted]

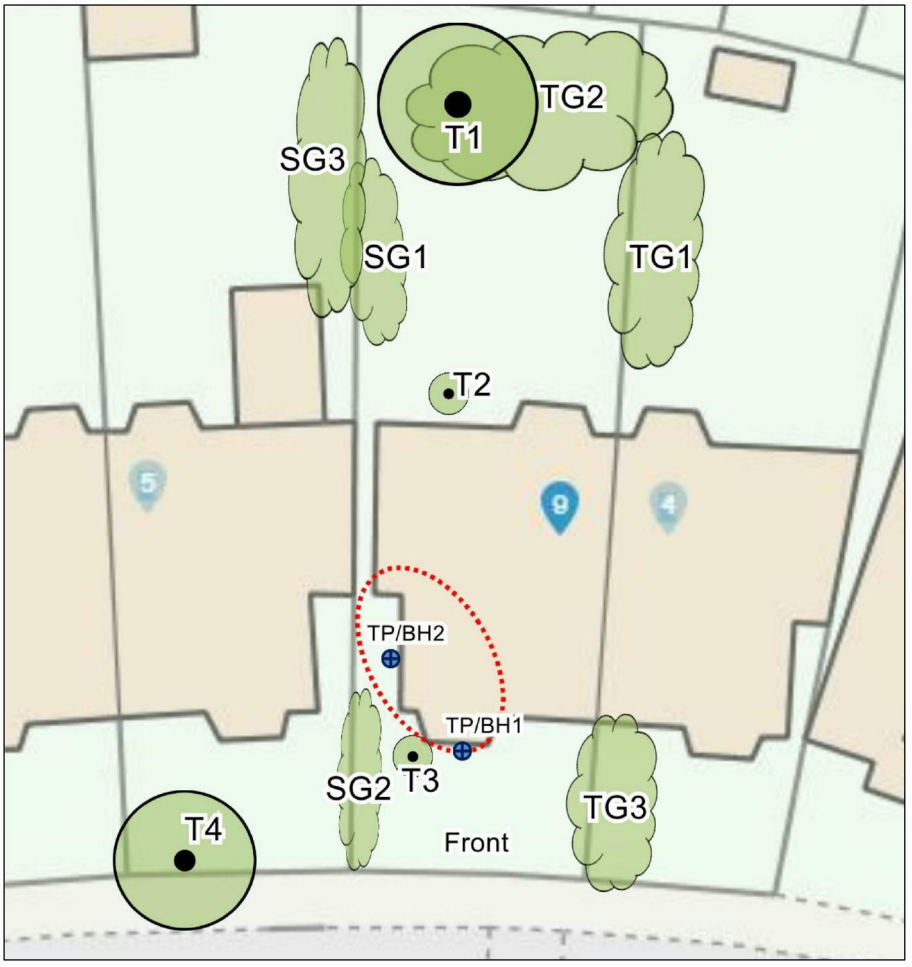
Table 2 **Future Risk** - Tree Details & Recommendations (contd.)

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
SG1	Mixed spp. group of mostly Euonymus, Laurel and Forsythia	4.5	80	2.5	6.5	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.					
SG3	Mixed spp. group of mostly Viburnum, Pittosporum [or Garrya], Palm and Portuguese Laurel	5.5	80 Ms *	4.5 *	9.3	Younger than Property	Third Party 10 Compayne Gardens NW6 3DH
Management history		No significant past management noted. Possibly causing direct damage to boundary wall.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning. Investigate damage to boundary wall and remove nearby trees as necessary.					

Ms: multi-stemmed * Estimated value

[redacted]

Site Plan



Plan not to scale – indicative only

Approximate areas of damage

[redacted]

Images

Overview of T4 Lime, SG2 group and T3 Bay

View of T4 Lime, SG2 group and T3 Bay adjacent to front left corner of the building

[redacted]

View of TG3 group

[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.

[redacted]