Arboricultural Appraisal Report

Subsidence Damage Investigation at:

52 West End Lane
London
NW6 2NE

CLIENT:	Crawford & Company
CLIENT REF:	SU1700120
MWA REF:	SUB170621-1526
MWA CONSULTANT:	Andy Clark
REPORT DATE:	17-07-2017

SUMMARY

Statutory Controls			Mitigation (current claim)	
TPO	Yes T1 & T2 Lime		Insured	Yes
Cons. Area	Yes		3rd Party	No
Trusts schemes	No		Local Authority	No
Planning	No		Other	No
Local Authority: -	London Borough of Camden			

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Introduction

Acting on instructions received from Crawford & Company, the insured property was visited on 04/07/2017 for the purpose of assessing 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 4 storey house built in C.1850. and converted into flats.

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 front and rear elevations to the right hand side of the building and is reported to have been first noticed in December 2016.

We have not been made aware of any previous claims

At the time of the engineers' inspection (25/01/2017) the structural significance of the damage was found to fall within Category 2 (Slight) of Table 1 of BRE Digest 251.

Site investigations

Site investigations were carried out by CET on 07/04/17 when trial pits were hand excavated to reveal the foundations, with a borehole being sunk through the base of the trial pit to determine subsoil conditions.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TH1	Concrete	1000
TH2	Crushed brick, stone and clinker ash	1000

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TH/BH1	Firm to stiff mid brown grey veined silty CLAY with partings of orange silt, fine sand and crystals.	47 - 53	High
TH/BH2	Stiff mid brown grey veined silty CLAY with partings of orange silt, fine sand and crystals.	45 - 52	High

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TH/BH1	1700	Acer spp.	Absent
TH/BH2	1700	Salix spp. and Tillia spp.	Present

Drains: No information available at the time of writing.

Monitoring: Level monitoring in and around the area of damage is in progress and commenced on the 25/02/2017; with subsequent readings provided from the follow up visit on 27/04/2017. Initial readings demonstrate movement ranging between 0.1mm and 2.3mm across MP's 1 to 5 during this first 8 week monitoring interval.

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 of high volume change potential (NHBC Classification) susceptible to undergoing volumetric change in relation to changes in soil moisture. A comparison between moisture content and the plastic and liquid limits suggests desiccation in TP/BH1 and TP/BH2.

There is desiccation at depths beyond normal ambient soil drying processes such as evaporation indicative of the soil drying effects of vegetation.

Shear vane testing of the substrate indicates that it is sufficiently consolidated to bear the imposed load and as such the damage cannot be attributed to consolidation settlement. This is borne out by the relative age of the building and the recent appearance of damage.

Live roots were observed to a depth of 1.7m bgl in TP/BH2 and recovered samples have been positively identified (using anatomical analysis) as Salix spp. and Tillia spp., the origin of the Tilia will be T1 and T2 Lime, confirming the influence of these trees on the soils below the foundations. On investigation of the property no Salix spp. [Willow] trees were evident. Irrespective of the root identification, the roots of T3 False Acacia and G1 Mixed spp. shrub group are also likely to be present below the foundations based on their size and proximity.

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 available information, it is our opinion that T1, T2 and T3 are the principal cause of the current subsidence damage. If an arboricultural solution is to be implemented to mitigate the current damage and allow the soils beneath the property to recover to a position such that an effective repair solution can be implemented we recommend that these trees and shrubs are removed.

Consideration has been given to pruning 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.

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

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.

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	Lime	10.5	420	4.5	8.5	Younger than property	Policy Holder
Management history		Pollarded in recent past at approx. 8m – regrowth appears <5yrs					
Recommendation		Fell to ground level and treat stump to inhibit regrowth					
T2	Lime	10.5	450*	5.0	10.5	Younger than property	Policy Holder
Management history		Pollarded in recent past at approx. 8m – regrowth appears <5yrs					
Recommendation		Fell to ground level and treat stump to inhibit regrowth					
T3	False Acacia	14.5	420	9.0	4.8	Younger than property	Policy Holder
Management history		No signs of significant past management					
Recommendation		Fell to ground level and treat stump to inhibit regrowth					

Ms: multi-stemmed * Estimated value

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

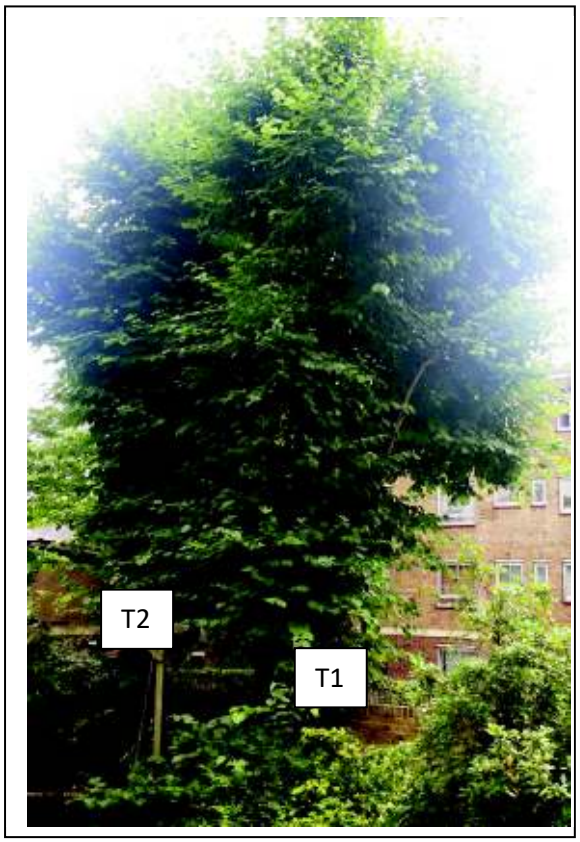
Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
G1	Mixed spp. group consisting Rhododendron, Photinia, Pittosporum and Elaeagnus	3.5	Ms 100	7.0	4.5	Younger than property	Policy Holder
Management history		No signs of significant past management					
Recommendation		Reduce height by 50% and trim annually to retain at reduced dimensions.					

SITE PLAN

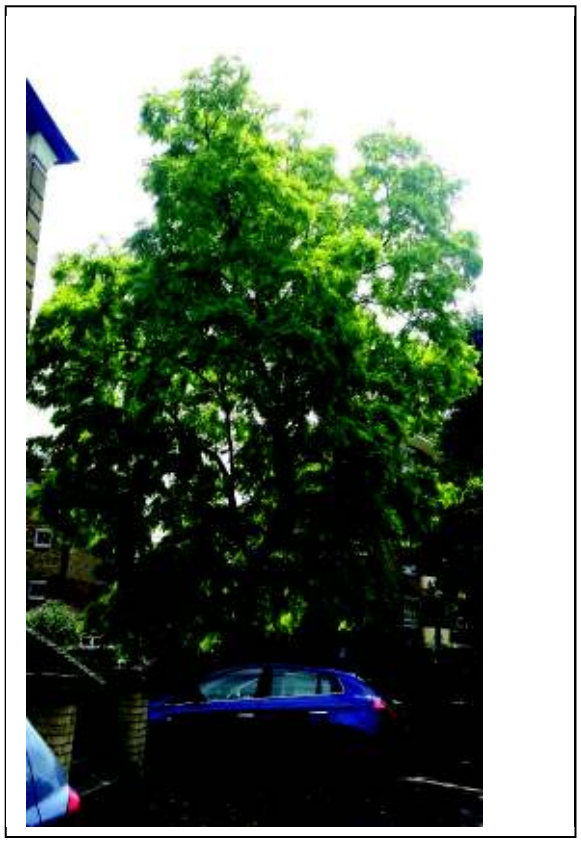
Plan not to scale – indicative only

Approximate areas of damage

Images



View of T1 Lime and T2 Lime



View of T3 False Acacia

View of G1 Mixed spp. shrub group