Arboricultural Appraisal Report

Subsidence Damage Investigation at:

9 Rosslyn Hill
London
NW3 5UL

CLIENT:	Crawford & Company
CLIENT REF:	SU1300377
POLICYHOLDER:	Mr Gonzalez Ramirez
MWA REF:	NW160413.02
MWA CONSULTANT:	Giles Mercer
REPORT DATE:	23rd December 2013

SUMMARY

Statutory Controls			Mitigation	
TPO	No		Insured	No
Cons. Area	Yes		3rd Party	Yes
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 and Company, the insured property was visited on 22 April 2013 for the purpose of assessing the potential role of vegetation in respect of clay-shrinkage 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.

Recommendations are given 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.

The site was re-visited on the 19th December 2013 following receipt of additional Site Investigations.

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 two storey end-terrace house of traditional construction (built circa 1957) with brick walls surmounted by a ridged tiled roof. The flat roofed, brick built garage to the rear of the property is the focal point of this claim.

The property occupies a site which slopes upwards from front to rear.

Damage Description & History

The property was previously tenanted however the insured was downsizing and therefore the tenants moved out in March 2012 and the insured moved back in September 2012.

The movement to the garage was noted in March 2012 by the insured. Some mastic repairs are evident which were undertaken by the tenant as the insured was not aware of the movement prior to the discovery.

The insured instructed an Engineer to inspect in July 2012 who concluded that the third party trees were the cause of the movement.

The damage presents as various stepped tapering and horizontal cracks were noted to the left hand flank ranging up to 10mm in width; mastic repairs were evident to some of the cracks, 10mm vertical tapering crack to the rear wall at midpoint with mastic repair evident, 12mm gap evident between the concrete floor slab and right hand party wall.

At the time of the Engineers' inspection, in structural terms the damage falls into Category 3 of Table 1, Building Research Establishment Digest 251 (1995), which describes it as moderate affecting building serviceability.

Category	Approximate crack width	Classification	BRE Digest 251 (1995 Rev)
0	0.1mm	Negligible	Aesthetic
1	Up to 1mm	Very slight	Aesthetic
2	Up to 5mm	Slight	Aesthetic / Serviceability
3	5 to 15mm or several say, 3 to 5mm	Moderate	Serviceability
4	15 to 25mm	Severe	Serviceability / Stability
5	More than 25mm or several 5 to 25mm	Very Severe	Stability

Classification derived from B.R.E. Digest 251 (Classification of damage based on crack width / ease of repair.)

Categories 0 and 1 (Aesthetic) comprise damage which affects only the appearance of the property. Categories 2, 3 and 4 (Serviceability) include cracking and distortion which may impair the weather tightness or other function of the building, fracturing of service pipes and jamming of doors and windows. Category 5 (Stability) are cases where there is a risk that some part of the structure will fail unless preventative action is taken.

Site investigations

Site investigations were undertaken by CET Property Assurance on the 24th July 2013. A single trial pit (TP1) was excavated at the front left hand corner of the detached garages. The Trial Pit was hand excavated in order to reveal foundation depth and design and once this information was established, a borehole (BH1) was sunk through the base of the Trial Pit in order to determine subsoil conditions.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP/BH1	Concrete	770 mm

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
B/H1 770mm	MADE GROUND: very compact, dark brown, gravelly, silty sand with brick and concrete fragments and clinker Roots of live appearance to 50mmØ	n/a	n/a
B/H1 1,000mm	MADE GROUND: medium compact mid brown grey veined silty clay with partings of orange silt & fine sand, brick fragments carbon deposits & occasional gravel	46%	High
B/H1 2,000mm	Firm mid brown grey veined silty CLAY with partings of orange silt & fine sand & carbon flecks	59%	High
B/H1 3,00mm	Stiff mid brown grey veined silty CLAY with partings of orange silt & fine sand & carbon flecks	58%	High

Roots:

Ref	Roots observed at / between	Identification	Starch content
TP/BH1	2200mm	*Fraxinus* spp. (Ash)	Present

Drains:

No Drain survey data was available at the time of writing this report.

Appraisal

Opinion and recommendations are made on the understanding that Crawford & Co Engineers 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.

At the time of the Engineers' inspection, in structural terms the damage falls into Category 3 of Table 1, Building Research Establishment Digest 251 (1995), which describes it as moderate affecting building serviceability.

Site investigations were undertaken by CET Property Assurance in July 2013.

Independent laboratory analysis identified plasticity indices of the underlying clay strata on site to be between 46% and 59%. NHBC 4.2 (2010) classifies these soils as being of high plasticity.

No survey of the drains at the property was undertaken however, damaged or leaking drains are not considered to be a material cause of the current subsidence damage since the property drains appear to be remote from the focal point of the damage and the results of laboratory soils testing are not consistent with defective drainage as a causal factor.

In particular Moisture contents were recorded below the plastic limit of the soil and soil sample suction testing revealed moderate desiccation.

Whilst foundations bear onto made ground Shear vane testing of the substrate (in combination with the absence of Mackintosh Probe test results (as the substrate was too compact)) indicate 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.

Soil sample suction testing indicates moderate desiccation.

The desiccation is at depths beyond normal ambient soil drying processes such as evaporation and it corresponds with both the presence and action of tree roots.

Samples of roots were recovered from underside of foundations in TP/BH1. These roots were identified microscopically as having emanated from Fraxinus spp. (Ash).

Our survey of the site identified the Ash (T6) and in the absence of any other significant Ash trees in the vicinity we believe that this is the most likely source of the recovered roots. Whilst no roots were recovered from the Sycamore (T1), the Birch (T2) the Lime (T3) and the Laburnum (T5), given their size, species profile and position relative to the observed damage it is our opinion that these represent the most significant vegetative influence and the primary cause of the observed damage and accordingly we have made recommendations in respect of this. The ash, although implicated by the root identification, is considered to be a secondary influence.

In order to mitigate current damage and allow soils beneath the property to recover such that an effective repair solution can be implemented we recommend that the Sycamore (T1), the Birch (T2), the Lime (T3), the Laburnum (T5) and the Ash (T6) be removed completely.

The trees are too close to the garages for pruning to be a viable alternative solution.

Other vegetation has been identified which we believe could contribute to further damage and accordingly we have made recommendations in respect of this.

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.

- Removal of trees is recommended together with future management of retained vegetation.

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

Tree No.	Species	Ht (m)	Dia (cm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T1	Sycamore	15	25* 25*	9	1.05	Younger than property	3rd Party:- 7 Rosslyn Hill
Recommendation		Remove and treat stump to inhibit regrowth					
T2	Birch	15	25* 30*	14	4.70	Younger than property	3rd Party:- 7 Rosslyn Hill
Recommendation		Remove and treat stump to inhibit regrowth					
T6	Ash	18	500*	12	15.8	Younger than property	3rd Party:- 7 Rosslyn Hill
Recommendation		Remove and treat stump to inhibit regrowth					
T3	Lime	15	370*	12	4.0*	Younger than property	3rd Party:- 7 Rosslyn Hill
Recommendation		Remove and treat stump to inhibit regrowth					
T5	Laburnum	7	22	5	1.0*	Younger than property	3rd Party:- 2 Belsize Lane
Recommendation		Remove and treat stump to inhibit regrowth					

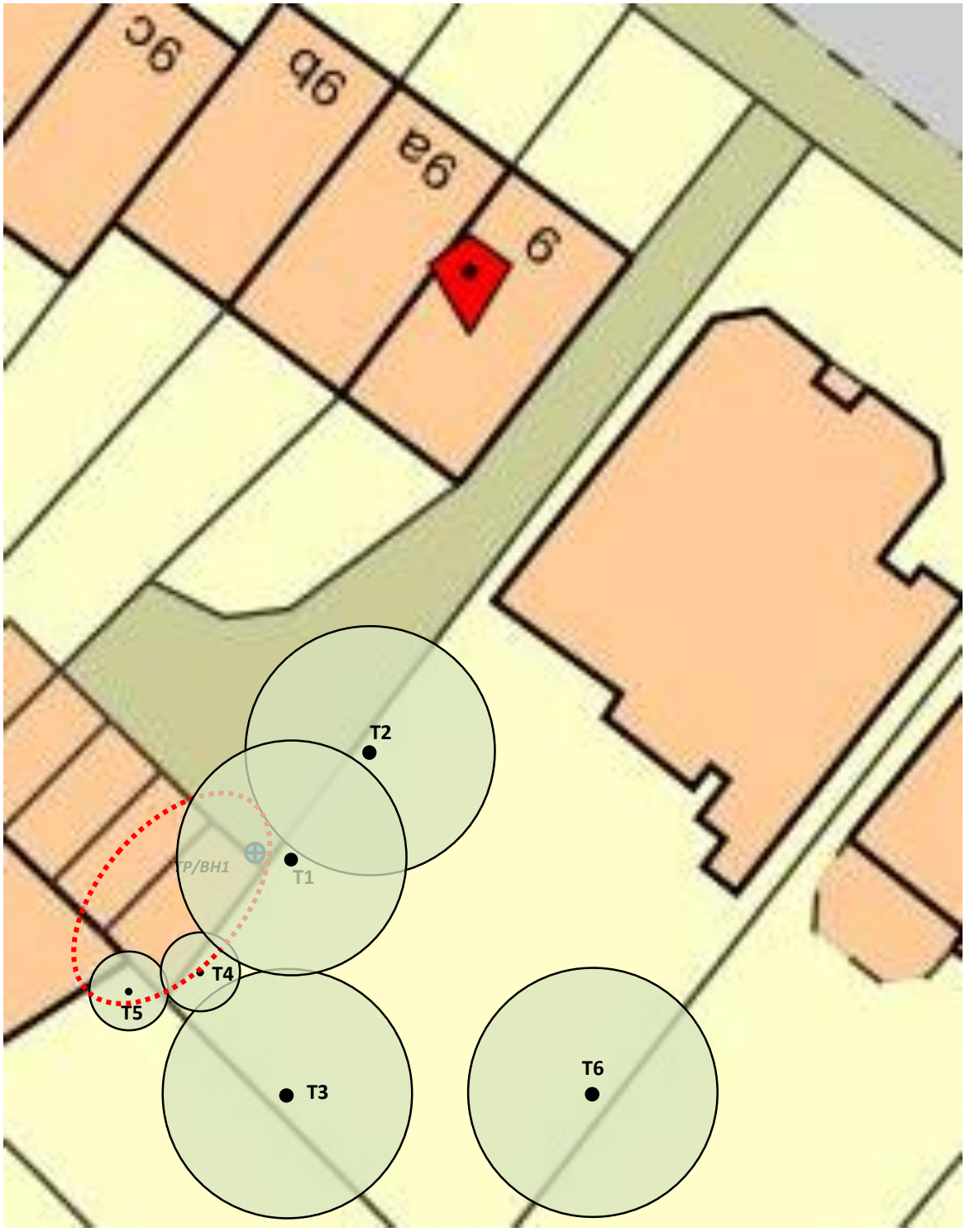
Ms: multi-stemmed * Estimated value

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

Tree No.	Species	Ht (m)	Dia (cm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T4	Cypress	4	12	2	1.0	Younger than property	3rd Party:- 7 Rosslyn Hill
Recommendation		Remove and treat stump to inhibit regrowth					

Ms: multi-stemmed * Estimated value

SITE PLAN



Plan not to scale – indicative only

Approximate areas of damage

Images

View of T2 & T4

View of T1 & T2

View of T6

View of Garage