Arboricultural Appraisal Report

Subsidence Damage Investigation at:

14 Parsifal Road
London
NW6 1UH

CLIENT:	Crawford & Company
CLIENT REF:	SU1604340
MWA REF:	SUB180316-2204
MWA CONSULTANT:	Andy Clark
REPORT DATE:	22/03/2018

SUMMARY

Statutory Controls			Mitigation (current claim works)	
TPO	No (current claim) No (future risk)		Insured	No
Cons. Area	Yes		3rd Party	Yes
Trusts schemes	N/A		Local Authority	Yes
Planning	N/A		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 20/03/2018 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 3 storey detached house of traditional construction, built C. 1897 and since converted into 4 self-contained flats.

External areas comprise gardens to the front and rear.

The property occupies a site that slopes gently downhill from right to left.

Damage Description & History

Damage relates to the front steps, the front bay and the front elevation of the insured dwelling, where cracking indicates downward movement.

The property has been the subject of two previous subsidence claims in 2007 and 2010. In both cases the local authority tree to the front of the property was deemed to be causal to the movement. Repairs were completed in 2013, at which time the front steps were rebuilt. It is understood that current damage was noted during August 2016.

At the time of the engineers' inspection (05/12/2016) the structural significance of the damage was found to fall within Category 3 (Moderate) of Table 1 of BRE Digest 251.

Site investigations

Site investigations were carried out by CET on 06/02/2017, when a single trial pit was excavated to reveal the foundations with a borehole sunk through the base of the trial pit to determine subsoil conditions.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP1	Concrete	800

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	Stiff to very stiff mid brown, grey veined silty CLAY with partings of orange silt and fine sand with carbon flecks and crystals.	46 - 51	High

Roots:

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

Drains: The drains have been surveyed and no significant defects were identified.

Monitoring: Level monitoring has been carried out to the front elevation of the property, commencing on 21/03/2017; with 5 subsequent readings taken over a bi-monthly schedule.

Readings demonstrate a seasonal trend of downward movement during the spring/summer months and upward recovery movement during the autumn/winter months which is indicative of the seasonal drying effects of vegetation.

The extent of movement across the property frontage is on the whole low, with movement fluctuating between 0.7mm and -1.00 in the most part. Pin 4 however, located to the front left-hand corner of the entrance steps, demonstrates the greatest range of movement – with downward movement of -2.80mm followed by upward recovery of 2.30mm.

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 that at the time of sampling the soil was desiccated in TP/BH1 at depths beyond normal ambient soil drying processes, such as evaporation, which is 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.

Roots were observed to a depth of 1.7m bgl in TP/BH1, and recovered samples have been positively identified (using anatomical analysis) as Monocotyledon spp. and Acer spp. The origin of the Acer spp. roots will be T1 Norway Maple, confirming the influence of this tree on the soils below the foundations. The Monocotyledon spp. roots will emanate from the nearby ornamental grasses of S2.

Irrespective of the roots found at the TP/BH1 location however, given the size and proximal location of T2 Cherry, the roots of this tree are also very likely to be present below the foundations and influencing soil moisture content – particularly to the left-hand side of the property.

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 T2 Cherry is the principal cause of the current subsidence damage, with contribution to a lesser extent from T1 Norway Maple.

The ornamental grasses will also impact upon soil moisture.

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 put in place, we recommend that T2 Cherry is removed and that T2 Norway Maple be subject to regular [biennial] pollarding. If movement persist following the removal of the cherry, the council maple T2 may need to be 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
T2	Cherry	8.4	330	7.5	8.0 *	Younger than Property	Third Party: 16 Parsifal Road
Management history		Subject to past management – appears previously crown reduced. Regrowth appears <5yrs					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth					

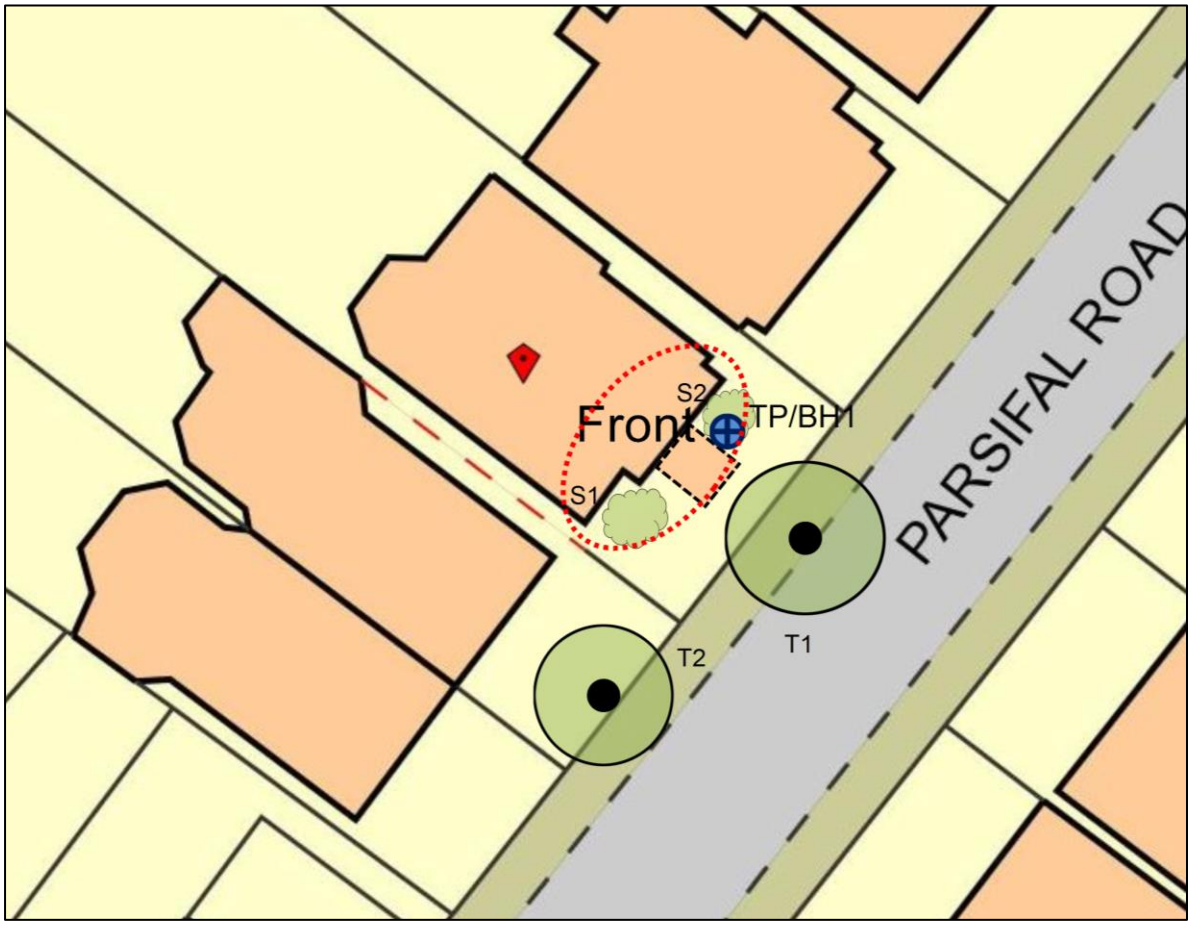
Ms: multi-stemmed * Estimated value

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

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T1	Maple	9.5	340	6.0	6.7	Younger than Property	Local Authority
Management history		Subject to past management -appears regularly pollarded. Regrowth appears <1yr					
Recommendation		Do not allow to exceed current dimensions by a programme of regular [biennial] re-pollarding.					
S1	Ornamental Grass	1.0	10 Ms	2.0	1.5	Younger than Property	Policy Holder
Management history		No significant past management noted					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth					
S2	Ornamental Grass	1.0	10 Ms	2.0	1.5	Younger than Property	Policy Holder
Management history		No significant past management noted					
Recommendation		Remove (fell) to near ground level 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 T1 Norway Maple

View of T2 Cherry

View of S1 Ornamental Grass

View of S2 Ornamental Grass