

Arboricultural Appraisal Report

Subsidence Damage Investigation at:

19 Compayne Gardens
London
NW6 3DG



CLIENT:	Crawford & Company
CLIENT REF:	SU1502293
MWA REF:	SUB150812-170
MWA CONSULTANT:	Giles Mercer (B.Sc Hons)
REPORT DATE:	21-08-2015

SUMMARY

Statutory Controls		Mitigation (current claim)	
TPO	Yes – T4	Insured	No
Cons. Area	Yes	3 rd Party	Yes
Trusts schemes	N/A	Local Authority	No
Planning	N/A	Other	No
Local Authority: -	London Borough of Camden		



Introduction

Acting on instructions received from Crawford & Company, the insured property was visited on 21/08/2015 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

We note from the Technical Report that the property comprises a large five storey converted (in the 1960's) terraced house (built circa 1900) of traditional construction with brick walls surmounted by a ridged tiled roof.

Flat A is in the lower garden level, Flat B in the upper ground floor, Flat C (rear) and Flat D (front) on the first floor, and Flat E (rear) and Flat F (front) on the second floor. Flat G, in the roof space, was added in circa 1990.

There is a light well around the front 3 storey bay. There is also a three storey bay to the rear. A conservatory was added to the rear of Flat A by a previous owner. The conservatory is believed to be at least 22 years old.

The site is generally level with no adverse or unusual topographical features.

Property: 19 Compayne Gardens,
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Damage Description & History

Engineers advise that the damage to the conservatory is indicative of possible subsidence and that due to the proximity of trees, subsidence due to root induced clay shrinkage may also be contributing to the damage observed in the rear rooms of Flats B, C and E.

At the time of the engineers' inspection on the 1st July 2015 the structural significance of the damage was found to fall within Category 2 (slight) of Table 1 of BRE Digest 251.

Damage to the front of the building is not considered by Engineers to be subsidence related.

Site investigations

Site investigations were carried out by CET property Assurance on the 16th July 2015.

Two trial pits were excavated, TP1 to the rear wall of the main building and TP2 to the rear of the conservatory. Please refer to the Site Investigation Report to determine the exact location of the Trial Pits / Boreholes.

The trial pits (TP) were hand excavated in order to reveal the foundation depth and specification and then a borehole (BH) was sunk through the base of the trial pit in order determine subsoil conditions.

A survey undertaken by Dynorod in May 2015 confirmed there were no cracks or leaks to the drains.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP1	Concrete	650mm
TP2	Concrete	400mm

Property: 19 Compayne Gardens,
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NW6 3DG

Client Ref: SU1502293
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Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1 USF-1.5m	Stiff, mid brown / orange, grey veined silty CLAY with partings of orange and brown silt and fine sand and occasional gravel	55	High
BH1 1.5-3.0m	Stiff, mid brown / orange, grey veined silty CLAY with partings of orange and brown silt and fine sand and occasional gravel and crystals.	51-54	High
TP/BH2 USF-1.0m	MADE GROUND medium compact dark brown sandy silty clay with gravel and brick pieces and concrete	53	High
BH2 1.0-2.2	Stiff, becoming firm, mid brown / Orange, grey veined silty CLAY with partings of orange and brown silt and fine sand.	49	High
BH2 2.2-5.3m	Stiff, becoming firm, mid brown / Orange, grey veined silty CLAY with partings of orange and brown silt and fine sand with crystals.	47	High

Roots:

Roots were observed throughout the trial pit and to a depth of 1.7m in BH1 and to a depth of 4.0m in BH2.

Ref	Roots Observed to depth of (m)	Identification	Starch test
TP1	USF	probably Leguminosae spp. but possibly Ulmus spp. *	Negative
BH1	1.7	probably Leguminosae spp. but possibly Ulmus spp. *	Negative
TP2	USF	Tilia spp.	Positive
TP2	USF	probably Leguminosae spp. but possibly Ulmus spp. *	Negative
BH2	1.9	Betula spp.	Negative
BH2	1.9	Acer spp.	Negative

Leguminosae spp. include laburnum, Robinia (false acacia or locust), broom, the pagoda tree, Mimosa and the climber wisteria. Ulmus spp. are elms. Tilia spp. are limes. Betula spp. are birches. Acer spp. are maples, including sycamore, Norway maple, and Japanese maples.

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

Monitoring: At the time of writing this report no monitoring data was available.

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Client Ref: SU1502293
MWA Ref: SUB150812-170

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.

Whilst the foundations of the conservatory bear onto made ground, in -situ Mackintosh probe testing of the material 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 structure and the recent appearance of damage.

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.

Soil sample suction testing indicates desiccation underside of foundations and at depth in both TP/BH1 and TP/BH2. The desiccation is at depths beyond normal ambient soil drying processes such as evaporation and is indicative of the soil drying effects of vegetation.

Roots were observed underside of foundations and at depth in both TP/BH1 and TP/BH2. Samples of these roots were recovered and independently identified as having emanated from a member of the leguminosae family, from *Betula* spp. (Birch), from *Tilia* spp. (Lime) and from *Acer* spp. (Maple).

Our survey of the site identified the Lime (T2 & T3), the Mimosa (T1). We are advised that a Silver Birch tree (ST1) was removed circa 2007 and an unknown tree - presumed to be an *Acer* (ST2) was removed circa 2002. The Mimosa is a member of the Leguminosae family and accordingly we are confident that it is the source of the roots identified as such in TP/BH1 and TP/BH2.

In the absence of other possible sources (the nearest Birch is outside the maximum normally accepted influencing distance and no *Acer* sources were identified) we believe that the Birch stump is the source of the Birch roots recovered in BH2 and the stump ST2 is the source of the recovered *Acer* roots.

The starch testing revealed that starch was absent from some of the samples. When a cell dies any starch it contained is digested by nearby micro-organisms, and eventually disappears. Therefore, if no

cell contents in the root turn violet (the starch test indicator), the Laboratory can usually state that the particular root is dead with confidence.

It is important to note that the statement applies to the particular root and may not reflect the state of the tree itself; a tree can have many dead roots in a healthy root system. The salient point is that components of the tree root system have been/are in-situ.

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 the Mimosa (T1) and the Lime trees (T2 and T3) are the material 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 the Mimosa (T1) and the Lime trees (T2 and T3) are removed.

We have given consideration to pruning as a means of mitigating the vegetative influence, however in this case, we do not consider pruning offers a viable long term solution - the Lime trees are already regularly pollarded and this has not prevented them being a material influence in the observed damage.

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.

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- 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	Mimosa	9.7	300*	6*	2.8	Younger than property but probably older than the conservatory	Third Party 17 Compayne
Management history		The mimosa tree in the rear garden of no 17 was reduced in size in November 2014 at the request of the insured. Previously pruned 5 years earlier.					
Recommendation		Remove and treat stump to inhibit regrowth					
T2	Lime	4.7	230	2.5	3.7	Younger than property but probably older than the conservatory	Third Party Fairhazel Co-Op
Management history		Regularly managed					
Recommendation		Remove and treat stump to inhibit regrowth					
T3	Lime	4.7	310	2.5	3.8	Younger than property but probably older than the conservatory	Third Party Fairhazel Co-Op
Management history		Regularly managed					
Recommendation		Remove and treat stump to inhibit regrowth					

Ms: multi-stemmed * Estimated value

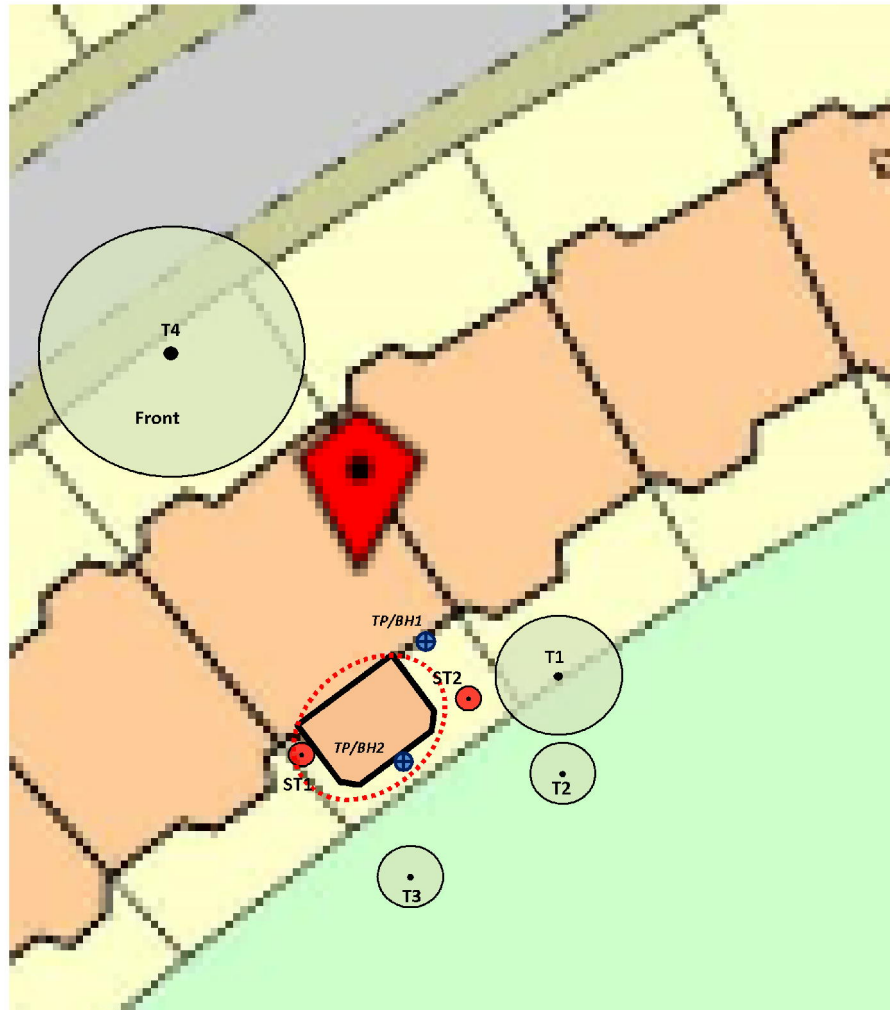
Property: 19 Compayne Gardens,
London,
NW6 3DG

Client Ref: SU1502293
MWA Ref: SUB150812-170


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

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
ST1	Birch	0	0	0	n/a	n/a	Policy Holder
Management history		Removed circa 2007					
Recommendation		None					
ST2	Unknown (Presumed to be Acer spp.)	0	0	0	n/a	n/a	Policy Holder
Management history		Removed circa 2002					
Recommendation		None					
T4	Lime	20	720	14	6.6	Similar age to property	Policy Holder
Management history		None observed					
Recommendation		Do not allow to exceed current dimensions or influence.					

Ms: multi-stemmed * Estimated value



SITE PLAN

 Approximate areas of damage

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Images



View of T1 & T2



View of conservatory with T1 in background

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NW6 3DG

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MWA Ref: SUB150812-170



View of T1 & T2



View of T4

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