

Arboricultural Appraisal Report

Subsidence Damage Investigation at:

40 Swakeleys Road
Ickenham
Uxbridge
UB10 8BE



CLIENT:	Crawford & Company
CLIENT REF:	SU1505084
MWA REF:	SUB170124-1030
MWA CONSULTANT:	Giles Mercer (B.Sc Hons)
REPORT DATE:	14-02-2017

SUMMARY

Statutory Controls		Mitigation (current claim)	
TPO	Yes – T1	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 Hillingdon		

Introduction

Acting on instructions received from Crawford & Company, the insured property was visited on 08/02/2017 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 risk address is a two-storey detached house of traditional construction with rendered walls surmounted by a hipped, tiled roof.

External areas comprise a driveway to the front of the house and gardens to the rear.

The site is generally level with no adverse topographical features.

Damage Description & History

The current damage predominantly affects the right-hand section of the property and was first noticed circa July 2014.

The property has been the subject of two recent subsidence claims in 2009 and 2012.

In 2009 the third-party oak tree T1 was reduced by 40% and the 2012 claim involved the removal of the insured's cherry tree from the left hand side of the property.

At the time of the engineers' inspection on the 4th January 2016 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 Tuesday, 19 January 2016.

Two Trial Pits were excavated at the subject property (please refer to the Site Investigation report for the exact location of the Trial Pits / Boreholes).

The Trial Pits (TP) was hand excavated in order to reveal the foundation depth and specification and then a Borehole (BH) was sunk through the base of the Trial Pits in order determine the nature of the subsoil.

A Control (or Remote) Borehole was sunk on site in a position considered to be remote from the influence of any vegetation. The Control Borehole allows comparison with soils in their 'natural' state i.e. outside the influence of vegetation.

The physical characteristics of the soil were logged and in-situ testing was carried out to determine the Shear Strength and/or the Consolidation of the soils.

Soil samples are retrieved during the investigation process and analysed by a UKAS accredited Laboratory (to relevant BS, EN and ISO standards).

A CCTV (Closed Circuit Television) survey of the drainage system on the property site was undertaken, the drainage layout mapped and a report prepared on the system structure, condition and functionality together with any recommendations for remedial works.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP1	Concrete	875

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1 USF-1.2m	Firm light brown / orange, grey veined silty CLAY with partings of orange and brown silt and fine sand.	61	High
BH1 1.2-1.5m	Stiff light brown / orange, grey veined silty CLAY with partings of orange and brown silt and fine sand.	n/a	n/a
BH1 1.5-2.2m	Very stiff, light brown, grey veined, silty CLAY with partings of orange, brown & red silt & fine sand & occasional clay-stone nodules.	n/a	n/a

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BH1 2.2-2.7m	Very stiff, light to mid brown, grey veined, sandy, silty CLAY with partings of orange & brown silt & fine sand & occasional claystone nodules.	26	Medium
BH1 2.7-3.1m	Medium dense to dense, moist, light grey silty SAND with occasional clay lenses.	n/a	n/a
BH1 3.1-6.0m	Very stiff, reddish brown, grey veined, silty CLAY with partings of orange & brown silt & fine sand & occasional clay- stone nodules.	38	Medium

Roots:

Ref	Roots Observed to depth of (m)	Identification	Starch test
TP1	USF	Quercus spp.	Positive
BH2	1.075-1.8m	Quercus spp.	Positive

Drains: The drains have been surveyed and some defects were identified which are being addressed..

Monitoring: Level monitoring indicates cyclical movement consistent with the presence and action of tree roots.

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.

While defects were identified within the drainage system at the property, drains are not considered to be a material cause of the observed damage and soil testing validates this position.

Site investigations and soil test results have confirmed a plastic clay subsoil of medium to high volume change potential (NHBC Classification) susceptible to undergoing volumetric change in relation to changes in soil moisture.

Soil sample suction testing shows severe desiccation underside of foundations in TP/BH1, this is confirmed by applying the Driscoll test.

The zone of desiccation is consistent with both the presence and action of tree roots.

Comparison with the remote borehole (BH2) where soils are outside the influence of vegetation shows a normal soil moisture profile and an absence of desiccation (except at depth where this is likely to be a feature of the local soil structure since it is replicated in BH1 and in both instances, is outside the influence of tree roots).

Roots were observed to a depth of 2.6m in BH1, samples of these roots were recovered and microscopically identified as having emanated from *Quercus* spp. (Oak).

Our survey of the site identified the Oak (T1) and we are confident that this is the source of the recovered roots.

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 Oak (T1) is 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 the Oak (T1) is 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.

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	Oak	18	20	900*	11.2	Older than property	Third Party Ickenham URC
Recommendation		Remove (Fell to ground level) and treat stump to inhibit regrowth					

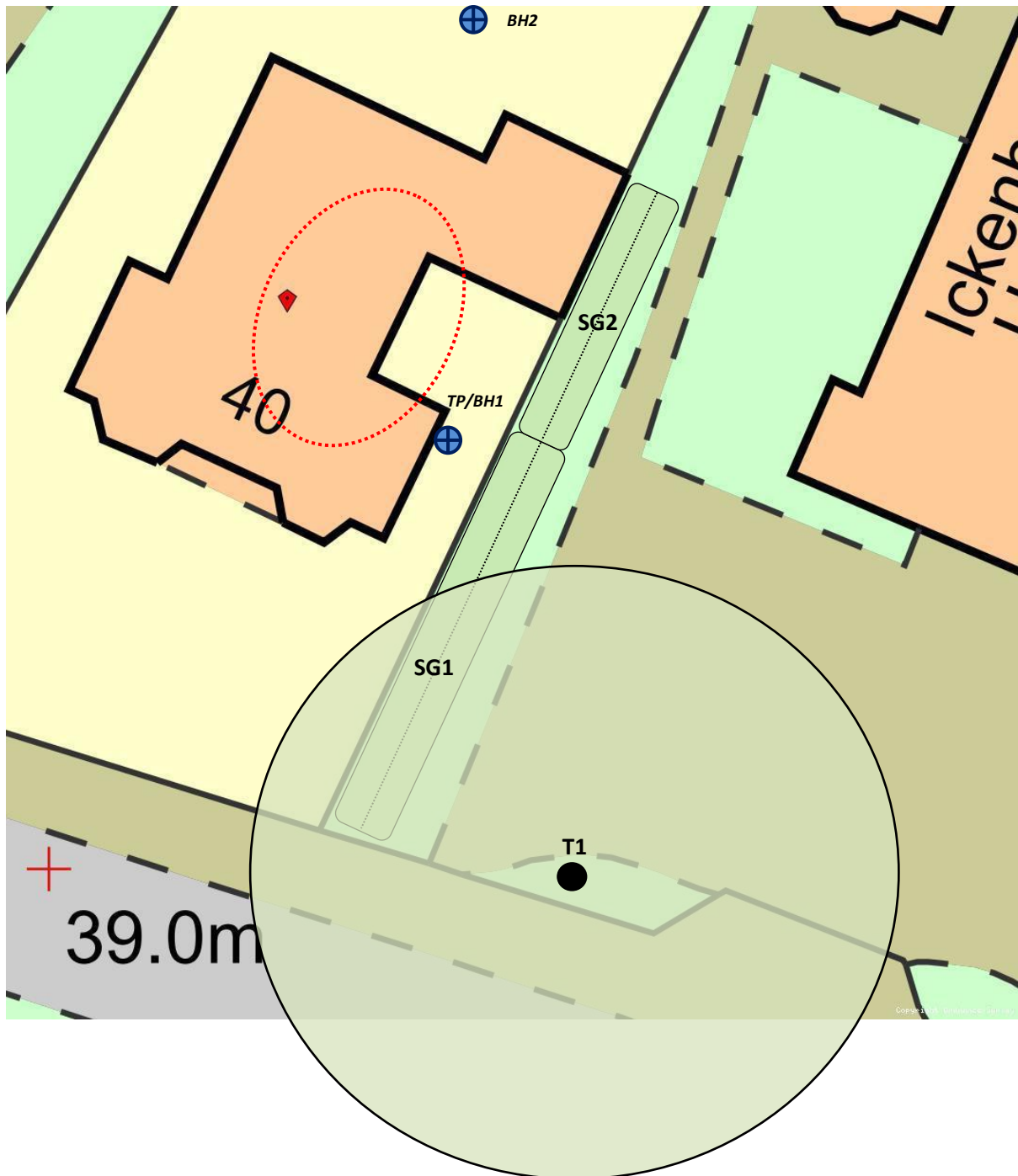
Ms: multi-stemmed * Estimated value

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

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
SG1	Mixed species shrub group including Pyracantha, Choisya, Eleagnus, Holly, Berberis, Buddleija, Rhus	≤ 3.5	40* ms	~ 3	≥ 3	Younger than Property	Third Party Ickenham URC
Recommendation		Do not allow to exceed current dimensions of influence through a program of annual pruning.					
SG2	Laurel	≤ 3.5	100* ms	~ 3	≥ 3	Younger than Property	Third Party Ickenham URC
Recommendation		Do not allow to exceed current dimensions of influence through a program of annual pruning.					

Ms: multi-stemmed * Estimated value

SITE PLAN



Plan not to scale – indicative only

 Approximate areas of damage

Images



View of SG1,SG2



View of T1



View of SG1, SG2 from Church



View of T1, SG1