

Arboricultural Assessment Report

Detailed Report on Trees

For:	Client:	Oriel Services Limited
	Insurer:	
Site:	Policyholder:	
	Risk Address:	4 Acre Lane, Waterlooville, Hampshire, PO7 8RJ
Refs:	OCA Ref:	47560
	Client Ref:	4002042
	Insurer Ref:	06SQ649472

Survey By:	Martin Hugi		
Title:	Consulting Arborist	Date:	15 April 2011
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Title:	Senior Consulting Arborist	Date:	20 May 2011



Consulting Arboriculturists

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Contents

Section

- 1** Introduction & Brief
- 2** Limitations
- 3** Evidential Assessment
- 4** Conclusions
- 5** Recommendations for Vegetation Management
- 6** Vegetation Survey
- 7** Site Plan

References

Reference

- 1** Cunningham Lindsey 'Engineering Appraisal Report' dated 12 April 2011
- 2** CET Safehouse Limited 'Factual Report of Investigation' dated 03 June 2010 & 06 December 2007
- 3** Level Monitoring for the period 25/05/10 – 23/03/11

1.0 Introduction & Brief

- 1.1** OCA UK Limited has been instructed by Oriel Services Limited on behalf of the building insurers of 4, Acre Lane, Waterlooville, Hampshire, PO7 8RJ (the Insured Property). We have been advised by Oriel Services Limited that the Insured Property has suffered differential movement and damage which is considered to have been caused by trees growing adjacent the property influencing soils beneath its foundations.
- 1.2** We have been instructed to undertake a survey of the vegetation growing adjacent the Insured Property, to provide our opinion as to whether, based on the available information any of this vegetation is likely to be influencing soil moisture levels beneath the foundations of the property and if so to provide recommendations as to what tree management could be implemented to effectively prevent damage continuing.

2.0 Limitations

- 2.1** Recommendations, with respect to tree management, are associated with the risk address following consultation with Engineers. In relation to the possibility of heave damage, the owners of any trees in third party control must obtain their own advice in respect of the possibility of any damage to their own or other structures outside of the control of the insured.
- 2.2** Recommendations do not take account of any necessary permission (statutory or otherwise) that must be obtained before proceeding with any tree works.

3.0 Evidential Assessment

Circumstances of discovery	The Engineer has advised that damage was discovered in the summer of 2006
Engineer's brief description of main damage	The Engineer describes the main area of damage as taking the form of hairline – 5mm tapering diagonal tapering cracks to walls together with distortion to window and door frames. This damage has closed and then re-opened and reached a maximum width of 15mm.
Engineer's brief description of the mechanism of movement	The Engineer has advised that the pattern of movement indicates a mechanism of downwards movement to the front of the property.
Engineer's BRE 251 numerical category	The Engineer has classified the damage as category 3 (moderate) in accordance with the BRE Digest 251 – Assessment of damage in low-rise buildings.
Engineer's assessment of onset and progression of damage	The Engineer considers that damage has occurred recently and that it is likely that movement will be of a cyclical nature with cracks opening in the summer and closing in the winter.
Engineer's conclusion as to cause of damage	The Engineer has concluded that the damage has resulted from clay shrinkage subsidence. This has been caused by moisture abstraction by roots altering the moisture content of the clay subsoil resulting in volume changes, which in turn have affected the foundations.
Foundations	Site investigations comprised of two trial pit and boreholes that were excavated adjacent the front and rear left corners of the Insured Property. The excavations revealed foundations at these points to be constructed at a depth of 1550mm (front left corner) and 1600mm (rear left corner) below ground level.
Trial Pit / Borehole, soil characteristics description	03/06/10 – TP/BH 1 - Soils at the underside of the foundations are described as: stiff, silty Clay to a depth of 5m. The borehole ended at 5m. TP/BH 2 - Soils at the underside of the foundations are described as: stiff, silty Clay to a depth of 4.3m. The borehole ended at 4.3m as unable to extract sample through water. 06/12/07 – TP/BH 2 - Soils at the underside of the foundations are described as: stiff silty Clay to a depth of 4.3m. The borehole ended at 4.3m as the ground was too dense for the drill to penetrate.
Soil plasticity	06/12/07 - Soil samples were taken from the trial pit and borehole and were subjected to laboratory testing. The results of these tests indicate that soils beneath the front left corner of the Insured Property have modified plasticity indices ranging between 46% and 49%. This confirms that underlying soils have a high potential for volume change due to their moisture content.

Desiccation	The Soil Suction Profile is indicative of desiccation at around a depth of 2m. This is demonstrated by the suction values increasing from 25kPa at a depth of 1.6m to 522kPa at 2m. Suction values then decrease beneath this depth. In addition soils are described as stiff and the shear strength values are at their maximum throughout the profile.
Heave Potential	The Engineer does not consider heave to be a consideration should the adjacent vegetation be removed.
Roots as described in Trial Pit / Borehole Log	06/12/07 - Roots of up to 3mm in diameter were noted at the underside of foundations in Trial Pit 2. Hair & Fibrous roots were noted to a depth of 3m in Borehole 2.
Laboratory analysis of roots	Root samples were taken from the trial pit and borehole and have been subject to laboratory testing using light microscopy techniques. The results of these tests are as follows: TP 2 (underside) – <i>Quercus</i> (Oak) 4 roots of up to 2.5mm in diameter.
Drainage	Engineers do not consider leaking or damaged drains to be a factor in current damage. The high shear vane readings appear to support this opinion.
Monitoring	A programme of precise level monitoring is currently being undertaken at the Insured Property. Readings are available for the period 25/05/10 – 23/03/11 and show a clear pattern of seasonal movement. The greatest amplitude of movement is recorded at point 4 with 16mm amplitude of movement. I note that these points are closest to English Oak T1 and English Oak T2.
Estimated cost of superstructure and repair works if tree removed	£15,000
Estimated cost of works if trees retained	£85,000

4.0 Conclusions

From the evidence summarised above I consider that I have demonstrated that on the balance of probabilities:

4.1 Tree Roots have extended beneath the foundations of the risk address

Roots have been noted throughout TP2 and to a maximum depth of 3m in BH2.

Samples of these roots have been tested using light microscopy techniques and have been formally identified as Quercus (Oak).

Given their size, species and proximity to the location of the trial pit/borehole I consider that these roots have emanated from English Oak T1 and English Oak T2.

4.2 Damage to the risk address has resulted due to the presence of these roots

The timing of damage is consistent with a time of year when soil moisture deficits due to the influence of adjacent vegetation would be at or reaching their peak.

The mechanism of movement as described by the Engineer is entirely consistent with the locations of English Oak T1 and English Oak T2.

Shrinkable clay soils have been encountered beneath foundations at front left corner of the Insured Property. These soils will be subject to volumetric changes due to fluctuations in their moisture content.

The soils analysis results indicate that underlying soils are in a desiccated condition.

Level monitoring demonstrates a seasonal pattern of movement that I can only attribute to the influence of adjacent vegetation. I note that the greatest amplitude of movement is 16mm at pin location 4, which is consistent with T1 and T2.

Engineers have confirmed that other potential causes of damage such as leaking or damaged drains have been discounted as a cause of the current damage.

Therefore it is my opinion that sufficient information has been provided to demonstrate that, on the balance of probabilities, English Oak T1 and English Oak T2 are the material cause of the current subsidence damage

I do not consider that there is any other vegetation growing adjacent the Insured Property that could be considered to be a factor in current damage.

5.0 Recommendations

Given their close proximity to the Insured Property I do not consider that undertaking pruning works to English Oak T1 and English Oak T2 will provide either an effective or sustainable means of controlling their water use. Therefore and in order to provide a long-term solution to the current subsidence damage I recommend these trees be removed.

5.1 Recommended vegetation management to address the current subsidence:

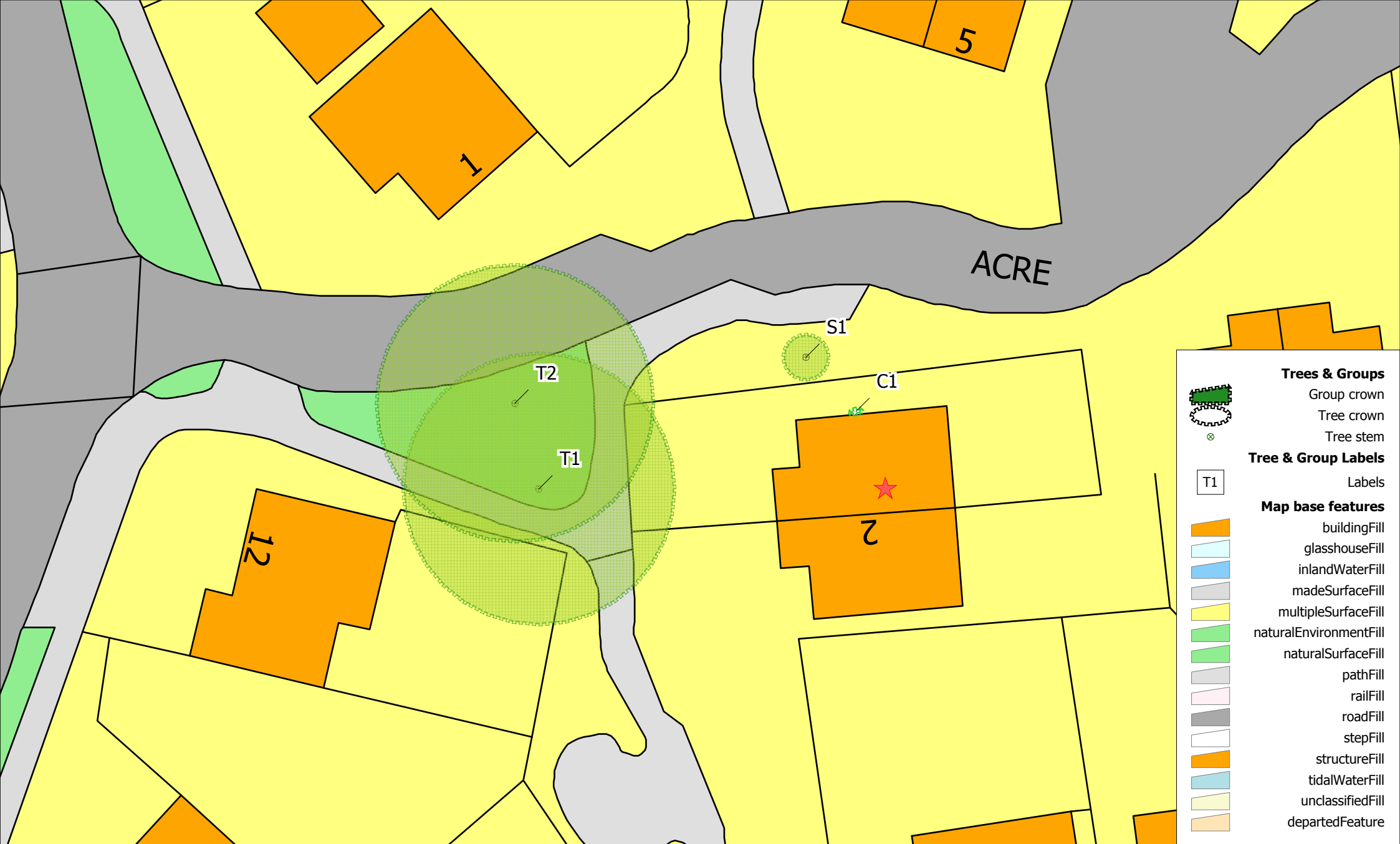
Tree No:	Species	Works Required
T1	English Oak	Fell to as close to ground level as possible and treat the stump with an appropriate herbicide
T2	English Oak	Fell to as close to ground level as possible and treat the stump with an appropriate herbicide

Age Class	YO – Young. SM – Semi-Mature. EM – Early Mature. MA – Mature. FM – Fully Mature. OM – Over Mature	Ownership	PH – Within boundary of risk address. P3P – Within boundary of third party properties. LA – Within land owned by a Local Authority. C3P – Commercial third party. U – Within land of indeterminable ownership.
Condition	G – Good. F – Fair. P – Poor. D – Dead, Dying or Dangerous		
Stem Diameter	MS – Multi-stemmed tree		



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Tree No	Common Name	Age Class	Condition	Height (m)	Crown Spread (m)	Stem diam. (mm)	Dist to bldg (m)	Pruning history	Recommendation	Tree work constraints	Notes	Owner
T1	English Oak	MA	F	14.6	14.4	625	11.4	Heavily reduced many years previous, Crown lifted	Fell and grind stump.		Assymetric crown spread	LA
T2	English Oak	MA	F	17.1	14.7	820	13.1	Heavily reduced > 5 years ago	Fell and grind stump.			LA
S1	Spiraea	EM	G	1.3	2.4	10	2.7	No significant past tree works	No work required.		Average stem diameter at ground level	PH
C1	Clematis	SM	G	2.2	1.2	5	0.1	No significant past tree works	No work required.		Average stem diameter at ground level	PH



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Job Ref.: 47560
Survey Date: 15/04/2011
Scale: 1:250 @ A4

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