

Arboricultural Assessment of 88 Lakewood Road, Chandlers Ford, SO53 5AA

Carried out by Matthew Rowden on behalf of Peter
Robertson, Proposer and correspondent for the application
for the above address.

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3. Instruction

This report is to survey one tree on the site for the potential to cause damage and/or harm. I refer to the current guidance set out within NTSG Common sense risk management of trees 2011. The risks that I have assessed are: Likelihood of damage to property (indirect or contact), tree failure through structures, and personal harm or injury.

4. Limitations

This survey is valid for 5 years. I must be kept in direct supervision of the site at all times in regards to all arboricultural matters in order for the findings in this report to remain valid.

5. Site details

The site is a residential property located off Lakewood road at number 88, Chandlers Ford. The tree in question is a mature sweet chestnut tree located at the front of the property, to the Northern Boundary of the site. The tree is covered by a preservation order ref:247-E, and is within 15m of the structure and overhangs Coultas road. The tree will henceforth be referred to as "T1".

The LPA is Eastleigh Borough council.

6. Legal restrictions

The tree is covered by a TPO, reference 247-E. This is a blanket TPO that covers the two sweet chestnut trees in that front garden.

7. Proposals

This report aims to establish whether the tree requires work within the next 5 years, 1 year, critically (as soon as reasonably practicable), or no work whatsoever.

8. Drawings and documents

The client has not provided drawings and documents for the purposes of this assessment. I have obtained one from Eastleigh borough council and have annotated the tree on the map.

9. Summary

T1 presents a litany of structural issues and physiological issues that pose significant threat to property and potential to cause harm. The retention of this tree is not viable.

10. Findings (please see appendix 1 for specific details)

- i. T1 is a mature sweet chestnut with a full, unpruned crown. The upper canopy is in re-trenchment, with clear indicators of reduced vitality, excessive dead wood and die back from the tips.
- ii. The tree lost two large limbs on September 16th, outside of any abnormal weather events, after two of the rainiest, most miserable and below average temperature summer months on record. With this in mind, I discount summer limb drop as a possible cause.
- iii. The detritus from the two failed limbs has been left as evidence: on inspection (see appendices) there appears to be a significant amount of cellulose rot at the points of failure, suggestive of fungal colonisation of the woody substrate. If it has manifested itself in the upper canopy limbs, it is likely that that same level of decay extends across the rest of the upper canopy. This has exposed the heartwood which is showing advanced stages of cellulose (brown) rot, with large bits of the substrate just falling away. This suggests that the heartwood of the limbs in the upper canopy is severely compromised, and unlikely to be adding such in the way of structural support: the sapwood is providing the majority (if not all). Studies by Arantes and Goodall 2014 suggest that "Mechanical property loss caused by brown rot fungi have been reported to be as much as 70%

of modulus of elasticity (MOE) and modulus of rupture (MOR) ([21](#)) in early, or incipient, decay stages. In other work ([35](#)) with *G. trabeum* brown rotted wood, loss of mass from the wood was undetectable until 40% loss in MOR had occurred."

- iv. There is a fungal fruiting body to the North aspect of the stem at ground level: this, I identified as *Armillaria mellea*, or honey fungus, confirmed via the Tim Moya associates app.
- v. No black rhizomorphs were visible during inspection.
- vi. Coultas road qualifies as target range 3 within the QTRA mechanism.

11. Analysis:

Fungal strategies of *Armillaria mellea*

- i. Honey fungus is an opportunistic pathogen that is commonly spread through the soil via rhizomorphs.
- ii. The signs of this are yellow fruiting bodies (pictured), and black rhizomorphs. The rhizomorphs are some of the biggest organisms in the world, so their presence in the soil alone is not enough to suggest the tree has been colonised, but a fungal fruiting body (sexual stage of infection) is. This also ties in with the symptoms: discoloured foliage, reduced growth, dieback of the branches and death.
- iii. The strategy of this fungi is it commonly affects trees with existing co-morbidities: Trees that may already be in decline, stressed or suffering from other physiological issues or pathogens.
- iv. The substrate can be decayed via rapid cellulose metabolism, resulting in brittle and weak unions, loss of strength in the upper canopy and increased chances of wind throw.
- v. This cellulose decay has been shown in reference Q to entail up to a 70% strength loss.

Decay detection

- vi. This report is based around visual inspection. I do not believe that any more detailed inspection is necessary (picus tomography or microdrill), as the burden of proof is very much discharged via visual inspection that the tree is structurally unstable and unworthy of retention.
- vii. I consider it unlikely that the stem is particularly decayed: the limbs appear to be failing in the upper canopy, and it is rare for honey fungus to hollow out the main stem.

Exploring pruning as an option

- viii. In order to determine by how much a tree should be pruned to adequately mitigate the risks of windthrow, I refer to the exhaustive works of Dr Frank Rinn.
- ix. The bending moment of the canopy can be assumed to be at the likely point of failure, which is upper canopy, anywhere on the main stem. Dr Frank Rinn [Ref: D] has worked

with how wind loading of trees can be affected and reduced via pruning, and drew the following conclusions:

- x. Height of the stem above the likely point of failure (in this case, anywhere in the canopy) is a crucial factor. E.g. If two trees of identical structure were situated side by side, but one was twice as tall as the other above the included bark union, the wind loading and bending moment on the likely point of failure would be up to 8 times that of the shorter tree.
- xi. From this, he drew the generalisation that a percentage reduction in height would equate to approximately double that in wind loading and therefore bending moment on the weak union or decayed stem (e.g. 10% height reduction=20% reduction in wind loading and therefore bending moment on the weakened stem).
- xii. That the higher a tree is, the more the wind loading increases exponentially.
- xiii. With this in mind, assuming that there has been a 70% loss in upper canopy strength, a minimum of a 35% reduction in overall height is necessary, equating to a reduction of 6.65m.
- xiv. A reduction of this severity on a compromised tree that is already in decline with a severe fungal infection is most likely to kill the tree, or severely compromise its amenity to such an extent that it may be lost within 5 years.

Quantified Tree Risk Assessment (QTRA)

- xv. Using a QTRA mechanism, the figures generated are as follows: T1 is a large (size 1) defective tree (threat 1/1->1/2) with a probability of failure between 1/100 and 1/1000.
- xvi. The target is a public highway and footpath that falls into target range 3.
- xvii. The probability of failure is calculated at POF range 2. With this in mind, the calculation is $1/1 \times 1/100 \times 1/100$, equating to a $<1/10,000$ value.
- xviii. This is classed within this industry standard mechanism as “unacceptable where imposed on others”, and that the action is to “control the risk”. The tree overhangs the public highway, and therefore the risk must be controlled.

Case law precedents

- xix. In this instance, the case law precedent that comes to mind is that of *Perrin and another Vs Northampton BC 2007*.
- xx. To summarise:

Investigations: The claimant alleged that a local authority owned tree that was covered by a tree preservation order had caused subsidence damage to their property.

Live roots were uncovered beneath the foundations of the property, but not directly or conclusively attributed to the defendant's tree.

The local planning authority rejected the application to fell the tree on the grounds that the data was insufficient to shift the burden of proof to that tree.

Vegetation management: The LPA relayed the following to the claimant, regarding the tree as high value:

- The amenity of the tree was considered to outweigh the reasons for the tree's removal.
- The claimant could apply to prune the encroaching roots.
- The tree could be pruned to decrease root growth/ingress, and reduce water demand.
- That there were engineering solutions such as underpinning for the property.

Judgement: The judge initially found in favour of the claimant, saying that the presence of a TPO is irrelevant: that the homeowner had the same rights with a TPO'd tree and a non TPO'd tree, and rejected the idea that engineering solutions should be considered first, and that the work carried out to the tree must be the "minimum to abate nuisance". The tree was to be felled. At appeal, the judge's verdict was found to be incorrect, and the judges ruled in favour of the defendants: that protected trees should remain protected until other solutions had been explored, such as underpinning or root barriers.

- xxi. With the above in mind, although not attributed to subsidence, the legal precedent is clear: The homeowner has the right to to abate such nuisance as is being caused by the tree, providing other solutions have been explored. The fact that the nuisance is not subsidence, but is more specifically safety and the danger it poses to the general public is irrelevant: in my professional opinion, the precedent is transferable, and although TPOd, the tree is presenting a nuisance that makes its retention not viable.
- xxii. This report has explored alternative solutions (i.e. Pruning), and has found it not to be viable. There are no engineering solutions to keep this tree structurally stable, so therefore, the tree must be felled. The data to shift the burden of proof to the tree's safety is currently residing on the driveway of 88 Lakewood road, awaiting viewing by the LPA tree officer.

12. Conclusion:

The tree is a large specimen with significant structural defects that fail the industry accepted mechanism I've used to analyse it, and I consider the likelihood of further significant failures within the next 5 years, highly likely. The upper canopy is compromised, the branches appear to be held together by a thin ring of sap wood, and the upper canopy has already lost two large limbs, leaving wounds that will be easily colonised by opportunistic pathogens. Combined with this, it is already colonised by one of the most aggressive pathogens that exist in the UK.

I do not believe that the amenity value presented by the tree justifies its retention when compared to the risk it poses, and the amenity of the entire site can be considerably improved by replacing this tree with a 14-16 heavy standard in a similar place.

The replacement tree should not be a sweet chestnut, as their CODIT properties are not great, and the ground is most likely harbouring a host of rhizomorphs that may shorten the life span of the new tree. I advise *Liquidambar styraciflua* or *Catalpa bignonioides* as two species that are virtually pest and disease free in the UK, but will grow to similar sizes as the tree they replace.

13. Recommendations

- T1- Fell: Replace with a 14-16 standard sweet gum or Indian bean tree. Action as soon as reasonably practicable (treat as critical priority).



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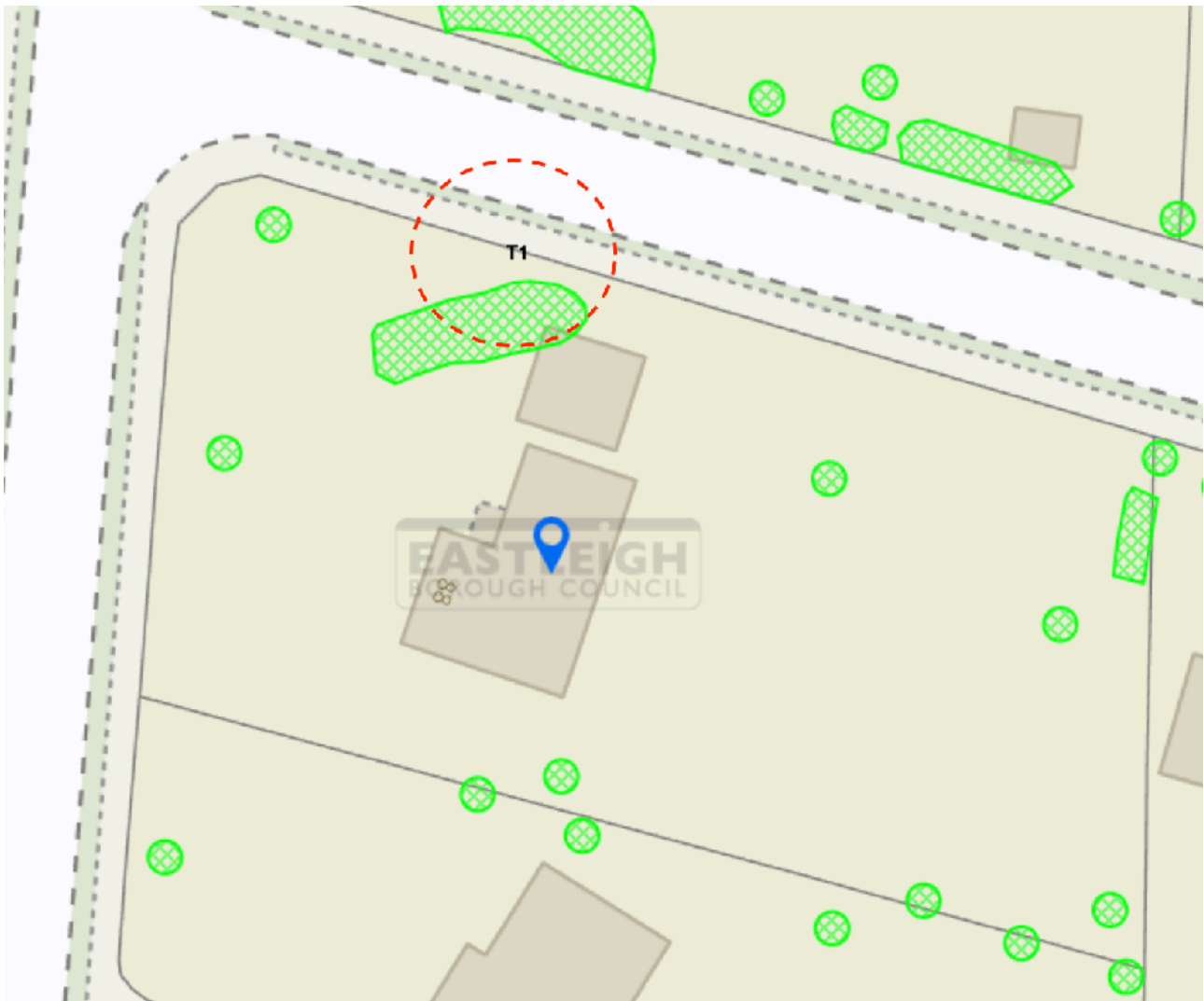
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14. References

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Appendix 1 - Tree survey schedule (separate document)

Appendix 2: Tree location plan



Appendix 3: Images



Two substantial limbs have failed, leaving large tears that can be easily colonised by opportunistic pathogens



Armillaria mellea fruiting body identified at base of stem and confirmed via TMA app.



Advanced stages of cellulose decay shown within the middle of one of the failed limbs: All limbs on the ground exhibit the same issue, and may be viewed by the tree officer upon visiting site.