

**Arboricultural inspection at 23
Oakwood road, Chandlers Ford,
Eastleigh, SO53 1LW**

Carried out by Matthew Rowden, Consultant at
Romsey Tree Surgeons LTD, for Paul Richardson of
the above address.

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1. **Instruction:** To inspect and assess one over mature *Betula pendula* for safety, amenity and long term retention, and to categorise the necessary remedial work as high priority (must be carried out within 3 months), moderate (6 months), and low (1 year). I have been instructed by Paul Richardson to conduct this report.

- 2. Limitations:** The inspection of the tree was of a preliminary nature, carried out from ground level, using the industry recognised VTA method (see Prof Dr. Mattheck in references), along side NTSG Common sense risk management of trees. Decay detection was confined to manual probing only. Mechanisms have been used to draw conclusions that can be subjective: Both QTRA and the Helliwell index can produce inconsistent results based on the user. They are, however, both industry recognised mechanisms.
- 3. Site details:** The site is a residential property located off Oakwood road in the centre of Chandlers Ford. The tree is located in the back garden, with a strong North Easterly canopy bias and lean.
- 4. Drawings and documents:** The client has not provided scale plans for the site to aid identification of the tree. A drawing has been obtained from Eastleigh borough council to aid identification. The tree mentioned on the plan shall henceforth be known as T1.
- 5. Legal restrictions:** The tree is covered by a tree preservation order. This report is in the wake of a rejection of an application (from Paul Richardson) to fell, by Eastleigh borough council. The reasons for rejection were: “The work to (the silver birch)[sic] is considered unjustified. The works would result in an adverse impact on the visual amenity, ecology and wildlife and screening of the surrounding area”. These rather woolly and non-specific reasons will be explored in analysis.
- 6. Summary of tree condition:**

A. Tree 1

- i. The silver birch is an over mature specimen that has historically lost the South West aspect stem.
- ii. This has resulted in extensive decay beneath the roots and buttresses of the remaining East aspect stem, with significant loss of anchorage.
- iii. The rest of the tree appears structurally sound, with the canopy exhibiting good vitality for a tree of this over maturity.
- iv. The remaining stem has a strong North Easterly canopy bias and lean which is in the direction of the prevailing wind.

7. Findings (Please see the inspection schedule and tree location plan for specific details):

T1:

Overview

- a. Over mature specimen with strong North Easterly canopy bias.
- b. Historically has lost the West aspect stem that has failed 25 years ago.

The decay has not been compartmentalised well, and there is a large wound from ground level to 1m on South West aspect measuring 500mm x 1000mm.

Trunk

- c. At buttress level, there is extensive decay to the West aspect, with a large wound measuring 1000mm x 500mm, with an explored depth beneath the buttresses of 500mm via manual probing.
- d. The remainder of the stem above 1m exhibits no defects, structural or physiological.

Branch structure

- e. No major issues with the formation of unions.

Crown

- f. The tree is exhibiting early signs of passing through maturity to the over mature stage, specifically canopy die back from the tips, premature defoliation, and some dead branches in the lower canopy.

Root system

- g. Major visible decay of the buttresses and root system to the West aspect. This can be regarded as of high significance.
- h. Manual probing revealed hollows up to 500mm deep beneath the remaining stem.
- i. Around 50% of the anchorage of the tree has been lost on the tensile side of the stem.
- j. The soil is sandy, calcareous and inelastic.
- k. There is significant thigomorphogenesis and secondary growth around the buttresses to the North East aspect.

8. Analysis:

- a. A loss of 50% of the anchorage of the tree may be regarded as highly significant.
- b. The subsequent decay into the lower stem extends at least 500mm below the remaining root plate, revealed by via manual probing.
- c. Although there is significant thigomorphogenesis to the North East aspect, this subscribes to Mattheck and Breloer's widely disputed theory that trees most commonly fail on the compressive side due to fibre buckling. However, the decay is less to the main stem and more to the buttresses and root plate.
- d. For this report, I refer to the study of "analysing key factors of roots and soil contributing to tree anchorage", Ming & Defoussez 2018. The conclusions of this study conducted via pull testing found the following:
 - i. Inelastic soil can reduce the anchorage strength of the tested trees by up to 20%.
 - ii. Pronounced changes to the anchorage strength (K0) were affected by the taproot diameter and thickness. Findings paragraph shows from manual probing that there is no taproot whatsoever.
 - iii. That the windward shallow roots (in this case, the roots to the South West aspect), were almost as important in anchorage as

the tap root: Both these are shown in findings to be non-existent.

- iv. That the leeward roots, even with the mechanasensis shown in the buttresses of T1 within findings, would contribute a maximum of 38% of the overall anchorage.
- e. Combined with the canopy bias and lean, alongside direction of prevailing wind, this can only be regarded as highly significant. I estimate that between 50 and 62% of anchorage is likely to have been lost based on findings and the study mentioned above.
- f.

Exploring pruning as an option in order to retain the tree:

- i. The bending moment of the canopy can be assumed to be at the likely point of failure, which is ground level. Dr Frank Rinn [Ref: D] has worked exhaustively with how wind loading of trees can be affected and reduced via pruning, and drew the following conclusions:
- ii. Height of the stem above the likely point of failure (in this case an included bark union) 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.

- iii. 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).
- iv. That the higher a tree is, the more the wind loading increases exponentially.
- v. With this in mind, assuming that if there has been a 50-62% loss in anchorage, a minimum 25% reduction in overall height is necessary, equating to a reduction of 4.5m.
- g. A height reduction of 4.5m far exceeds the phenological requirements as detailed by BS3998:2010, and would be highly likely to destroy any remaining amenity value of the tree.
- h. It is also worth noting that silver birch trees have poor CODIT properties [Ref: B], and the tree would struggle to adequately compartmentalise decay after such heavy pruning. There is a strong possibility that such a heavy reduction could kill this over mature tree.

Response to tree officer's refusal:

- i. The tree officer who visited the site last time (before this new evidence was produced) refused the application on the grounds of "visual amenity, ecology and wildlife, and screening of the surrounding area".

- j. This refusal is what I would regard as, at best, lazy; at worst, borderline negligent. Nowhere within that response has safety or risk been considered. The legal precedent to consider is that of Edwards vs National coal board 1947: is the risk of failure as low as reasonably practicable(ALARP)? The answer is “no”.
- k. Using the NTSG Common sense risk management of trees, alongside reference G, I would regard the imminent failure of the tree exceptionally likely:
 - i. Using a QTRA mechanism, the figures generated are as follows:
T1 is a large (size 1) defective tree (threat $1/1 \rightarrow 1/2$) with a probability of failure between $1/100$ and $1/1000$.
 - ii. The target is a domestic garden surrounded by residential properties (target range 3).
 - iii. 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.
 - iv. This is classed within this industry standard mechanism as “un-acceptable where imposed on others”, and that the action is to “control the risk”.
 - v. As pruning is not viable, the only way that risk can be controlled is via felling and replacing.

l. Using the industry recognised Helliwell index to value visual amenity of

the tree, the workings are as follows:

- i. Size= 198M2 (7)
- ii. Duration = 5-10 years (1)
- iii. Importance = Little (Chandlers Ford is a heavily wooded area and this a pioneer species nearing the end of its useful contribution). (1)
- iv. Tree cover= Many (1)
- v. Suitability = Fairly (2)
- vi. Form = Poor (0.5)
- vii. This equates to $(7 \times 1 \times 1 \times 1 \times 2 \times 0.5) \times £42.97$
- viii. Therefore, the amenity value of this tree can be classed as £300.79.

k. The cost-benefit analysis of the value of the tree vs the likelihood of failure simply does not add up: The “visual amenity value” of this tree is of low significance when compared to the possibility of failure and the risk it poses to the landowner, the other higher value trees within the garden, and the assorted outbuildings and other targets.

l. It is also in the interest of building resilience within the urban tree population that a shelterwood or selective approach of bringing on new stock is implemented, with a drive away from native species: retaining an over mature birch tree in a heavily wooded area that can only be viewed from

a few aspects is not in line with those commonly held goals, detailed in Eastleigh Borough council's tree strategy to "encourage resilience to a changing climate". Felling and replacing with the "right tree in the right place" (as quoted from page 8 of this document) is far more in line with the goals of this strategy.

- m. It is also worth noting, with reference to the tree strategy, that Eastleigh BC claims: "there are occasions where tree felling is unavoidable... for the council to protect health and safety or for important countryside management". This case is a candidate for both these commitments so succinctly laid out in the document.
- n. The tree strategy is quite clearly promoting an active policy moving forward to 2030, rather than a reactive one. Retaining T1 is, of itself, a reactive policy, keeping a potentially dangerous tree until such a time as it fails, rather than felling and replanting before this occurrence.

9. Conclusion: After exploring all options, I conclude that T1 requires felling.

This is because the findings show significant destabilisation of the structure to the extent that the risk posed is not acceptable, yet analysis shows that any effective pruning would be detrimental to such a degree that the life of the tree would be dramatically reduced. The amenity value of the tree is not enough to justify retaining it, when there is no feasible way to make the risk it poses ALARP.

10. Recommendations:

- T1: Fell. Replace with an 8-10 standard. Suggested alternative species would be *Ailanthus altissima*, a *Persica parrotia*, or a *Liquidambar styraciflua*.

A handwritten signature in black ink, appearing to read 'M. Rowden', is written over a solid orange horizontal line.

31/01/2023

Matthew Rowden *NDArborL3, ProfDipArb L6, TechArborA*

11. References:

- A. The Body Language of trees, Claus Mattheck
- B. Modern Arboriculture, Alex Shigo
- C. BS3998:2010
- D. How much crown pruning is needed for a specific wind-load reduction? Frank Rinn
- E. BS8545:2014
- F. Plant Biomechanics, Karl Niklas
- G. "Analysing key factors of roots and soil contributing to tree anchorage", Ming & Defoussez 2018
- H. Eastleigh borough council tree strategy, March 2022
- I. Edwards vs National coal board 1947

12. Appendices 1, & 2**1. Tree survey schedule from VTA**

Categories	T1			
Tree ID	T1			
Species	<i>Betula pendula</i>			
Stem diameter at 1.5m	711			
Height(m)	18			
Canopy spread (NESW)[m]	6	8	5	3
Life stage	Over mature			
General observations	Strong canopy bias to North and East run line with prevailing wind. Stem to W aspect has failed historically around 25 years ago. Simultaneous soft rot to resultant would have resulted in complete degradation of anchorage to the SW aspect. Manual probing reveals decay extends 500mm beneath root plate to NE aspect. Tap root is not present. Some extensive secondary growth to buttresses on NE aspect. Overall canopy is dense with some minor dieback from the tips, consistent with the tree passing from maturity to over maturity.			
Preliminary management recommendations	Fell			
Priority	Moderate : 6 months			

Key

- Tree No.: Refers to numbers as shown in the tree location plan.
- Species: common name.
- Height (measured in meters)
- Stem diameter measured at 1.5m height in mm.
- Life stage: Young (Y) (small trees at a very early stage of their growth), young mature (YM)(larger trees at an early life stage with the potential to still grow considerably larger), Mature (MA)(trees which have reached their maximum size and are self sustaining at the point), Over mature (OM)(trees that are beginning to decline and starting to die back from the tips), Veteran (V)(trees that are rapidly in decline and steadily losing canopy spread), Dead (D)
- Crown spread (measured in meters at the points of North, South, East and West). Where “#” is used as a suffix, the measurements are approximate.

- Condition and general observations - a visual assessment of the physiological and structural condition of the tree, classed as : Poor, fair, good, dead, decline. Physiologically refers to the vitality and vigour of the tree; Structural refers to the presence of physical defects within the tree's structural makeup. For example, a multi stemmed tree from a lapsed pollard with multiple defects in those unions, but with good vitality and good leaf cover would be classed as physiologically good, but structurally poor. General observation refers specifically to the potential of the tree to cause damage to structures whether indirectly or directly.
- Recommendations - recommendations to maintain the tree, or assessing whether its retention is viable, whether it be the suggestion of aerial inspections, remedial pruning, or detailed decay inspections.
- Priority - the timescales for remedial works, whether they be 3 months, 6 months, 1 year, or not necessary.

Appendix 2: Tree location plan

