



# WALKERS TREE SERVICES

Professional Arborists Since 1984



## Tree Survey & Tree Condition Report. Part 1 of 2

**The Site:**

Birch Hill Garden Estate  
Joseph Lister Drive  
Rochdale  
OL12 9RN

**Report Requested by:**

Stephen Harley

**Enviro**care

**Date of this Report:**

15/03/2023

**Survey Reference Number:**

011

**By. Mark Walker**

TechArbor.A.

Lantra Professional Tree Inspection

QTRA registered user No. 5227



Arboricultural  
ASSOCIATION

Technician Member

## Civil Law regarding tree ownership and Duty of Care.

The tree owner or manager has a duty of care to:

*'Take reasonable care to avoid acts or omissions which they can reasonably foresee would be likely to injure their neighbour'.*

The tree owner also has a duty under the *Occupiers Liability Acts* to *'take reasonable steps to ensure visitors or trespassers on their land are safe'.*

*Trees can never have a zero-hazard rating. Tree safety is about the tolerability of risk that trees pose. The scope of this survey is to determine whether the trees, on the site specific to this report, have visible and identifiable defects that can be recorded and evaluated. Trees can and do maintain themselves as adaptive structures, acclimatising to changing conditions. However, excessive external forces, either man made or caused by nature can push a tree beyond the envelope of its own structural strength capacity, which can lead to failure, either in part or entirely. It is necessary to inspect medium and large trees after high winds to check for structural damage, also damage to surrounding trees or structures that could alter subsequent wind patterns and consequently change the wind loading on trees.*

\*

This document is a tree condition report for the purpose of generating a tree management schedule for the site specified on the front page of this document. The site visit or visits is the source of the data gathered and the condition of the tree or trees is determined by the site visits. Supplementary historic data can be gathered, usually if disturbance to the tree root area is evident i.e., building works, ground works or ground excavations are apparent close to trees and tree anchor roots. Walkers Tree Services holds no liability for existing damage undetectable by primary visual observations. Historic damage to tree anchor roots and general subterranean mismanagement of trees that subsequently cause damage is not the liability of Walkers Tree Services.

The content is for the use of the client only.

If any questions arise, please do contact:

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# 1. Introduction

## 1.1. The Instruction and function of this report.

- 1.2. Walkers Tree Services has been instructed by Stephen Harley to undertake a tree condition survey of the tree stock on the Birch hill Gardens Estate. This is the second survey of this site Walkers Tree Services have undertaken. The first survey was submitted on the 27/04/2021, this current survey will use the previous survey as the base document and will build onto it and update it in order to achieve a comprehensive assessment of the tree stock.
- 1.3. The survey has been undertaken to assess the structural and physiological condition of the trees to fulfil the tree owners Duty of Care responsibilities.
- 1.4. All trees above 200mm in diameter have been recorded and assessed as individuals and sub 200mm trees have been recorded in the survey as Groups.
- 1.5. The condition of the trees on this site has generated work recommendations. Work recommendations endeavour to maintain trees in condition that is suitable for their location, however, the priority focus of recommended works is to protect people and property. The work recommendations are listed in section 4 and the work schedule can be found in Appendix F.

## 1.6. Scope of the survey and report.

- 1.7. The ground level survey is a record of observations made regarding tree size, location, and condition, including:
  - Tree age and size
  - Tree physiological condition
  - Tree structural condition
  - Location/target value and requirement of remedial works if and where required.
- 1.8. The tree survey schedule can be found in Appendix B.
- 1.9. The findings of the survey will result in the trees being placed in one of two categories:
  - Work required
  - Work not required.

1.10.

If a tree is assessed and does not require work it will be recorded in the survey as such and no further mention of the tree, other than its resurvey date, is provided.

If a tree is assessed and work is required then the work options are divided into 3 categories, these are:

- **Necessary work** - *Mitigating risk of harm from a tree hazard – by default this ranges from Urgent to High priority work.*
- **Statutory tree maintenance** - *Achieving statutory branch height clearances over footpaths and roads – by default this is High Priority work*
- **Functional maintenance** – *Clearing tree parts from buildings and utilities to avoid damages.*

1.11. Technical References

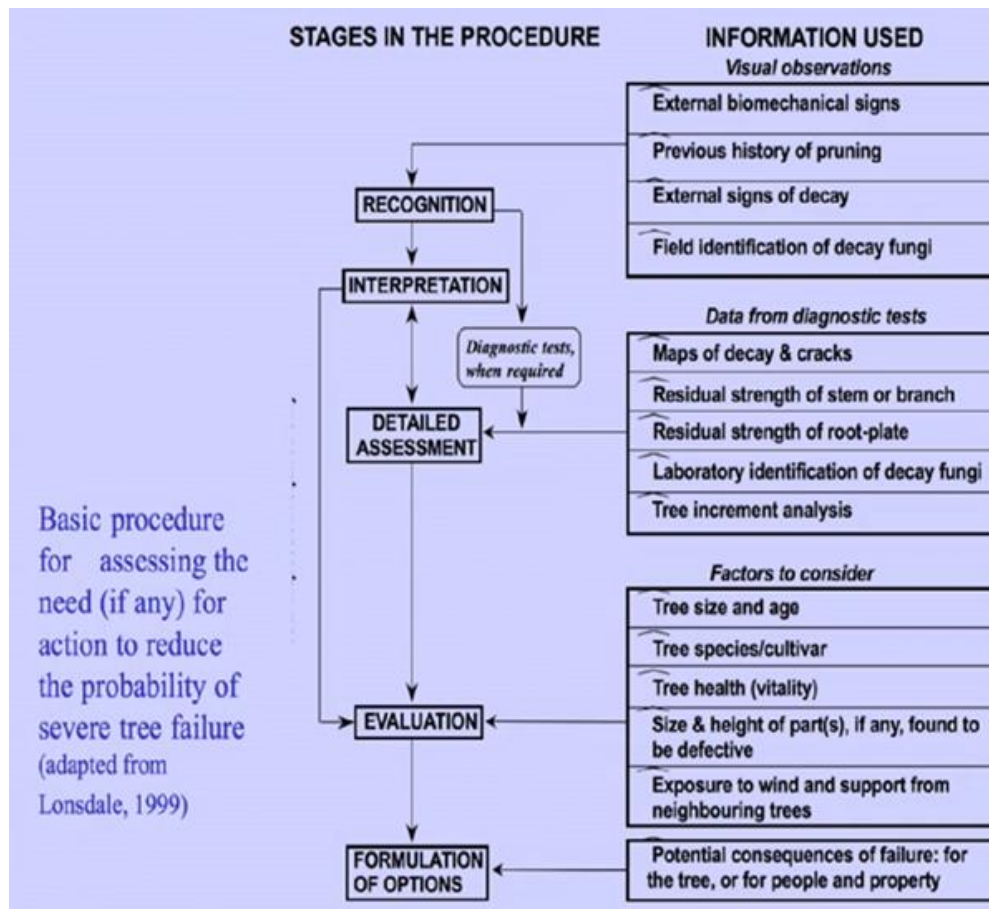
- **Principles of Tree Hazard Assessment & Management** - David Lonsdale
- **The Body Language of Trees** - Claus Mattheck & Helge Breloer
- **BS 3998:2010 Tree Work: Recommendations**
- **BS 5837 (2012) – Trees in Relation to Design, Demolition and Construction**
- **National Tree Safety Group: Common sense risk management of trees 2011**
- <https://www.gov.uk/guidance/tree-preservation-orders-and-trees-in-conservation-areas>
- <http://www.legislation.gov.uk/ukpga/1981/69/contents> Wildlife & Countryside Act 1981
- <https://www.forestresearch.gov.uk>
- <http://www.treeterms.co.uk>
- **QTRA (Quantified Tree Risk Assessment)**

## 2. Tree survey methodology

### 2.1. Data collection & assessment method.

- 2.2. The height of the trees is measured from ground level. The height is measured using laser device from several locations to get an accurate measurement.
- 2.3. Tree stem diameter is measured at 1.5 meters above ground level; noted if otherwise. This measurement is written as DBH (Diameter at Breast Height). Only trees with a diameter of 200mm and above are recorded in the tree survey schedule as individuals.
- 2.4. The method used to assess the trees condition, both physiologically and structurally, is the Visual Tree Assessment (VTA). This is a detailed assessment that is focused and stepwise. Fig1 is a diagrammatic representation of the procedure. See Fig1 below.
- 2.5. The condition of the tree root area, the area as defined in section 4.6.1 of BS5837:2012, is surveyed to determine if roots have been disturbed by excavation, compaction, or obvious water level changes.
  - *4.6.1 For single stemmed trees, the RPA (see 3.7) should be calculated as an area equivalent to a circle with a radius 12 times the stem diameter.*
  - *3.7 root protection area (RPA) layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability.*
- 2.6. Tree physiological condition has been determined by observing the upper tree portions, the crown, for low bud density, low leaf density, leaf discolouration, the amount of dead wood and growth patterns that are stress indicators. The stem and stem base are also checked for fungal pathogens and peeling bark.
- 2.7. The structural condition of the tree is determined by checking the trees structural components for any dysfunction, i.e., the visible portions of the branch unions (primary, secondary, and tertiary branch unions) for cracks, cavities, compression unions and included bark. The tree stem for cavities, cracks and localized tree growth types that indicate dysfunction, such as internal decay that can result in loss of structural integrity. The whole tree is checked for cracks, necrotic areas, cavities, and fungal pathogens.
- 2.8. It is by contrasting the surveyed tree parts with their corresponding ideal species type that conclusions have been drawn, and it is against a backdrop of familiarity of these species (32 years in the Arboricultural industry) that conclusions about the condition of the trees from its visible portions are drawn.
- 2.9. If trees have been found to have significant structural and physiological dysfunction, then the tree or tree part will be assessed using the QTRA method. The QTRA method (Quantified Tree Risk Assessment) is a method of obtaining an annualised risk of harm from a tree hazard. If required, the QTRA Tree Survey schedule is found in Appendix C.
- 2.10. This report concludes with the Schedule of Work that lists any recommended tree works.

Fig1: Representation of Visual Tree Assessment.



## 2.11. Tree risks and hazards a guide

### 2.12.

A tree can be classed as a hazard if there are targets and a tree related defect. Targets are people, vehicles, infrastructure and property, and tree related defects are trees or tree parts that have the capacity to cause harm and damage due to deviations from normal tree physiology / structure.

### 2.13.

The QTRA provides a method of quantifying risk of harm from trees with targets and defects. The output of the QTRA is an annualised risk of harm that a tree poses. The QTRA method will be used to assess the tolerability of risk if trees are found with defects or dysfunction. QTRA Practice Notes can be found in Appendix E.

### 2.14.

The broadly acceptable level of risk of harm from any tree is 1/1,000,000. If the odds of harm are lower than this, then a decision-making process begins.

### 2.15.

It is a requirement of the QTRA method that all parties accept the premises of the method. The onus is on the tree owner or manager to make the final decision on the level of tolerability of risk and if any work is undertaken to mitigate those risks.

## 2.16. Justification of works.

### 2.17.

If work is recommended, then the justification for the works will follow from the site observations regarding statutory regulation, QTRA output and the maintenance of tree clearance from structures.

Trees found to have structural defects, may require remedial works to be able to retain the trees.

## 2.18. Tree Preservation Orders (TPO) & Conservation Area (CA).

### 2.19.

The Birch Hill Clock Tower (the old hospital) is covered by a conservation area: **NAMED BIRCH HILL DEARNLEY CONSERVATION AREA**. Designated 2008

With regard to Tree Preservation Orders, I have contacted Rochdale Borough Council on the 15<sup>th</sup> of March 2023 for the TPO information for this site.

### 2.20.

A Tree Preservation Order is an order made by a local planning authority in England to protect specific trees, groups of trees or woodlands in the interests of public amenity. An Order prohibits the:

- cutting down
- topping
- lopping
- uprooting
- wilful damage
- wilful destruction

of trees without the local planning authority's written consent. If consent is given, it can be subject to conditions which have to be followed. In the Secretary of State's view, cutting roots is also a prohibited activity and requires the authority's consent.

### 2.21.

Owners of protected trees must not carry out, or cause or permit the carrying out of, any of the prohibited activities without the written permission of the local authority.

### 2.22.

Arboricultural advice from competent contractors and consultants, or the authority, will help to inform tree owners of their responsibilities and options. It is important that trees are inspected regularly, and necessary maintenance carried out to make sure they remain safe and healthy.

### 2.23.

Trees in a conservation area that are not protected by an Order are protected by the provisions in section 211 of the Town and Country Planning Act 1990. These provisions require tree owners to notify the local planning authority, using a 'section 211 notice', 6 weeks before carrying out certain work on such trees, unless an exception applies. The work may go ahead before the end of the 6-week period if the local planning authority gives consent. This notice period gives the authority an opportunity to consider whether to make an Order on the tree.

## 2.24. Local authority details.

Rochdale Borough Council  
[www.rochdale.gov.uk](http://www.rochdale.gov.uk)

## 2.25. Tree Officer Details.

**Email:** [environmental.management@rochdale.gov.uk](mailto:environmental.management@rochdale.gov.uk)

**Telephone:** 0300 303 8884

**Address:**

Environmental Management  
Green Lane  
Heywood OL10 2DY

## 2.26. Implementation of works.

All tree works should be undertaken by professional arborists working to **BS3998 Recommendations for Tree Works**. It is important to use professional arborist's for carrying out the works to ensure the work is done correctly and to the specification provided in the Work Schedule within this document, and that the arborist's undertaking the tree works are insured. Failure to follow the work recommendations in this document and subsequent harm that may arise if not undertaken correctly is not the liability of Walkers Tree Services.

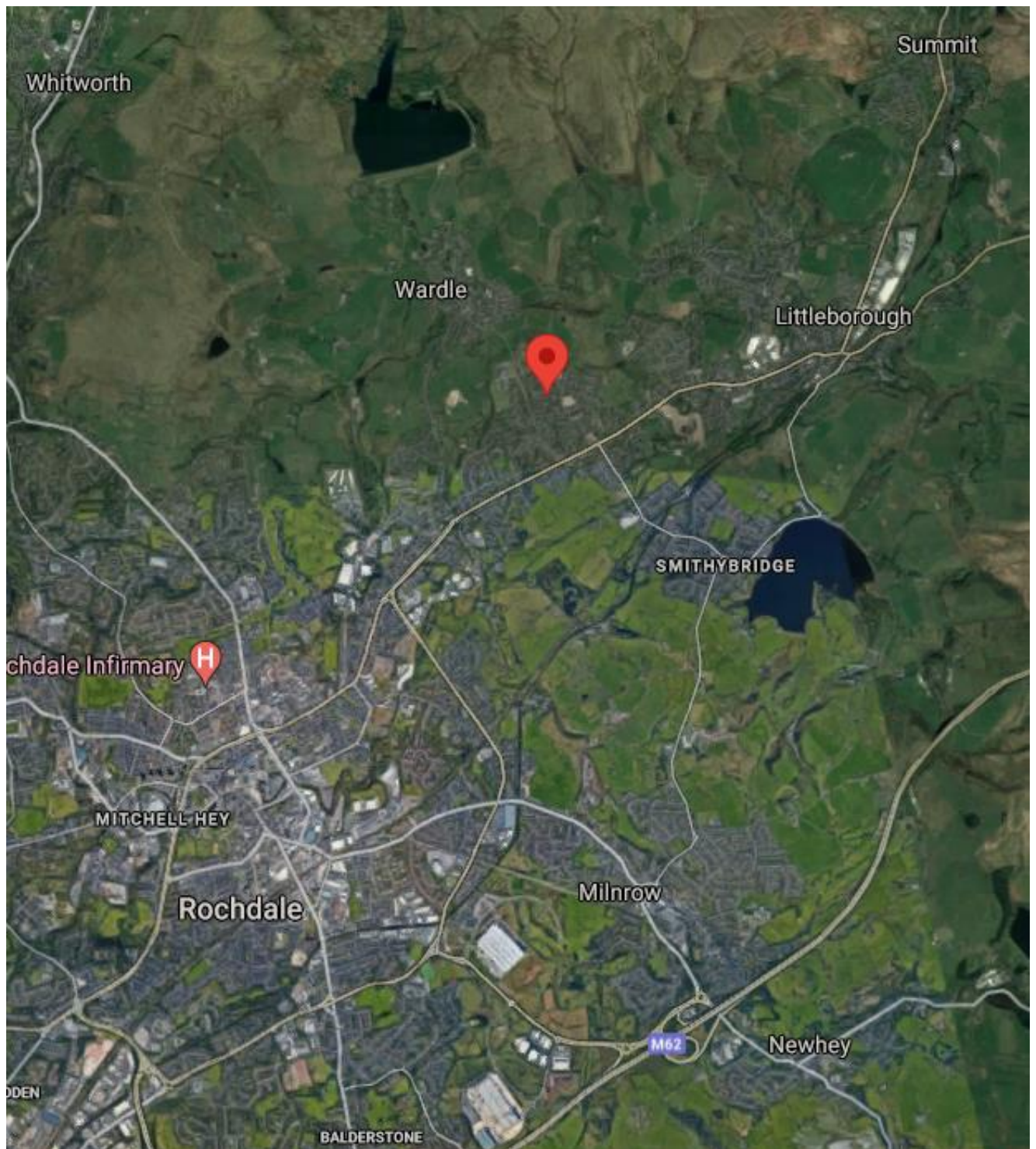
## 2.27. Statutory wildlife obligations.

The Wildlife & Countryside Act 1981 is an important piece of wildlife legislation in Great Britain. Since the passing of the Wildlife and Countryside Act 1981 there have been various amendments to the text of the Act, most significantly through the Countryside and Rights of Way (CROW) Act 2000 (in England and Wales) and the Nature Conservation (Scotland) Act 2004 (in Scotland). Any works done to the tree stock must take this legislation into account.

### 3. Site visit

- 3.1. Site description. *(Italics represent copied text from first survey)*
- 3.2. *The site is located northeast of Rochdale town. See Fig.2*
- 3.3. *This location has been subject to a large-scale housing development. This development project has generally worked with and been constructed upon a pre-existing site layout.*
- 3.4. *Most of the tree stock has been retained and protected throughout the development.*
- 3.5. *The mature tree stock on the site is of high amenity and aesthetic value and it is a successful retention with the new housing development.*
- 3.6. ***There are several areas where the development has had a detrimental effect on the tree stock, mainly the Sycamore trees, whose susceptibility to root disturbance and the effect is oftentimes manifested in crown die back and/or specific limbs within a crown dying off after disturbance. This artifact of root disturbance is evident on Sycamore trees on site\*.***
- 3.7. \*The above observation from the original survey has become the defining factor that will be the focal point of this second survey. The continued decline in the vitality of the Sycamore trees was apparent on the second site visit date 14/03/2023.

Fig.2: Site Location.



### 3.8. Time of Survey.

3.9. The tree information and assessments were made and recorded on the 14/03/2023. The weather was damp cold, but visibility was good.

### 3.10. Observations of the trees.

3.11. Observations revealed that the Sycamores mentioned in in 2021 have continued to decline in vitality. This is indicated by the increase in deadwood within the crowns of the trees. The Ash trees mentioned in 2021 have also declined in their vitality, this is due to Ash Die Back fungal infection.

3.12. Work recommendations from the 2021 survey had only been partially completed. This partial completion of the recommended works has allowed a general consideration of the progress of vitality decline. Having the work recommendations completed would have given a better indication of the rate of decline however, the observation of decline is still apparent from memory of the original survey.

3.13. The main area of continued decline of tree vitality are the trees in location 3, Oakhurst Close, this area is dominated by semi-mature Sycamore trees. The work recommendations haven't been completed; it appears that the trees have declined further. Dead crown portions and increased deadwood can be observed.

3.14. The Ash trees on site have also declined in vitality and can be reassessed on the next site visit.

3.15. Location 7 trees have also grown into the carriage way and require statutory clearance works. This work can be postponed until the final report is submitted.

## **4. Management Plan & Recommendations**

### **4.1. Tree work recommendations**

**The work recommendations for this site are best postponed until a further assessment of the trees can be made. It is therefore advisable to resurvey the site when the trees have come into leaf.**

**The condition of the trees can be assessed thoroughly, and suitable recommendations can be made.**

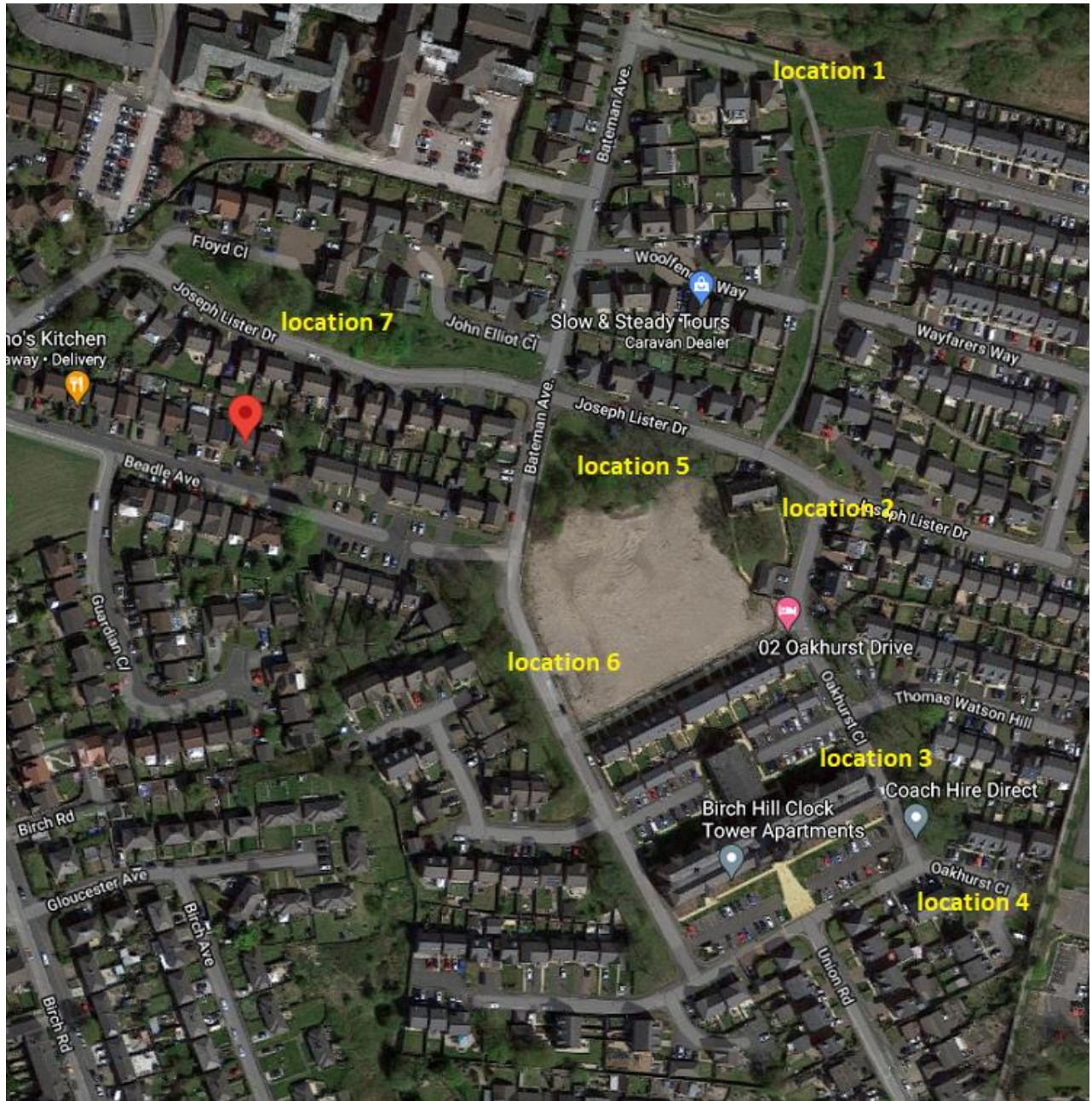
**In the intervening time between the date of this report to the scheduled resurvey I should receive the TPO details from Rochdale Borough Council and be able to include this data into the final report.**

**Resurvey scheduled for the last week of April 2023, week commencing the 24<sup>th</sup> of April 2023.**

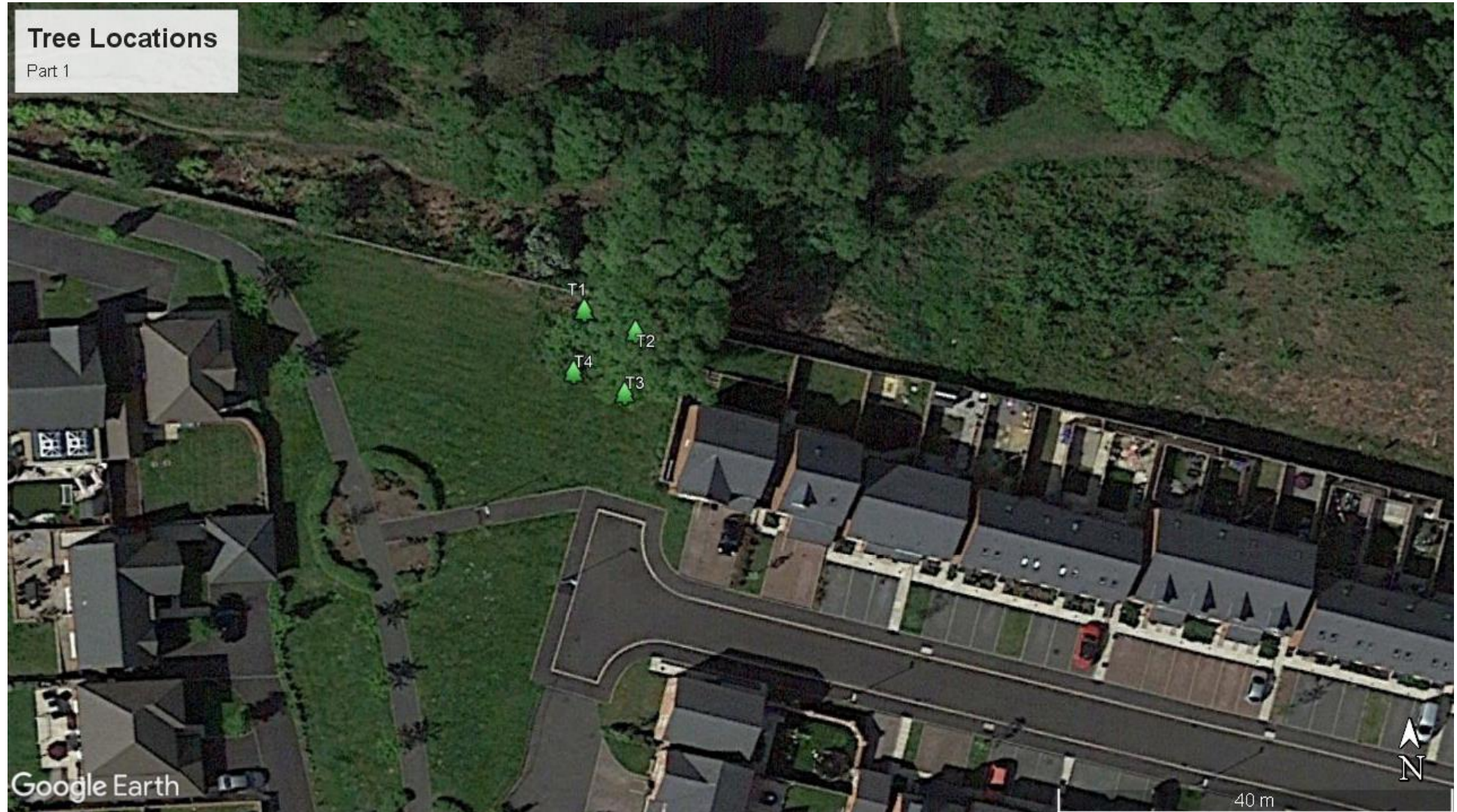
**A complete work recommendation will be provided in the week commencing 1<sup>st</sup> May 2023.**

Fig.3: Tree Locations.

Tree locations - 1 to 7



## Appendix A. Tree Locations.

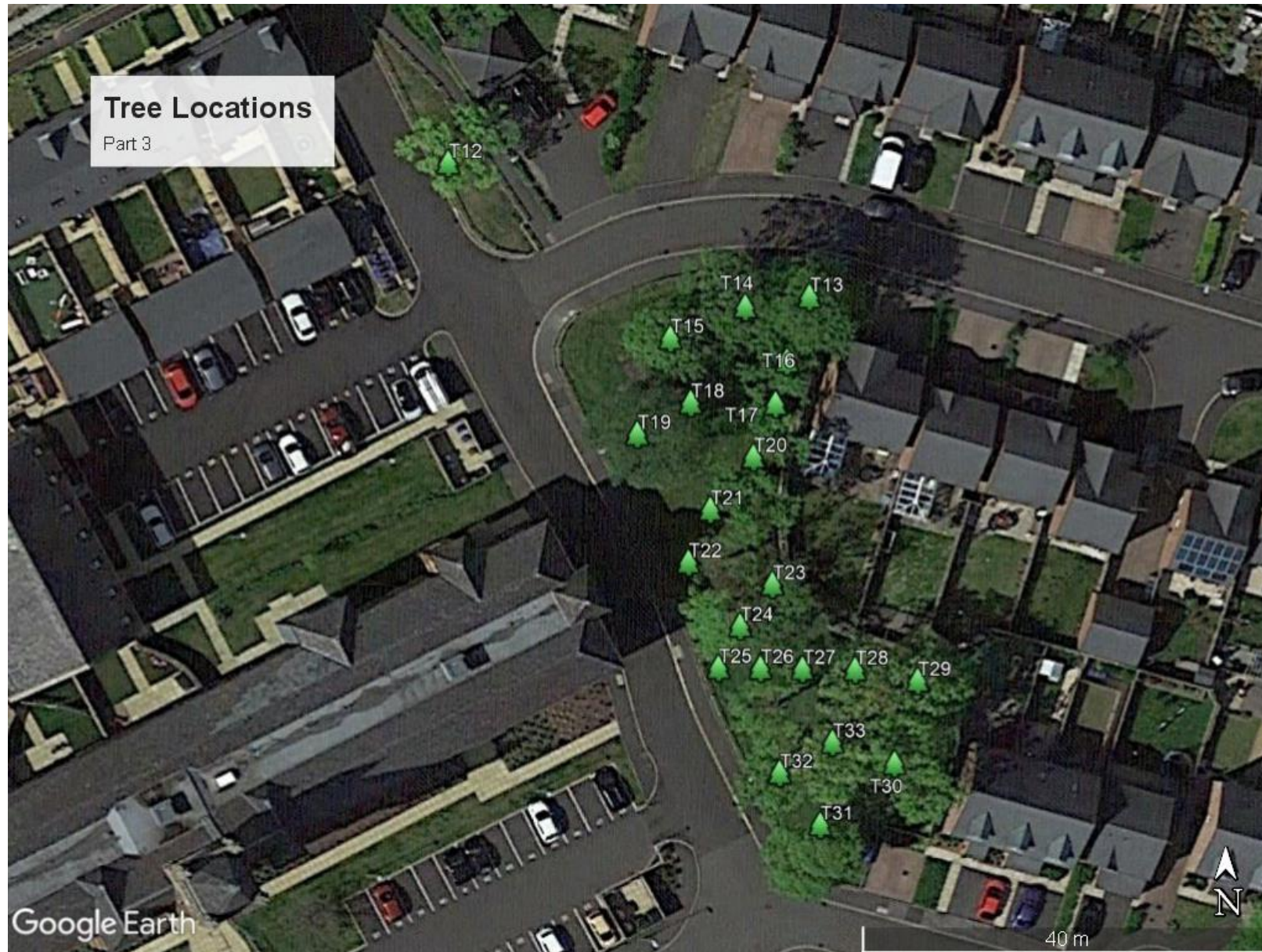


Tree Location Part 2.



Birch Hill Gardens Estate – OL12 9RN  
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Tree Location Part 3.



Birch Hill Gardens Estate – OL12 9RN  
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Tree Location Part 4.



Birch Hill Gardens Estate – OL12 9RN  
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Tree Location Part 5



## Tree Location Part 6



## Tree Location Part 7



Birch Hill Gardens Estate – OL12 9RN  
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## Appendix B: Tree survey schedule.

| Tree Num | Tree Species | Number of Stems | DBH mm | Height - M's | Crown Spread M's | Age Class | Physiological Condition | Structural Condition | BS5837 Tree Quality | Remaining Contribution | Fungi present | Target/Context | Risk ALARP | Recommendations            | Work to be Completed within | Review Time | Notes                                                        |
|----------|--------------|-----------------|--------|--------------|------------------|-----------|-------------------------|----------------------|---------------------|------------------------|---------------|----------------|------------|----------------------------|-----------------------------|-------------|--------------------------------------------------------------|
| T1       | Birch sp..   | 1               | 340    | 14           | 6                | M         | Good                    | Good                 | A2                  | >40                    | No            | Low            | Yes        |                            |                             | 3-Years     |                                                              |
| T2       | Birch sp..   | 1               | 450    | 14           | 6                | M         | Good                    | Good                 | A2                  | >40                    | No            | Property       | Yes        | Prune to clear             | Completed                   | 3-Years     |                                                              |
| T3       | Birch sp..   | 1               | 330    | 14           | 7                | M         | Good                    | Good                 | A2                  | >40                    | No            | Property       | Yes        | Prune to clear             | Completed                   | 3-Years     |                                                              |
| T4       | Birch sp..   | 1               | 640    | 14           | 5                | M         | Good                    | Good                 | A2                  | >40                    | No            | Low            | Yes        |                            |                             | 3-Years     |                                                              |
| G1       |              |                 |        |              |                  |           |                         |                      |                     |                        |               |                |            |                            |                             | 3-Years     | mixed species juvenile plantings strimmer damage lower stem. |
| T5       | Sycamore     | 1               | 430    | 10           | 6                | M         | Good                    | Good                 | A2                  | >40                    | No            | Low            | Yes        | Dead wood                  | Not Done                    | 3-Years     |                                                              |
| T6       | Sycamore     | 1               | 340    | 10           | 4                | M         | Good                    | Good                 | A2                  | >40                    | No            | Low            | Yes        | Dead wood                  | Not Done                    | 3-Years     |                                                              |
| T7       | Willow       | 7               | 100    | 6            | 2                | Y         | Good                    | Good                 | A2                  | >40                    | No            | Low            | Yes        |                            |                             | 3-Years     |                                                              |
| T8       | Willow       | 5               | 100    | 6            | 2                | Y         | Good                    | Good                 | A2                  | >40                    | No            | Low            | Yes        |                            |                             | 3-Years     |                                                              |
| T9       | Sycamore     | 1               | 400    | 11           | 5                | M         | Good                    | Good                 | A2                  | >40                    | No            | Road           | Yes        | Dead wood, Statutory prune | Completed                   | 3-Years     |                                                              |
| T10      | Sycamore     | 1               | 450    | 17           | 7                | M         | Good                    | Good                 | A2                  | >40                    | No            | Road           | Yes        | Dead wood, Statutory prune | Completed                   | 3-Years     |                                                              |
| T11      | Ash          | 1               | 380    | 14           | 7                | M         | Good                    | Good                 | A2                  | >40                    | No            | Road           | Yes        | Dead wood, Statutory prune | Completed                   | 3-Years     |                                                              |
| T12      | Sycamore     | 1               | 640    | 12           |                  | M         | Good                    | Good                 | A2                  | >40                    | No            | Road           | Yes        | Dead wood                  | Not Done                    | 3-Years     |                                                              |
| T13      | Beech sp..   | 1               | 460    | 13           | 5                | M         | Good                    | Good                 | A1                  | >40                    | No            | Property       | Yes        | Prune to clear             | Completed                   | 3-Years     |                                                              |
| T14      | Sycamore     | 1               | 480    | 13           | 4                | EM        | Good                    | Good                 | A2                  | >40                    | No            |                | Yes        |                            |                             | 3-Years     |                                                              |
| T15      | Sycamore     | 1               | 410    | 12           | 4                | EM        | Good                    | Good                 | B1                  | 40                     | No            | Low            | Yes        |                            |                             | 3-Years     |                                                              |

Birch Hill Gardens Estate – OL12 9RN

Survey Ref: 011

15/03/2023

|     |             |   |     |    |   |    |      |      |    |     |          |          |     |                |          |         |                        |
|-----|-------------|---|-----|----|---|----|------|------|----|-----|----------|----------|-----|----------------|----------|---------|------------------------|
| T16 | Lime sp..   | 1 | 350 | 12 | 4 | EM | Fair | Good | C1 | 20  | No       | Property | Yes |                |          | 3-Years |                        |
| T17 | Lime sp..   | 1 | 400 | 12 | 4 | EM | Fair | Good | C1 | 20  | No       | Property | Yes | Dead wood      | Not Done | 3-Years |                        |
| T18 | Sycamore    | 1 | 490 | 13 | 7 | EM | Good | Good | A1 | >40 | No       | Low      | Yes |                |          | 3-Years |                        |
| T19 | Birch sp..  | 1 | 260 | 15 | 4 | M  | Good | Good | C1 | 10  | No       | Low      | Yes | Prune to clear | Not Done | 3-Years |                        |
| T20 | Lime sp..   | 1 | 430 | 12 | 5 | M  | Fair | Fair | C1 | 20  | No       | Property | Yes |                |          | 3-Years |                        |
| T21 | Sycamore    | 1 | 360 | 12 | 3 | Y  | Poor | Poor | U  | <10 | No       | Medium   | No  | Fell           | Not Done | 3-Years |                        |
| T22 | Sycamore    | 1 | 360 | 12 | 5 | EM | Fair | Good | A2 | >40 | No       | Medium   | Yes | Dead wood      | Not Done | 3-Years |                        |
| T23 | Sycamore    | 1 | 340 | 12 | 4 | EM | Fair | Good | A2 | >40 | No       | Low      | Yes | Dead wood      | Not Done | 3-Years |                        |
| T24 | Sycamore    | 1 | 320 | 11 | 3 | EM | Good | Good | A2 | >40 | No       | Low      | Yes |                |          | 3-Years |                        |
| T25 | Sycamore    | 1 | 430 | 10 | 5 | M  | Poor | Fair | C1 | 20  | No       | Medium   | No  | Dead wood      | Not Done | 3-Years |                        |
| T26 | Sycamore    | 1 | 410 | 13 | 5 | M  | Good | Good | A2 | >40 | No       | Medium   | Yes | Dead wood      | Not Done | 3-Years |                        |
| T27 | Sycamore    | 1 | 340 | 10 | 4 | EM | Good | Good | A2 | >40 | No       | Medium   | Yes | Dead wood      | Not Done | 3-Years |                        |
| T28 | Sycamore    | 1 | 410 | 10 | 4 | EM | Fair | Good | A2 | >40 | No       | Medium   | Yes | Dead wood      | Not Done | 3-Years |                        |
| T29 | Sycamore    | 1 | 380 | 10 | 4 | EM | Fair | Good | A2 | >40 | No       | Medium   | Yes | Dead wood      | Not Done | 3-Years |                        |
| T30 | Sycamore    | 1 | 450 | 12 | 4 | EM | Fair | Good | A2 | >40 | No       | Medium   | Yes | Dead wood      | Not Done | 3-Years |                        |
| T31 | Sycamore    | 1 | 400 | 14 | 6 | EM | Fair | Good | A2 | >40 | No       | Medium   | Yes | Dead wood      | Not Done | 3-Years |                        |
| T32 | Sycamore    | 1 | 290 | 11 | 4 | Y  | Fair | Good | C1 | 10  | No       | Medium   | Yes | Prune to clear | Not Done | 3-Years |                        |
| T33 | Sycamore    | 1 | 440 | 12 | 5 | EM | Fair | Good | A2 | >40 | No       | Low      | Yes |                |          | 3-Years |                        |
|     |             |   |     |    |   |    |      |      |    |     |          |          |     |                |          |         |                        |
| T34 | Sycamore    | 1 | 530 | 13 | 8 | M  | Good | Poor | C1 | 10  | Ustulina | Property | No  | Fell           | Not Done | 3-Years | Ustulina on lower stem |
| T35 | Cherry      | 1 | 310 | 6  | 5 | EM | Good | Good | A2 | >40 | No       | Low      | Yes |                |          | 3-Years |                        |
| T37 | Lime sp.    | 1 | 560 | 14 | 7 | M  | Good | Good | A1 | >40 | No       | Property | Yes |                |          | 3-Years |                        |
| T38 | Conifer sp. | 1 |     | 7  | 2 | y  | Good | Good | A1 | >40 | No       | Low      | Yes |                |          | 3-Years |                        |
|     |             |   |     |    |   |    |      |      |    |     |          |          |     |                |          |         |                        |
| T39 | Ash         | 1 | 680 | 14 | 7 | M  | Fair | Fair | C1 | 10  | Yes      | Property | Yes | Re-inspect     | 2-High   |         | Re-survey midsummer    |
| T40 | Birch sp.   | 1 | 380 | 15 | 8 | EM | Good | Good | A2 | >40 | No       | Road     | Yes |                |          | 3-Years | Cavity lower stem      |
| T41 | Rowan Sp.   | 1 | 380 | 15 | 7 | M  | Good | Good | A2 | >40 | No       | Road     | Yes |                |          | 3-Years |                        |
| T42 | Sycamore    | 1 | 380 | 15 | 5 | EM | Good | Good | A2 | >40 | No       | Road     | Yes |                |          | 3-Years |                        |
| T43 | Sycamore    | 1 | 700 | 14 | 8 | M  | Good | Good | A2 | >40 | No       | Road     | Yes |                |          | 3-Years |                        |
| T44 | Beech       | 1 | 280 | 8  | 4 | Y  | Good | Good | A2 | >40 | No       | Road     | Yes |                |          | 3-Years |                        |
| T45 | Sycamore    | 1 | 410 | 15 | 4 | EM | Good | Good | A2 | >40 | No       | Road     | Yes |                |          | 3-Years |                        |
| T46 | Sycamore    | 1 | 350 | 15 | 4 | EM | Good | Good | A2 | >40 | No       | Road     | Yes |                |          | 3-Years |                        |

|     |                   |     |     |    |    |    |      |      |    |     |     |        |     |                 |          |         |                        |
|-----|-------------------|-----|-----|----|----|----|------|------|----|-----|-----|--------|-----|-----------------|----------|---------|------------------------|
| T47 | Ash               | 1   | 510 | 14 | 5  | M  | Good | Good | A2 | >40 | No  | Medium | Yes |                 |          | 3-Years |                        |
| T48 | Sycamore          | 1   | 550 | 15 | 5  | M  | Good | Good | A2 | >40 | No  | Medium | Yes |                 |          | 3-Years |                        |
| T49 | Sycamore          | 1   | 440 | 15 | 7  | M  | Good | Good | A2 | >40 | No  | Medium | Yes |                 |          | 3-Years |                        |
| T50 | Ash               | 1   | 580 | 15 | 7  | M  | Good | Good | A2 | >40 | No  | Medium | Yes |                 |          | 3-Years |                        |
| T51 | Sycamore          | 1   | 460 | 15 | 5  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T52 | Sycamore          | 1   | 360 | 15 | 3  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T53 | Sycamore          | 1   | 360 | 15 | 5  | EM | Good | Good | A2 | 40  | No  | Low    | Yes |                 |          | 3-Years |                        |
| T54 | Sycamore          | 1   | 360 | 15 | 4  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T55 | Ash               | 1   | 430 | 14 | 5  | EM | Fair | Good | A2 | >40 | Yes | Low    | Yes | Re-inspect      | 2-High   |         | Re-survey<br>midsummer |
| T56 | Sycamore          | 1   | 350 | 13 | 6  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T57 | Sycamore          | 1   | 230 | 12 | 4  | Y  | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T58 | Lime sp.          | 1   | 360 | 10 | 7  | EM | Good | Good | A2 | >40 | No  | Road   | Yes |                 |          | 3-Years |                        |
| T59 | Lime sp.          | 1   | 520 | 13 | 8  | M  | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T60 | Lime sp.          | 1   | 470 | 16 | 10 | M  | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T61 | Horse<br>Chestnut | 1   | 570 | 16 | 10 | M  | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T62 | Sycamore          | 1   | 340 | 15 | 4  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T63 | Sycamore          | 1   | 360 | 14 | 4  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T64 | Ash               | 1   | 380 | 16 | 5  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T65 | Ash               | 1   | 430 | 16 | 6  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T66 | Rowan Sp.         | 1   | 310 | 8  | 6  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T67 | Ash               | 1   | 570 | 16 | 10 | M  | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T68 | Sycamore          | 1   | 360 | 13 | 6  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T69 | Sycamore          | 1   | 160 | 9  | 2  | Y  | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T70 | Rowan Sp.         | 1   | 230 | 9  | 4  | EM | Good | Fair | C1 | 10  | No  | Low    | Yes |                 |          | 3-Years |                        |
| T71 | Sycamore          | 1   | 360 | 11 | 5  | EM | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T72 | Birch sp.         | 1   | 430 | 18 | 7  | M  | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T73 | Lime sp.          | 1   | 500 | 17 | 8  | M  | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| T74 | Birch sp.         | 1   | 470 | 14 | 8  | M  | Good | Good | A2 | >40 | No  | Low    | Yes |                 |          | 3-Years |                        |
| G2  | Mixed Sp..        | 10+ |     |    |    |    |      |      |    |     |     |        |     |                 |          |         |                        |
| T75 | Lime sp.          | 1   | 460 | 17 | 9  | M  | Good | Good | A2 | >40 | No  | Road   | Yes | Statutory prune | Not Done | 3-Years |                        |

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|     |           |   |     |    |    |   |      |      |    |     |    |          |     |                 |          |         |                     |
|-----|-----------|---|-----|----|----|---|------|------|----|-----|----|----------|-----|-----------------|----------|---------|---------------------|
|     |           |   |     |    |    |   |      |      |    |     |    |          |     |                 |          |         |                     |
| T76 | Cherry    | 1 | 400 | 5  | 8  | M | Fair | Good | B1 | 20  | No | Low      | Yes |                 |          | 3-Years |                     |
|     |           |   |     |    |    |   |      |      |    |     |    |          |     |                 |          |         |                     |
| T77 | Birch sp. | 3 | 320 | 13 | 12 | M | Good | Good | B1 | 20  | No | Property | Yes |                 |          | 3-Years |                     |
|     |           |   | 370 |    |    |   |      |      |    |     |    |          |     |                 |          |         |                     |
|     |           |   | 350 |    |    |   |      |      |    |     |    |          |     |                 |          |         |                     |
|     |           |   |     |    |    |   |      |      |    |     |    |          |     |                 |          |         |                     |
| T78 | Sycamore  | 1 | 630 | 12 | 13 | M | Good | Good | A1 | >40 | No | Road     | Yes |                 |          | 3-Years |                     |
| T79 | Sycamore  | 1 | 470 | 14 | 8  | M | Good | Good | A2 | >40 | No | Low      | Yes |                 |          | 3-Years |                     |
| T80 | Sycamore  | 1 | 590 | 14 | 6  | M | Good | Good | A2 | >40 | No | Carpark  | Yes |                 |          | 3-Years |                     |
| T81 | Sycamore  | 1 | 570 | 12 | 7  | M | Good | Good | A2 | >40 | No | Footpath | Yes |                 |          | 3-Years |                     |
| T82 | Sycamore  | 1 | 440 | 14 | 5  | M | Good | Good | A2 | >40 | No | Low      | Yes |                 |          | 3-Years |                     |
| T83 | Sycamore  | 1 | 660 | 15 | 11 | M | Good | Good | A1 | >40 | No | Property | Yes |                 |          | 3-Years |                     |
| T84 | Lime sp.  | 1 | 540 | 13 | 10 | M | Good | Good | B1 | 20  | No | Property | Yes |                 |          | 3-Years |                     |
| T85 | Sycamore  | 1 | 680 | 13 | 12 | M | Good | Good | A1 | >40 | No | Road     | Yes |                 |          | 3-Years |                     |
| T86 | Lime sp.  | 1 | 450 | 14 | 11 | M | Good | Good | A1 | >40 | No | Property | Yes | Prune to clear  | Not Done | 3-Years | Clear lamp          |
| T87 | Elm       | 1 | 440 | 13 | 6  | M | Good | Good | A1 | >40 | No | Property | Yes |                 |          | 3-Years |                     |
| T88 | Lime sp.  | 1 | 490 | 13 | 7  | M | Good | Good | A1 | >40 | No | Property | Yes | Prune to clear  | Not Done | 3-Years | Clear over property |
|     |           |   |     |    |    |   |      |      |    |     |    |          |     |                 |          |         |                     |
| T89 | Sycamore  | 1 | 420 | 12 | 5  | M | Good | Good | A1 | >40 | No | Property | Yes |                 |          | 3-Years |                     |
| T90 | Sycamore  | 1 | 490 | 12 | 6  | M | Good | Good | A1 | >40 | No | Property | Yes |                 |          | 3-Years |                     |
| T91 | Sycamore  | 1 | 760 | 12 | 10 | M | Good | Good | A1 | >40 | No | Property | Yes |                 |          | 3-Years |                     |
| T92 | Sycamore  | 1 | 690 | 12 | 12 | M | Good | Good | A1 | >40 | No | Road     | Yes |                 |          | 3-Years |                     |
| T93 | Birch sp. | 2 | 160 | 9  | 4  | Y | Good | Good | B1 | 40  | No | Road     | Yes | Formative prune | Not Done | 3-Years | Remove co-dom. stem |
|     |           |   | 200 |    |    |   |      |      |    |     |    |          |     |                 |          |         |                     |
| T94 | Sycamore  | 1 | 760 | 12 | 10 | M | Good | Good | A1 | >40 | No | Property | Yes |                 |          | 3-Years |                     |
| T95 | Sycamore  | 1 | 890 | 13 | 12 | M | Good | Fair | B1 | 20  | No | Property | Yes |                 |          | 3-Years |                     |
|     |           |   |     |    |    |   |      |      |    |     |    |          |     |                 |          |         |                     |
| T96 | Sycamore  | 1 | 470 | 11 | 7  | M | Poor | Poor | U  |     | No | Property | No  | Fell            | Not Done |         |                     |
| T97 | Sycamore  | 1 | 540 | 11 | 10 | M | Fair | Fair | C1 | 10  | No | Property | Yes | Dead wood       | Not Done | 3-Years |                     |

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|      |                |   |     |    |    |    |      |      |    |     |    |          |     |                 |          |         |                      |
|------|----------------|---|-----|----|----|----|------|------|----|-----|----|----------|-----|-----------------|----------|---------|----------------------|
| T98  | Horse Chestnut | 1 | 560 | 11 | 8  | EM | Good | Poor | C1 | 10  | No | Property | Yes | Fell            | Not Done |         | Damage to stem       |
|      |                |   |     |    |    |    |      |      |    |     |    |          |     |                 |          |         | too excessive        |
|      |                |   |     |    |    |    |      |      |    |     |    |          |     |                 |          |         | to warrant retention |
| T99  | Horse Chestnut | 1 | 600 | 12 | 10 | M  | Good | Good | A1 | >40 | No | Carpark  | Yes | Prune to clear  | Not Done | 3-Years | Clear building       |
|      |                |   |     |    |    |    |      |      |    |     |    |          |     |                 |          |         |                      |
| T100 | Norway Maple   | 1 | 510 | 14 | 8  | EM | Good | Good | A1 | >40 | No | Low      | Yes |                 |          | 3-Years |                      |
| T101 | Norway Maple   | 1 | 370 | 14 | 5  | EM | Good | Good | A2 | >40 | No | Low      | Yes |                 |          | 3-Years |                      |
| T102 | Norway Maple   | 1 | 400 | 14 | 5  | EM | Fair | Good | A2 | >40 | No | Road     | Yes |                 |          | 3-Years |                      |
| T103 | Norway Maple   | 1 | 360 | 14 | 6  | EM | Good | Good | A2 | >40 | No | Road     | Yes |                 |          | 3-Years |                      |
| T104 | Norway Maple   | 1 | 350 | 8  | 5  | EM | Good | Good | A2 | >40 | No | Low      | Yes |                 |          | 3-Years |                      |
| T105 | Lime sp.       | 1 | 470 | 16 | 7  | M  | Good | Good | A2 | >40 | No | Road     | Yes |                 |          | 3-Years |                      |
| T106 | Norway Maple   | 1 | 350 | 12 | 5  | EM | Good | Good | A2 | >40 | No | Road     | Yes | Statutory prune | Not Done | 3-Years | Clear road           |
| T107 | Horse Chestnut | 1 | 490 | 16 | 7  | EM | Good | Good | A2 | >40 | No | Low      | Yes |                 |          | 3-Years |                      |
| T108 | Lime sp.       | 1 | 350 | 12 | 5  | EM | Good | Good | A2 | >40 | No | Road     | Yes |                 |          | 3-Years |                      |
| T109 | Norway Maple   | 1 | 500 | 16 | 6  | M  | Good | Good | A2 | >40 | No | Low      | Yes |                 |          | 3-Years |                      |
| T110 | Norway Maple   | 1 | 440 | 16 | 8  | EM | Good | Good | A2 | >40 | No | Road     | Yes |                 |          | 3-Years |                      |
| T112 | Norway Maple   | 1 | 340 | 14 | 5  | EM | Good | Good | A2 | >40 | No | Low      | Yes |                 |          | 3-Years |                      |
| T113 | Norway Maple   | 1 | 370 | 14 | 6  | EM | Good | Good | A2 | >40 | No | Road     | Yes |                 |          | 3-Years |                      |
| T114 | Norway Maple   | 1 | 350 | 12 | 6  | EM | Good | Good | A2 | >40 | No | Low      | Yes |                 |          | 3-Years |                      |
| T115 | Rowan Sp.      | 5 | 640 | 14 | 14 | M  | Good | Good | A1 | >40 | No | Property | Yes |                 |          | 3-Years |                      |
|      |                |   | 460 |    |    |    |      |      |    |     |    |          |     |                 |          |         |                      |

|      |                |   |     |    |    |   |      |      |    |     |    |          |     |      |          |         |                    |
|------|----------------|---|-----|----|----|---|------|------|----|-----|----|----------|-----|------|----------|---------|--------------------|
|      |                |   | 250 |    |    |   |      |      |    |     |    |          |     |      |          |         |                    |
|      |                |   | 340 |    |    |   |      |      |    |     |    |          |     |      |          |         |                    |
|      |                |   | 310 |    |    |   |      |      |    |     |    |          |     |      |          |         |                    |
| T116 | Norway Maple   | 1 | 600 | 15 | 9  | M | Good | Good | A2 | >40 | No | Road     | Yes |      |          | 3-Years |                    |
| T118 | Norway Maple   | 1 | 470 | 14 | 9  | M | Good | Good | A2 | >40 | No | Road     | Yes |      |          | 3-Years |                    |
| T119 | Sycamore       | 1 | 560 | 14 | 8  | M | Good | Good | A2 | >40 | No | Road     | Yes |      |          | 3-Years |                    |
| T120 | Norway Maple   | 1 | 510 | 13 | 9  | M | Good | Good | A2 | >40 | No | Low      | Yes |      |          | 3-Years |                    |
| T121 | Norway Maple   | 1 | 430 | 13 | 7  | M | Good | Good | A2 | >40 | No | Low      | Yes |      |          | 3-Years |                    |
| T122 | Rowan Sp.      | 1 | 270 | 12 | 4  | M | Good | Good | A2 | >40 | No | Low      | Yes |      |          | 3-Years |                    |
| T123 | Norway Maple   | 1 | 580 | 12 | 8  | M | Good | Good | A2 | >40 | No | Drive    | Yes |      |          | 3-Years |                    |
|      |                |   |     |    |    |   |      |      |    |     |    |          |     |      |          |         |                    |
| T124 | Norway Maple   | 1 | 580 | 14 | 9  | M | Good | Good | A2 | >40 | No | Drive    | Yes |      |          | 3-Years |                    |
| T125 | Lime sp.       | 1 | 560 | 12 | 10 | M | Good | Good | A1 | >40 | No | Road     | Yes |      |          | 3-Years |                    |
| T126 | Beech          | 1 | 400 | 12 | 6  | M | Good | Good | A1 | >40 | No | Low      | Yes |      |          | 3-Years |                    |
| T127 | Horse Chestnut | 1 | 320 | 12 | 5  | M | Good | Good | C1 | 10  | No | Low      | Yes | Fell | Not Done | 3-Years | Fell to allow room |
| T128 | Sycamore       | 1 | 530 | 13 | 9  | M | Good | Good | A1 | >40 | No | Low      | Yes |      |          | 3-Years |                    |
| T129 | Sycamore       | 1 | 460 | 13 | 9  | M | Good | Good | A1 | >40 | No | Property | Yes |      |          | 3-Years |                    |
| T130 | Lime sp.       | 1 | 510 | 14 | 9  | M | Good | Good | A1 | >40 | No | Low      | Yes |      |          | 3-Years |                    |

## Appendix C: QTRA Tree Survey.

The original QTRA data is still valid and applicable. Tree 34 still stands and the stem decay and Ustulina are progressing as expected.

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### INDIVIDUAL TREE RISK SURVEY

|                |                           |                         |            |              |
|----------------|---------------------------|-------------------------|------------|--------------|
| <b>SITE:</b>   | BIRCH HILL GARDENS ESTATE | <b>SURVEYOR:</b>        | M WALKER   | <b>PAGE:</b> |
| <b>CLIENT:</b> | SCOTT HARLEY – ENVIROCARE | <b>ASSESSMENT DATE:</b> | 04/05/2021 |              |
| <b>BRIEF:</b>  | FELLING OF TREES ON SITE  | <b>JOB REFERENCE:</b>   |            |              |

| TREE NO. | SPECIES  | AGE RANGE | HEIGHT (M) | CROWN SPREAD (M) | STEM DIA. (MM) | VITALITY | COMMENTS                                                                                                                                                                                                                                                                                                                       | MANAGEMENT                                                                           | RISK ASSESSMENT OF | TARGET RANGE | SIZE RANGE | PROB RANGE | REDUCED MASS | RISK OF HARM | PRIORITY |
|----------|----------|-----------|------------|------------------|----------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------|--------------|------------|------------|--------------|--------------|----------|
| T21      | Sycamore | Y         | 12         | 3                | 360            | POOR     | Poor condition tree                                                                                                                                                                                                                                                                                                            | Fell and remove from site.                                                           | WHOLE              | 3            | 2          | 3          |              | 1M           | LOW      |
| T34      | Sycamore | M         | 13         | 8                | 530            | POOR     | Ustulina at base, large stem sapwood<br>Damage exposed dead sapwood,<br>Drilled with decay detector drill wall-<br>Thickness results Appendix G                                                                                                                                                                                | Fell and remove from site.                                                           | WHOLE              | 2            | 1          | 3          |              | 1/4K         | HIGH     |
| T96      | Sycamore | M         | 11         | 7                | 470            | POOR     | Dead tree                                                                                                                                                                                                                                                                                                                      | Fell and remove from site                                                            | WHOLE              | 3            | 1          | 3          |              | 1/40K        | MED      |
| T98      | Chestnut | M         | 11         | 8                | 560            | POOR     | Severe damage on stem                                                                                                                                                                                                                                                                                                          | Excessive decay – remove and<br>allow surrounding tree the current<br>occupied space | WHOLE              | 4            | 1          | 3          |              | 1/400K       | MED      |
| T127     | Chestnut | EM        | 12         | 5                | 320            | GOOD     | Growing between two trees. Currently<br>The space accommodated all 3 –<br>However, as the trees mature a<br>conflict for space is inevitable with the<br>consequence of having three mature<br>trees with substandard form. Remove<br>the one chestnut now and the future<br>will see two mature trees with A1<br>quality form | Fell whilst still relatively small.                                                  |                    |              |            |            |              |              |          |

### HEADINGS & ABBREVIATIONS

VERSION 5.11-16

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>REF:</b>                | REFERENCE FOR TREE                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>SPECIES:</b>            | THREE TO FIVE CHARACTER ABBREVIATION OF COMMON NAME OF THE SPECIES BEING RECORDED                                                                                                                                                                                                                                                                                                                                |
| <b>AGE RANGE:</b>          | Y = YOUNG, SM = SEMI MATURE, EM = EARLY MATURE, M = MATURE, PM = POST MATURE, V = VETERAN                                                                                                                                                                                                                                                                                                                        |
| <b>HEIGHT:</b>             | MEASURED OR ESTIMATED HEIGHT (IDENTIFY WHERE HEIGHTS ARE ESTIMATED)                                                                                                                                                                                                                                                                                                                                              |
| <b>STEM DIA:</b>           | STEM DIAMETER – MEASURED AT A HEIGHT OF APPROXIMATELY 1.5 METRES                                                                                                                                                                                                                                                                                                                                                 |
| <b>VITALITY:</b>           | A MEASURE OF PHYSIOLOGICAL CONDITION, D = DEAD, MD = MORIBUND, P = POOR, R = REDUCED FOR THE SPECIES AND AGE, N = WITHIN THE NORMAL RANGE FOR THE SPECIES AND AGE                                                                                                                                                                                                                                                |
| <b>SIZE RANGE:</b>         | QTRA SIZE RANGE OF THE TREE OR BRANCH THAT HAS BEEN ASSESSED                                                                                                                                                                                                                                                                                                                                                     |
| <b>POF RANGE:</b>          | QTRA RANGE OF PROBABILITY OF FAILURE WITHIN 12 MONTHS                                                                                                                                                                                                                                                                                                                                                            |
| <b>TARGET RANGE:</b>       | QTRA TARGET RANGE. WHERE THERE IS CONSTANT OCCUPATION OF THE TARGET BY MORE THAN ONE PERSON, OR A PROPERTY TARGET HAS A REPAIR OR REPLACEMENT VALUE THAT IS GREATER THAN VOSL. THIS IS EXPRESSED AS A 'MULTIPLE TARGET' E.G. CONSTANT OCCUPATION BY 10 PEOPLE WOULD BE EXPRESSED AS TARGET RANGE 1(10T). THE 'MULTIPLE TARGET' IS THEN CARRIED THROUGH TO THE RISK OF HARM TO IDENTIFY THE INCREASED CONSEQUENCE |
| <b>REDUCED MASS %:</b>     | WHERE THE MASS OF A BRANCH IS REDUCED BY DEGRADATION. THE RISK OF HARM IS MULTIPLIED BY A FRACTION OF EITHER ¼ OR ½ TO REFLECT THE REMAINING PROPORTION OF THE ORIGINAL BRANCH                                                                                                                                                                                                                                   |
| <b>RISK OF HARM:</b>       | THE RISK OF HARM FOR THE COMING YEAR                                                                                                                                                                                                                                                                                                                                                                             |
| <b>RISK ASSESSMENT OF:</b> | DESCRIPTION OF THE TREE/BRANCH AND TARGET THAT HAS BEEN ASSESSED                                                                                                                                                                                                                                                                                                                                                 |

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## Appendix D: Key for Tree Survey and Work Recommendations.

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tree Number</b>     | Primary identification marker for a specific tree: It will be maintained throughout the survey schedule and site plan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Tree Species</b>    | Correct and full scientific name of the tree numbered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Number of Stems</b> | record of number of stems the tree has growing from single root base                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Stem Diameter</b>   | Record of the trees stem diameter(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Height</b>          | Recorded tree height measured in meters to an accuracy of 2 meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Spread</b>          | Recorded spread of the tree crown at its greatest value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Life Stage</b>      | <p>Description of the approximate age of the tree, as follows:</p> <ul style="list-style-type: none"><li>• Y = Young tree not yet reaching 1/3<sup>rd</sup> of the species expected final height.</li><li>• EM = Early Mature tree that has achieved 1/3<sup>rd</sup> to 2/3<sup>rd</sup>s of the species expected final height.</li><li>• M = Mature tree that is close to its expected final height and crown size.</li><li>• LM = Late Mature tree having achieved its expected height and volume expectant of species, whose growth has slowed and can be expected to begin to decline in vigour.</li><li>• V = Veteran tree in its final stage of life characterized by a decline in the volume of the crown and root system; these trees necessarily exhibit biological aesthetic or cultural value.</li><li>• Dead = Dead tree regardless of age.</li></ul> |
| <b>Condition</b>       | <p>A record of the trees <b>Structural &amp; Physiological</b> state at the time of the survey. Observations for each category are recorded as follows:</p> <p><b>Physiological Condition:</b></p> <ul style="list-style-type: none"><li>• <b>Good (G)</b> = Tree in good condition typical to species observed. Good leaf cover, good vitality for species and requiring no attention. Will usually display expected amount of deadwood within the crown</li><li>• <b>Fair (F)</b> = A tree displaying signs of stress. Usually expressed in the form of leaf discolouration and leaf loss and thinning, dieback and dead branches and increase of deadwood within crown. Epicormic growth indicates stress on some species of tree; this will be written specifically within the survey. Stress is</li></ul>                                                     |

reversible and can be caused by such things as drought, waterlogging, extreme temperatures, nutrient deficiency, attacks by pests and pathogens.

- **Poor (P)** = A tree showing signs of low vitality due to continued stress to the point where the tree is under significant strain; and is unlikely to return to a fair or good physiological condition. Expressions of poor physiological condition are excessive dieback in the crown of the tree, poor to little leaf cover contained in the crown, heavy pest infection or colonisation and increasing necrotic condition throughout the tree system.
- **Dead (D)** = A tree that is no longer living. No growth no leaf and zero chance of recovery.

#### **Structural Condition:**

- **Good (G)** = Tree with few minor defect's observable. Overall structure is free from damage and the tree display no major growth pattern defects, such as suppression compression forks or subsiding branches. Requires no remedial works.
- **Fair (F)** = A tree that may require remedial works to alleviate present or potential structural stresses caused by observable defects. Defects could be rectified by minor remedial tree works.
- **Poor (P)** = A tree with major structural defects such as advanced decay, significant root damage, snapped out or cracked limbs. Tree works would be necessary.

#### **Remaining Contribution**

understood  
the

A general estimation of the tree's possible life span; the value is based on condition of the tree at the time of survey, and it is that unforeseeable events can occur which can drastically reduce estimated Remaining Contribution value.

#### **Tree quality assessment BS 5837**

Birch Hill Gardens Estate – OL12 9RN

Survey Ref: 011

15/03/2023

Based on the British Standard 5837 this is a judgment of tree quality. A copy of the BS5837: 2012 Tree Quality Assessment is on the final page of this Key document.

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Root Defects</b>    | A record of any visible defects observed. N.P = Non present at the time of survey.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Stem Defects</b>    | A record of any stem defects observed.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Branch Defects</b>  | A record of any branch defects, this includes primary and secondary unions                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Crown Defects</b>   | A record of defects of the crown of the tree. The types of observations are low leaf density, leaf size and colour of leaf.                                                                                                                                                                                                                                                                                                                                           |
| <b>Fungi</b>           | A record of any tree fungi present at the time of survey.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Target</b>          | A record of the immediate surroundings of the tree with it in mind that if failure of the tree occurs <b>is it likely to hit the Target.</b>                                                                                                                                                                                                                                                                                                                          |
| <b>Risk ALARP</b>      | Refers to tolerability of risk: <b>Health &amp; Safety Executive.</b><br><a href="https://www.hse.gov.uk/risk/theory/r2p2.pdf">https://www.hse.gov.uk/risk/theory/r2p2.pdf</a>                                                                                                                                                                                                                                                                                        |
| <b>Recommendations</b> | Work prescribed to an individual tree to negate a negative prognosis. <i>i.e.</i> recommendations are works to trees that will either maintain, help or preserve the tree in a safe state. The works recommended will follow from the observations taken on site. The recommendations will consider the trees structural and physiological condition in context with its environmental location. Statutory clearances will be observed on public paths and roadsides. |

#### **Recommendations:**

- **CL = Crown Lift.** The removal of the lower branches of the tree crown to a specified height. *Note.* Excessive crown raising of the primary branches is unadvisable and will only be advised in extreme circumstances.
- **PC = Prune to Clear.** This operation is undertaken in order to achieve specific distance of the tree branch or whole crown from a building, road sign and/or street utility. Done to remove obstructions.
- **F = Fell.** The removal of the entire tree to as low as possible to ground level unless stated otherwise.

- **SG = Stump Grind.** Grinding out the tree stump mechanically and removing the bulk of the arisings and reinstating the area as per specific instruction.
- **P = Pollard.** The truncating of the tree crown at specific points to maintain a specific frame from which the tree can regrow year on year. Good management for *Platanus sp.*
- **RP = Re-pollard.** Ongoing tree management where the decision to pollard has been taken. The growth is cut back to the original pollard points.
- **CR = Crown reduction.** Pruning to reduce either the overall spatial volume of the crown of the tree or the reduction of a specific part of the tree, the recommendations will instruct accordingly. Crown reductions are undertaken to alleviate weight loading, nuisance and rebalance the crown.
- **CT = Crown Thin.** Pruning to reduce the crown density, without reducing its spatial volume.
- **FP = Formative Pruning.** Pruning of young trees to modify their form at maturity, either to avoid future structural defects (for instance by singling a twin-stem) or to create a desired cultivated tree form. The term is reserved for young trees because all pruning could be said to change form.
- **AI = Aerial Inspection.** A close inspection of the aerial part of a tree, either by mobile elevated work platform (MEWP) or by a tree surgeon (climbing inspection). And report findings to further understanding of both physiological and structural condition to better inform work recommendations.
- **RI = Re-Inspect.** A scheduled re-inspection of the tree. May be to record the progress of a defect or a remedy. Will specify.
- **DW = Remove Dead wood.** A clear instruction to remove the major deadwood from the crown of the tree, removing dead material greater than 50mm in diameter

## Work Priority and Inspection Frequency.

Work Priority and Inspection Frequency are informed and derived from the Risk Rating of a specific condition. The aim of the work recommendations is to achieve a risk value of the tree stock on the site surveyed to be as low as reasonably practicable. The Health and Safety Executive (HSE) provides guidance on the concept of 'As Low as Reasonably Practicable'

<http://www.hse.gov.uk/risk/theory/alarpglance.htm>

## Risk Rating

### Works to be completed within:

- 1 = Urgent.** Work to be carried out immediately. Move target or restrict or deny access to tree location.
- 2 = High** Work to be carried out within 30 days of observation or report of fault.
- 3 = Medium** Work to be carried out within 6 months of the observation.
- 4 = Low** work to be carried out within 12 months of observation.
- 5 = None** No works required; no targets exist.

## Risk Rating

### Reinspection:

- 1 = Urgent.** To be carried out as soon as can be arranged, such as aerial inspection.
- 6 Months** Reinspection to be carried out at day 6 months from time of observation or report of fault.
- 1 Year** Reinspection to be carried out at 12 months.
- 18 Months** Reinspection to be carried out at 18 months.
- 2 Years** Reinspection to be carried out at 24 months.
- 3 Years** Reinspection to be carried out at 36 months.
- 4 Years** Reinspection to be carried out at 48 months.
- 5 Years** Reinspection to be carried out at 60 months.

Table 1 Cascade chart for tree quality assessment

| Category and definition                                                                                                                                                   | Criteria (including subcategories where appropriate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                   |                                                                                                                                       | Identification on plan |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Trees unsuitable for retention (see Note)                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |                                                                                                                                       |                        |
| <b>Category U</b><br>Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years | <ul style="list-style-type: none"><li>Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)</li><li>Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline</li><li>Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality</li></ul> <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p> |                                                                                                                                                                                                                                                                   |                                                                                                                                       | See Table 2            |
|                                                                                                                                                                           | 1 Mainly arboricultural qualities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2 Mainly landscape qualities                                                                                                                                                                                                                                      | 3 Mainly cultural values, including conservation                                                                                      |                        |
| Trees to be considered for retention                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |                                                                                                                                       |                        |
| <b>Category A</b><br><b>Trees of high quality</b> with an estimated remaining life expectancy of at least 40 years                                                        | Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features                                                                                                                                                            | Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture) | See Table 2            |
| <b>Category B</b><br><b>Trees of moderate quality</b> with an estimated remaining life expectancy of at least 20 years                                                    | Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation                                                                                                                                                                                                                                                                                                                                                                                                            | Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality | Trees with material conservation or other cultural value                                                                              | See Table 2            |
| <b>Category C</b><br><b>Trees of low quality</b> with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm       | Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits                                                              | Trees with no material conservation or other cultural value                                                                           | See Table 2            |

# Appendix E: Quantified Tree Risk Assessment Practice Note.

## Quantified Tree Risk Assessment Practice Note

*"When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind"*

William Thomson, Lord Kelvin, Popular Lectures and Addresses [1891-1894]

### 1. INTRODUCTION

Every day we encounter risks in all of our activities, and the way we manage those risks is to make choices. We weigh up the costs and benefits of the risk to determine whether it is acceptable, unacceptable, or tolerable. For example, if you want to travel by car you must accept that even with all the extensive risk control measures, such as seat-belts, speed limits, airbags, and crash barriers, there is still a significant risk of death. This is an everyday risk that is taken for granted and tolerated by millions of people in return for the benefits of convenient travel. Managing trees should take a similarly balanced approach.

A risk from falling trees exists only if there is both potential for tree failure and potential for harm to result. The job of the risk assessor is to consider the likelihood and consequences of tree failure. The outcome of this assessment can then inform consideration of the risk by the tree manager, who may also be the owner.

Using a comprehensive range of values<sup>1</sup>, Quantified Tree Risk Assessment (QTRA) enables the tree assessor to identify and analyse the risk from tree failure in three key stages. 1) to consider land-use in terms of vulnerability to impact and likelihood of occupation, 2) to consider the consequences of an impact, taking account of the size of the tree or branch concerned, and 3) to estimate the probability that the tree or branch will fail onto the land-use in question. Estimating the values of these components, the assessor can use the QTRA manual calculator or software application to calculate an annual Risk of Harm from a particular tree. To inform management decisions, the risks from different hazards can then be both ranked and compared, and considered against broadly acceptable and tolerable levels of risk.

#### A Proportionate Approach to Risks from Trees

The risks from falling trees are usually very low and high risks will usually be encountered only in areas

with either high levels of human occupation or with valuable property. Where levels of human occupation and value of property are sufficiently low, the assessment of trees for structural weakness will not usually be necessary. Even when land-use indicates that the assessment of trees is appropriate, it is seldom proportionate to assess and evaluate the risk for each individual tree in a population. Often, all that is required is a brief consideration of the trees to identify gross signs of structural weakness or declining health. Doing all that is reasonably practicable does not mean that all trees have to be individually examined on a regular basis (HSE 2013).

The QTRA method enables a range of approaches from the broad assessment of large collections of trees to, where necessary, the detailed assessment of an individual tree.

#### Risk of Harm

The QTRA output is termed the Risk of Harm and is a combined measure of the likelihood and consequences of tree failure, considered against the baseline of a lost human life within the coming year.

#### ALARP (As Low As Reasonably Practicable)

Determining that risks have been reduced to As Low As Reasonably Practicable (HSE 2001) involves an evaluation of both the risk and the sacrifice or cost involved in reducing that risk. If it can be demonstrated that there is gross disproportion between them, the risk being insignificant in relation to the sacrifice or cost, then to reduce the risk further is not 'reasonably practicable'.

#### Costs and Benefits of Risk Control

Trees confer many benefits to people and the wider environment. When managing any risk, it is essential to maintain a balance between the costs and benefits of risk reduction, which should be considered in the determination of ALARP. It is not only the financial cost of controlling the risk that should be considered, but also the loss of tree-related benefits, and the risk to workers and the public from the risk control measure itself.

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<sup>1</sup> See Tables 1, 2 & 3.

When considering risks from falling trees, the cost of risk control will usually be too high when it is clearly 'disproportionate' to the reduction in risk. In the context of QTRA, the issue of 'gross disproportion'<sup>2</sup>, where decisions are heavily biased in favour of safety, is only likely to be considered where there are risks of 1/10 000 or greater.

### Acceptable and Tolerable Risks

The Tolerability of Risk framework (ToR) (HSE 2001) is a widely accepted approach to reaching decisions on whether risks are broadly acceptable, unacceptable, or tolerable. Graphically represented in Figure 1, ToR can be summarised as having a Broadly Acceptable Region where the upper limit is an annual risk of death 1/1 000 000, an Unacceptable Region for which the lower limit is 1/1 000, and between these a Tolerable Region within which the tolerability of a risk will be dependent upon the costs and benefits of risk reduction. In the Tolerable Region, we must ask whether the benefits of risk control are sufficient to justify their cost.

In respect of trees, some risks cross the Broadly Acceptable 1/1 000 000 boundary, but remain tolerable. This is because any further reduction would involve a disproportionate cost in terms of the lost environmental, visual, and other benefits, in addition to the financial cost of controlling the risk.

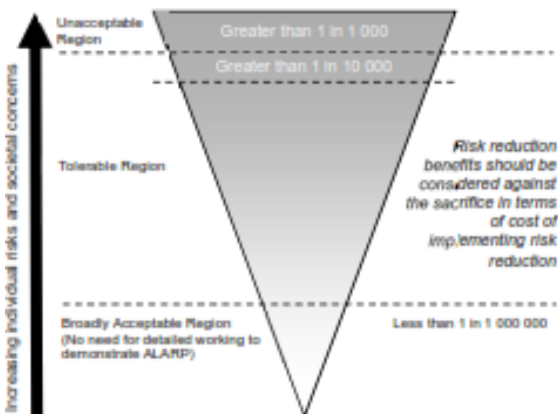


Figure 1. Adapted from the Tolerability of Risk framework (HSE 2001).

### Value of Statistical Life

The Value of Statistical Life (VOSL), is a widely applied risk management device, which uses the value of a hypothetical life to guide the proportionate allocation of resources to risk reduction. In the UK,

this value is currently in the region of £2 000 000, and this is the value adopted in the QTRA method.

In QTRA, placing a statistical value on a human life has two particular uses. Firstly, QTRA uses VOSL to enable damage to property to be compared with the loss of life, allowing the comparison of risks to people and property. Secondly, the proportionate allocation of financial resources to risk reduction can be informed by VOSL. "A value of statistical life of £1 000 000 is just another way of saying that a reduction in risk of death of 1/100 000 per year has a value of £10 per year" (HSE 1996).

Internationally, there is variation in VOSL, but to provide consistency in QTRA outputs, it is suggested that VOSL of £2 000 000 should be applied internationally. This is ultimately a decision for the tree manager.

## 2. OWNERSHIP OF RISK

Where many people are exposed to a risk, it is shared between them. Where only one person is exposed, that individual is the recipient of all of the risk and if they have control over it, they are also the owner of the risk. An individual may choose to accept or reject any particular risk to themselves, when that risk is under their control. When risks that are imposed upon others become elevated, societal concern will usually require risk controls, which ultimately are imposed by the courts or government regulators.

Although QTRA outputs might occasionally relate to an individual recipient, this is seldom the case. More often, calculation of the Risk of Harm is based on a cumulative occupation – i.e. the number of people per hour or vehicles per day, without attempting to identify the individuals who share the risk.

Where the risk of harm relates to a specific individual or a known group of people, the risk manager might consider the views of those who are exposed to the risk when making management decisions. Where a risk is imposed on the wider community, the principles set out in the ToR framework can be used as a reasonable approach to determine whether the risk is ALARP.

## 3. THE QTRA METHOD - VERSION 5

The input values for the three components of the QTRA calculation are set out in broad ranges<sup>3</sup> of Target, Size, and Probability of Failure. The assessor

<sup>2</sup> Discussed further on page 5.

<sup>3</sup> See Tables 1, 2 & 3.

estimates values for these three components and inputs them on either the manual calculator or software application to calculate the Risk of Harm.

#### **Assessing Land-use (Targets)**

The nature of the land-use beneath or adjacent to a tree will usually inform the level and extent of risk assessment to be carried out. In the assessment of Targets, six ranges of value are available. Table 2 sets out these ranges for vehicular frequency, human occupation and the monetary value of damage to property.

#### **Human Occupation**

The probability of pedestrian occupation at a particular location is calculated on the basis that an average pedestrian will spend five seconds walking beneath an average tree. For example, an average occupation of ten pedestrians per day, each occupying the Target for five seconds is a daily occupation of fifty seconds, giving a likelihood of occupation 1/1,728. Where a longer occupation is likely, as with a habitable building, outdoor café, or park bench, the period of occupation can be measured, or estimated as a proportion of a given unit of time, e.g. six hours per day (1/4). The Target is recorded as a range (Table 2).

#### **Weather Affected Targets**

Often the nature of a structural weakness in a tree is such that the probability of failure is greatest during windy weather, while the probability of the site being occupied by people during such weather is often low. This applies particularly to outdoor recreational areas. When estimating human Targets, the risk assessor must answer the question 'in the weather conditions that I expect the likelihood of failure of the tree to be initiated, what is my estimate of human occupation?' Taking this approach, rather than using the average occupation, ensures that the assessor considers the relationship between weather, people, and trees, along with the nature of the average person with their ability to recognise and avoid unnecessary risks.

#### **Vehicles on the Highway**

In the case of vehicles, likelihood of occupation may relate to either the falling tree or branch striking the vehicle or the vehicle striking the fallen tree. Both types of impact are influenced by vehicle speed; the faster the vehicle travels the less likely it is to be struck by the falling tree, but the more likely it is to strike a fallen tree. The probability of a vehicle occupying any particular point in the road is the ratio

of the time it is occupied - including a safe stopping distance - to the total time. The average vehicle on a UK road is occupied by 1.6 people (DfT 2010). To account for the substantial protection that the average vehicle provides against most tree impacts and in particular, frontal collisions, QTRA values the substantially protected 1.6 occupants in addition to the value of the vehicle as equivalent to one exposed human life.

#### **Property**

Property can be anything that could be damaged by a falling tree, from a dwelling, to livestock, parked car, or fence. When evaluating the exposure of property to tree failure, the QTRA assessment considers the cost of repair or replacement that might result from failure of the tree. Ranges of value are presented in Table 2 and the assessor's estimate need only be sufficient to determine which of the six ranges the cost to select.

In Table 2, the ranges of property value are based on a VOSL of £2 000 000, e.g. where a building with a replacement cost of £20 000 would be valued at 0.01 (1/100) of a life (Target Range 2).

When assessing risks in relation to buildings, the Target to be considered might be the building, the occupants, or both. Occupants of a building could be protected from harm by the structure or substantially exposed to the impact from a falling tree if the structure is not sufficiently robust, and this will determine how the assessor categorises the Target.

#### **Multiple Targets**

A Target might be constantly occupied by more than one person and QTRA can account for this. For example, if it is projected that the average occupation will be constant by 10 people, the Risk of Harm is calculated in relation to one person constantly occupying the Target before going on to identify that the average occupation is 10 people. This is expressed as Target 1(10T)/1, where 10T represents the Multiple Targets. In respect of property, a Risk of Harm 1(10T)/1 would be equivalent to a risk of losing £20 000 000 as opposed to £2 000 000.

#### **Tree or Branch Size**

A small dead branch of less than 25mm diameter is not likely to cause significant harm even in the case of direct contact with a Target, while a falling branch with a diameter greater than 450mm is likely to cause some harm in the event of contact with all but the most robust Target. The QTRA method categorises

Size by the diameter of tree stems and branches (measured beyond any basal taper). An equation derived from weight measurements of trees of different stem diameters is used to produce a data set of comparative weights of trees and branches ranging from 25mm to 600mm diameter, from which Table 1 is compiled. The size of dead branches might be discounted where they have undergone a significant reduction in weight because of degradation and shedding of subordinate branches. This discounting, referred to as 'Reduced Mass',

reflects an estimated reduction in the mass of a dead branch.

**Table 1. Size**

| Size Range | Size of tree or branch                  | Range of Probability |
|------------|-----------------------------------------|----------------------|
| 1          | > 450mm (>18") dia.                     | 1/1 - >1/2           |
| 2          | 200mm (10 1/2") dia. - 450mm (18") dia. | 1/2 - >1/5.6         |
| 3          | 110mm (4 1/2") dia. - 200mm (10") dia.  | 1/5.6 - >1/52        |
| 4          | 25mm (1") dia. - 100mm (4") dia.        | 1/52 - 1/2 500       |

\* Range 1 is based on a diameter of 600mm.

**Table 2. Targets**

| Target Range | Property (repair or replacement cost) | Human (not in vehicles)                                                                              | Vehicle Traffic (number per day)                                                                    | Ranges of Value (probability of occupation or fraction of £2 000 000) |
|--------------|---------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| 1            | £2 000 000 - >£200 000                | <b>Occupation:</b> Constant - 2.5 hours/day<br><b>Pedestrians &amp; cyclists:</b> 720/hour - 73/hour | 26 000 - 2 700 @ 110kph (68mph)<br>32 000 - 3 300 @ 80kph (50mph)<br>47 000 - 4 800 @ 50kph (32mph) | 1/1 - >1/10                                                           |
| 2            | £200 000 - >£20 000                   | <b>Occupation:</b> 2.4 hours/day - 15 min/day<br><b>Pedestrians &amp; cyclists:</b> 72/hour - 8/hour | 2 600 - 270 @ 110kph (68mph)<br>3 200 - 330 @ 80kph (50mph)<br>4 700 - 480 @ 50kph (32mph)          | 1/10 - >1/100                                                         |
| 3            | £20 000 - >£2 000                     | <b>Occupation:</b> 14 min/day - 2 min/day<br><b>Pedestrians &amp; cyclists:</b> 7/hour - 2/hour      | 260 - 27 @ 110kph (68mph)<br>320 - 33 @ 80kph (50mph)<br>470 - 48 @ 50kph (32mph)                   | 1/100 - >1/1 000                                                      |
| 4            | £2 000 - >£200                        | <b>Occupation:</b> 1 min/day - 2 min/week<br><b>Pedestrians &amp; cyclists:</b> 1/hour - 3/day       | 26 - 4 @ 110kph (68mph)<br>32 - 4 @ 80kph (50mph)<br>47 - 6 @ 50kph (32mph)                         | 1/1 000 - >1/10 000                                                   |
| 5            | £200 - >£20                           | <b>Occupation:</b> 1 min/week - 1 min/month<br><b>Pedestrians &amp; cyclists:</b> 2/day - 2/week     | 3 - 1 @ 110kph (68mph)<br>3 - 1 @ 80kph (50mph)<br>5 - 1 @ 50kph (32mph)                            | 1/10 000 - >1/100 000                                                 |
| 6            | £20 - £2                              | <b>Occupation:</b> <1 min/month - 0.5 min/year<br><b>Pedestrians &amp; cyclists:</b> 1/week - 6/year | None                                                                                                | 1/100 000 - 1/1 000 000                                               |

Vehicle, pedestrian and property Targets are categorised by their frequency of use or their monetary value. The probability of a vehicle or pedestrian occupying a Target area in Target Range 4 is between the upper and lower limits of 1/1 000 and >1/10 000 (column 5). Using the VOSL £2 000 000, the property repair or replacement value for Target Range 4 is £2 000 - >200.

### Probability of Failure

In the QTRA assessment, the probability of tree or branch failure within the coming year is estimated and recorded as a range of value (Ranges 1 - 7, Table 3).

Selecting a Probability of Failure (PoF) Range requires the assessor to compare their assessment of the tree or branch against a benchmark of either a non-compromised tree at Probability of Failure Range 7, or a tree or branch that we expect to fail within the year, which can be described as having a 1/1 probability of failure.

During QTRA training, Registered Users go through a number of field exercises in order to calibrate their estimates of Probability of Failure.

**Table 3. Probability of Failure**

| Probability of Failure Range | Probability                |
|------------------------------|----------------------------|
| 1                            | 1/1 - >1/10                |
| 2                            | 1/10 - >1/100              |
| 3                            | 1/100 - >1/1 000           |
| 4                            | 1/1 000 - >1/10 000        |
| 5                            | 1/10 000 - >1/100 000      |
| 6                            | 1/100 000 - >1/1 000 000   |
| 7                            | 1/1 000 000 - 1/10 000 000 |

The probability that the tree or branch will fail within the coming year.

## The QTRA Calculation

The assessor selects a Range of values for each of the three input components of Target, Size and Probability of Failure. The Ranges are entered on either the manual calculator or software application to calculate a Risk of Harm.

The Risk of Harm is expressed as a probability and is rounded, to one significant figure. Any Risk of Harm that is lower than 1/1 000 000 is represented as <1/1 000 000. As a visual aid, the Risk of Harm is colour coded using the traffic light system illustrated in Table 4 (page 7).

### Risk of Harm - Monte Carlo Simulations

The Risk of Harm for all combinations of Target, Size and Probability of Failure Ranges has been calculated using Monte Carlo simulations<sup>4</sup>. The QTRA Risk of Harm is the mean value from each set of Monte Carlo results.

In QTRA Version 5, the Risk of Harm should not be calculated without the manual calculator or software application.

## Assessing Groups and Populations of Trees

When assessing populations or groups of trees, the highest risk in the group is quantified and if that risk is tolerable, it follows that risks from the remaining trees will also be tolerable, and further calculations are unnecessary. Where the risk is intolerable, the next highest risk will be quantified, and so on until a tolerable risk is established. This process requires prior knowledge of the tree manager's risk tolerance.

### Accuracy of Outputs

The purpose of QTRA is not necessarily to provide high degrees of accuracy, but to provide for the quantification of risks from falling trees in a way that risks are categorised within broad ranges (Table 4).

## 4. INFORMING MANAGEMENT DECISIONS

### Balancing Costs and Benefits of Risk Control

When controlling risks from falling trees, the benefit of reduced risk is obvious, but the costs of risk control are all too often neglected. For every risk reduced there will be costs, and the most obvious of these is the financial cost of implementing the control measure. Frequently overlooked is the transfer of risks to workers and the public who might be directly affected by the removal or pruning of trees. Perhaps

more importantly, most trees confer benefits, the loss of which should be considered as a cost when balancing the costs and benefits of risk control.

When balancing risk management decisions using QTRA, consideration of the benefits from trees will usually be of a very general nature and not require detailed consideration. The tree manager can consider, in simple terms, whether the overall cost of risk control is a proportionate one. Where risks are approaching 1/10 000, this may be a straightforward balancing of cost and benefits. Where risks are 1/10 000 or greater, it will usually be appropriate to implement risk controls unless the costs are grossly disproportionate to the benefits rather than simply disproportionate. In other words, the balance being weighted more on the side of risk control with higher associated costs.

### Considering the Value of Trees

It is necessary to consider the benefits provided by trees, but they cannot easily be monetised and it is often difficult to place a value on those attributes such as habitat, shading and visual amenity that might be lost to risk control.

A simple approach to considering the value of a tree asset is suggested here, using the concept of 'average benefits'. When considered against other similar trees, a tree providing 'average benefits' will usually present a range of benefits that are typical for the species, age and situation. Viewed in this way, a tree providing 'average benefits' might appear to be low when compared with particularly important trees – such as in Figure 2, but should nonetheless be sufficient to offset a Risk of Harm of less than 1/10 000. Without having to consider the benefits of risk controls, we might reasonably assume that below 1/10 000, the risk from a tree that provides 'average benefits' is ALARP.

In contrast, if it can be said that the tree provides lower than average benefits because, for example, it is declining and in poor physiological condition, it may be necessary to consider two further elements. Firstly, is the Risk of Harm in the upper part of the Tolerable Region, and secondly, is the Risk of Harm likely to increase before the next review because of an increased Probability of Failure. If both these conditions apply then it might be appropriate to consider the balance of costs and benefits of risk reduction in order to determine whether the risk is ALARP. This balance requires the tree manager to take a view of both the reduction in risk and the costs of that reduction.

<sup>4</sup> For further information on the Monte Carlo simulation method, refer to [http://en.wikipedia.org/wiki/Monte\\_Carlo\\_method](http://en.wikipedia.org/wiki/Monte_Carlo_method)



Fig. 2

### Lower Than Average Benefits from Trees

Usually, the benefits provided by a tree will only be significantly reduced below the 'average benefits' that are typical for the species, age and situation, if the life of the benefits is likely to be shortened, perhaps because the tree is declining or dead. That is not to say that a disbenefit, such as undesirable shading, lifting of a footpath, or restricting the growth of other trees, should not also be considered in the balance of costs and benefits.

The horse chestnut tree in Figure 3 has recently died, and over the next few years, may provide valuable habitats. However, for this tree species and the relatively fast rate at which its wood decays, the lifetime of these benefits is likely to be limited to only a few years. This tree has an already reduced value that will continue to reduce rapidly over the coming five to ten years at the same time as the Risk of Harm is expected to increase. There will be changes in the benefits provided by the tree as it degrades. Visual qualities are likely to reduce while the decaying wood provides habitats for a range of species, for a short while at least. There are no hard and fast measures of these benefits and it is for the tree manager to decide what is locally important and how it might be balanced with the risks.

Where a risk is within the Tolerable Region and the tree confers lower than average benefits, it might be appropriate to consider implementing risk control while taking account of the financial cost. Here, VOSL can be used to inform a decision on whether the cost of risk control is proportionate. Example 3 below puts this evaluation into a tree management context.

There will be occasions when a tree is of such minimal value and the monetary cost of risk reduction so low that it might be reasonable to

further reduce an already relatively low risk. Conversely, a tree might be of such considerable value that an annual risk of death greater than 1/10 000 would be deemed tolerable.

Occasionally, decisions will be made to retain elevated risks because the benefits from the tree are particularly high or important to stakeholders, and in these situations, it might be appropriate to assess and document the benefits in some detail. If detailed assessment of benefits is required, there are several methodologies and sources of information (Forest Research 2010).



Fig. 3

### Delegating Risk Management Decisions

Understanding of the costs with which risk reduction is balanced can be informed by the risk assessor's knowledge, experience and on-site observations, but the risk management decisions should be made by the tree manager. That is not to say that the tree manager should review and agree every risk control measure, but when delegating decisions to surveyors and other staff or advisors, tree managers should set out in a policy, statement or contract, the principles and perhaps thresholds to which trees and their associated risks will ordinarily be managed.

Based on the tree manager accepting the principles set out in the QTRA Practice Note and or any other specific instructions, the risk assessor can take account of the cost/benefit balance and for most

situations will be able to determine whether the risk is ALARP when providing management recommendations.

**Table 4. QTRA Advisory Risk Thresholds**

| Thresholds  | Description                                                                                                                            | Action                                                                                                                                                                                                               |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1/1,000     | <b>Unacceptable</b><br>Risks will not ordinarily be tolerated                                                                          | <ul style="list-style-type: none"> <li>Control the risk</li> </ul>                                                                                                                                                   |
|             | <b>Unacceptable</b><br>(where imposed on others)<br>Risks will not ordinarily be tolerated                                             | <ul style="list-style-type: none"> <li>Control the risk</li> <li>Review the risk</li> </ul>                                                                                                                          |
|             | <b>Tolerable</b><br>(by agreement)<br>Risks may be tolerated if those exposed to the risk accept it, or the tree has exceptional value | <ul style="list-style-type: none"> <li>Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value</li> <li>Review the risk</li> </ul>                            |
| 1/10 000    | <b>Tolerable</b><br>(where imposed on others)<br>Risks are tolerable if ALARP                                                          | <ul style="list-style-type: none"> <li>Assess costs and benefits of risk control</li> <li>Control the risk only where a significant benefit might be achieved at reasonable cost</li> <li>Review the risk</li> </ul> |
| 1/1 000 000 | <b>Broadly Acceptable</b><br>Risk is already ALARP                                                                                     | <ul style="list-style-type: none"> <li>No action currently required</li> <li>Review the risk</li> </ul>                                                                                                              |

#### QTRA Informative Risk Thresholds

The QTRA advisory thresholds in Table 4 are proposed as a reasonable approach to balancing safety from falling trees with the costs of risk reduction. This approach takes account of the widely applied principles of ALARP and ToR, but does not dictate how these principles should be applied. While the thresholds can be the foundation of a robust policy for tree risk management, tree managers should make decisions based on their own situation, values and resources. Importantly, to enable tree assessors to provide appropriate management guidance, it is helpful for them to have some understanding of the tree owner's management preferences prior to assessing the trees.

A Risk of Harm that is less than 1/1 000 000 is Broadly Acceptable and is already ALARP. A Risk of Harm 1/1 000 or greater is unacceptable and will not ordinarily be tolerated. Between these two values, the Risk of Harm is in the Tolerable Region of ToR and will be tolerable if it is ALARP. In the Tolerable

Region, management decisions are informed by consideration of the costs and benefits of risk control, including the nature and extent of those benefits provided by trees, which would be lost to risk control measures.

For the purpose of managing risks from falling trees, the Tolerable Region can be further broken down into two sections. From 1/1 000 000 to less than 1/10 000, the Risk of Harm will usually be tolerable providing that the tree confers 'average benefits' as discussed above. As the Risk of Harm approaches 1/10 000 it will be necessary for the tree manager to consider in more detail the benefits provided by the tree and the overall cost of mitigating the risk.

A Risk of Harm in the Tolerable Region but 1/10 000 or greater will not usually be tolerable where it is imposed on others, such as the public, and if retained, will require a more detailed consideration of ALARP. In exceptional circumstances a tree owner might choose to retain a Risk of Harm that is 1/10 000 or greater. Such a decision might be based on the agreement of those who are exposed to the risk, or perhaps that the tree is of great importance. In these circumstances, the prudent tree manager will consult with the appropriate stakeholders whenever possible.

#### 5. EXAMPLE QTRA CALCULATIONS AND RISK MANAGEMENT DECISIONS

Below are three examples of QTRA calculations and application of the QTRA Advisory Thresholds.

##### Example 1.

|       | Target |   | Size |   | Probability of Failure |   | Risk of Harm |
|-------|--------|---|------|---|------------------------|---|--------------|
| Range | 6      | x | 1    | x | 3                      | = | <1/1 000 000 |

Example 1 is the assessment of a large (Size 1), unstable tree with a probability of failure of between 1/100 and >1/1 000 (PoF 3). The Target is a footpath with less than one pedestrian passing the tree each week (Target 6). The Risk of Harm is calculated as less than 1/1 000 000 (green). This is an example of where the Target is so low consideration of the structural condition of even a large tree would not usually be necessary.

### Example 2.

|       | Target | Size | Probability of Failure | Risk of Harm |   |   |              |
|-------|--------|------|------------------------|--------------|---|---|--------------|
| Range | 1      | x    | 4                      | x            | 3 | = | 1(2T)/50 000 |

In Example 2, a recently dead branch (Size 4) overhangs a busy urban high street that is on average occupied constantly by two people, and here Multiple Target occupation is considered.

Having an average occupancy of two people, the Risk of Harm 1(2T)/50 000 (yellow) represents a twofold increase in the magnitude of the consequence and is therefore equivalent to a Risk of Harm 1/20 000 (yellow). This risk does not exceed 1/10 000, but being a dead branch at the upper end of the Tolerable Region it is appropriate to consider the balance of costs and benefits of risk control. Dead branches can be expected to degrade over time with the probability of failure increasing as a result. Because it is dead, some of the usual benefits from the branch have been lost and it will be appropriate to consider whether the financial cost of risk control would be proportionate.

### Example 3.

|       | Target |   | Size |   | Probability of Failure | Risk of Harm |
|-------|--------|---|------|---|------------------------|--------------|
| Range | 3      | x | 3    | x | 3                      | = 1/500 000  |

In Example 3, a 200mm diameter defective branch overhangs a country road along which travel between 470 and 48 vehicles each day at an average speed of 50kph (32mph) (Target Range 3). The branch is split and is assessed as having a probability of failure for the coming year of between 1/100 and 1/1 000 (PoF Range 3). The Risk of Harm is calculated as 1/500 000 (yellow) and it needs to be considered whether the risk is ALARP. The cost of removing the branch and reducing the risk to Broadly Acceptable (1/1 000 000) is estimated at £350. To establish whether this is a proportionate cost of risk control, the following equation is applied. £2 000 000 (VOGL) x 1/500 000 = £4 indicating that the projected cost of £350 would be disproportionate to the benefit. Taking account of the financial cost, risk transfer to arborists and passers-by, the cost could be described as being grossly disproportionate, even if accrued benefits over say ten years were taken into account.

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Quantified Tree Risk Assessment Limited.  
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SK11 7NJ, United Kingdom.

## Appendix F: Tree works schedule.

|                                                                                                                |                    |                                                   |  |                                                                                      |                 |
|----------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------|--|--------------------------------------------------------------------------------------|-----------------|
| Tree work schedule                                                                                             |                    | Birch Hill Gardens Estate<br>Rochdale<br>OL12 9RN |  | Walkers tree services. Tree condition report.<br>Ref: 011<br>Date Issued: 00/00/2023 |                 |
|                                                                                                                |                    |                                                   |  | Tree risk mitigation & Tree maintenance schedule 2023                                |                 |
| Tree works specifications herein are to be completed and conform to - BS 3998:2010 Tree Work. Recommendations. |                    |                                                   |  |                                                                                      |                 |
| Tree Number                                                                                                    | Works to undertake |                                                   |  | Priority value                                                                       | Date Completed? |
|                                                                                                                |                    |                                                   |  |                                                                                      |                 |
|                                                                                                                |                    |                                                   |  | High –<br>within 30 days                                                             |                 |
|                                                                                                                |                    |                                                   |  | Medium –<br>within 7 Months                                                          |                 |
|                                                                                                                |                    |                                                   |  | Low –<br>within 12 Months                                                            |                 |
|                                                                                                                |                    |                                                   |  |                                                                                      |                 |