BS5837:2012 Tree Survey at XXX.

Including Arboricultural Impact Assessment, Tree Constraints Plan & Tree Protection Plan.

Prepared for xxx

8th September, 2014; Revised 29th January, 2016

Revision 1: 18th September 2014. Alteration of garage location.
Revision 3: 21st November, 2015. Altered garage location and loss of T16
Revision 4: 29th January, 2016. Retention of greater number of trees.

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1.0 **Summary**

- Following an instruction from xxx, I have conducted an arboricultural survey according to BS5837:2012 on the trees in and adjacent to the garden of xxx for the purposes of construction planning.
- The site is relatively unexposed in a residential suburban setting on a clay till soil containing gravels & sands. The soil is of high fertility.
- The site stands in Zone 1 of the xxx Conservation Area – T47 is noted as a 'Significant Tree'. Oak tree T4 is subject to TPO 22 of xxx Borough Council.
- A number of trees are of low value, contribute little to the character of the Conservation Area and are to be removed: T2, 7, 8, 12, 13, 18 and 20.
- A number of trees are incompatible with the building design and site layout and are to be removed: T14, 19, 21, 33 - 39 & the first four west-most plants of G1.
- The most significant design constraints are:
  - Foundations should be of sleeved micropile construction.
  - The building should incorporate several large windows to facilitate the entry of natural light.
  - Gutters should be protected with leaf guards.
  - External surfaces should be of non-slip design.
- Tree work should be carried out by competent, trained and insured arboriculturists in accordance with BS3998:2010.
- Retained trees are to be protected by a Tree Protection Barrier and Ground Protection as described in BS5837:2012.
- The proposal does not affect the boundary trees or visual appearance of xxx Lane protected by the Conservation Area designation.
- Post-construction mitigation:
  - T19 (Field maple (Acer campestre)) is a native species and its loss should be mitigated by replacement planting with a semi-mature specimen to the east of the new dwelling.
  - Oak T4 and Cider Gum T26 to be monitored for one full year post construction. Problems to be remedied as appropriate.
2.0 Background

2.1 Instruction:
- I have been instructed by xxx to conduct an arboricultural survey according to BS5837:2012 on the trees in and adjacent to the garden of xxx for the purposes of construction planning.
- The initial enquiry was received by phone on December 9th, 2013 with an initial site inspection on December 10th. An instruction to proceed was received by phone on June 30th, 2014. Inspection took place on July 14th between 09:00 and 14:00hrs.
- I received a further instruction to review and update the arboricultural implications and tree constraints plans using a revised site layout in October, 2015, and to increase the number of retained trees in January 2016.
- The client requires a Tree Survey, and Arboricultural Implications Assessment and a Tree Protection Plan, to include CAD drawings. xxx further authorised sharing of plans and documents with xxx.

2.2 Techniques used:
- Visual Tree Assessment (VTA; Lonsdale, 1999).
- Desk-based enquiries: TPO / CA status, geological survey, mapping.

2.3 Limitations:
- The contents are intended for the sole use of the clients and their appointed professional structural engineer and / or architect. It is also understood that the document will be shared with the Local Planning Authority in order to support a Planning Application. No liability is accepted for its use by any other party to advance an argument or claim (including legal or financial) without prior consent.
- No liability is accepted for defects hidden from view by vegetation or other obstacles to access.
- Formal assessment of topography, drainage, service conduits, & soil conditions have not been made and are beyond the scope of this report.
- Specific laboratory investigations of soil properties (plasticity index, moisture content, suction pressure) have not been made and are beyond the scope of this report.
- This report considers only the potential for the trees to be affected by the proposed development. No liability for damage arising from any other source or mechanism is accepted.
- This report will be deemed to be invalid if a history of such vegetation related subsidence damage in surrounding properties is known but has not been made known to the surveyor.
- The survey area has been limited to that specified in the instruction. Generally, trees less than 5m tall have been excluded unless of particular relevance. Other trees at the property may be affected should works or vehicle movements extend outside the area described in which case a further inspection and report will be required.
- A full topographical survey was not available at the time of writing. Plans have therefore been based on architect’s drawings. Whilst every effort has been made to represent site conditions and layout accurately, these plans should not be relied upon for detailed planning, design or setting out. Plans...
reproduced in this report are for illustrative purposes only. No liability is accepted for inaccuracies arising from the use of these plans.

- Implications assessment and recommendations are based on the survey carried out in July 2014.
- It is understood that any risks associated with these limitations are accepted by the clients.

2.4 Weather conditions:
Sunny, warm, wind force 1.

2.5 Access conditions:
Access to the garden was unhindered but dense ivy obscured some of the trees adjacent to Rectory Lane. Tree T48 could not be accessed as it stands within an electricity substation.

2.6 Validity:
Plants are biological organisms and change with time. Assessment of health and condition remains valid for six months from the date of inspection (July 2014), or until a major storm is experienced, after which time a new inspection is required. All other aspects of this report remain valid for two years from date.

2.7 Background information:
- Tree T4 (Sessile oak) is protected as T17 of TPO 22 of xxx Borough Council while the property as a whole lies within Zone 1 of the xxx Conservation Area (xxx Borough Council Planning Department by phone 12:38pm 09/09/2014).
- Tree T47 is noted as a ‘Significant Tree’ in the Conservation Area Character Appraisal (BEAMS, 2009) which also recognises the view west along xxx Lane at this point to be a ‘Significant View or Vista’.
3.0 Results:

3.1 Situation:

- The property occupies a level site in a residential area at an elevation of approximately 105m on the northern edge of xxx (Ordnance Survey Explorer Sheet 193).

- Locally, ground undulates to create a series of low rises on which the various housing developments of xxx stand. XXX Woods lie nearby to the west while an area of open farmland known as XXX’ lies to the north but separated from the property by further housing. This is a relatively unexposed location.

- The property stands at the edge of two surface deposit types: clay silt & gravel ‘Head’ deposits and deposits of chalky till containing sands, gravels, silts & clays. The underlying bedrocks are chalks of the Nodular & New Pit Formations (BGS, 2014). Boreholes XXX & XXX drilled approx. 150m away to the northeast reveals the presence of silty clay containing large amounts of flint, gravel, chalk gravel and some cobblestones & sand to a depth of 3.3m.

- Soil type is described as a freely draining slightly acid but base rich soil of high fertility (LandIS, 2014).

- It is proposed to build a detached house with separate garage of brick and tile construction with access from XXX Road.
3.2 Site plan:

Tree survey plan at XXX.

Green: Category A trees; Blue – Category B trees; Red – Category C trees; Grey – Category U trees.

Labels show tree number, retention category, species and height in metres.
## 3.3 Tree Assessment:

<table>
<thead>
<tr>
<th>T</th>
<th>Species</th>
<th>H</th>
<th>D</th>
<th>Spread</th>
<th>Clr</th>
<th>Age</th>
<th>P Cond</th>
<th>S Cond</th>
<th>Rec</th>
<th>ERC</th>
<th>Cat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contorted hazel</td>
<td>5</td>
<td>66</td>
<td>N 0</td>
<td>E 1.5</td>
<td>S 2.5</td>
<td>W 0</td>
<td>2</td>
<td>EM</td>
<td>Fair</td>
<td>Poor (Unbalanced; contorted habit largely lost)</td>
</tr>
<tr>
<td>2</td>
<td>Sycamore</td>
<td>8</td>
<td>87</td>
<td>N 0.5</td>
<td>E 3</td>
<td>S 3.5</td>
<td>W 1.5</td>
<td>2</td>
<td>EM</td>
<td>Fair</td>
<td>Poor (Unbalanced; leaning stem)</td>
</tr>
<tr>
<td>3</td>
<td>Common ash</td>
<td>6</td>
<td>63</td>
<td>N 1.5</td>
<td>E 2</td>
<td>S 2</td>
<td>W 1</td>
<td>2</td>
<td>EM</td>
<td>Good (but at risk from Chalara)</td>
<td>Good</td>
</tr>
<tr>
<td>4</td>
<td>Sessile oak</td>
<td>17.5</td>
<td>1052</td>
<td>N 6</td>
<td>E 5.5</td>
<td>S 9</td>
<td>W 9e</td>
<td>4</td>
<td>M</td>
<td>Fair</td>
<td>Fair (Unbalanced; pruned heavily in past; repeat due)</td>
</tr>
<tr>
<td>5</td>
<td>Black cherry plum</td>
<td>9</td>
<td>280</td>
<td>N 3</td>
<td>E 4</td>
<td>S 4</td>
<td>W 5</td>
<td>2</td>
<td>M</td>
<td>Good (but at risk from Chalara)</td>
<td>Poor (Included bark union; congested crown; large amounts of minor deadwood)</td>
</tr>
<tr>
<td>6</td>
<td>Lawson's cypress 'Golden Wonder'</td>
<td>4.5</td>
<td>157</td>
<td>N 1</td>
<td>E 1</td>
<td>S 1</td>
<td>W 1</td>
<td>2</td>
<td>M</td>
<td>Poor (suppressed)</td>
<td>Good</td>
</tr>
<tr>
<td>7</td>
<td>Cherry sp.</td>
<td>9</td>
<td>269</td>
<td>N 0</td>
<td>E 0</td>
<td>S 0</td>
<td>W 3</td>
<td>3</td>
<td>Dead</td>
<td>Fragile</td>
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<td>8</td>
<td>Blue Colorado spruce</td>
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<td>131</td>
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<td>E 4</td>
<td>S 4</td>
<td>W 3</td>
<td>2.5</td>
<td>M</td>
<td>Poor (suppressed)</td>
<td>Poor (hazard beam)</td>
</tr>
<tr>
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<td>Lawson's cypress 'Flecklewood'</td>
<td>14</td>
<td>456</td>
<td>N 4</td>
<td>E 4</td>
<td>S 3</td>
<td>W 3</td>
<td>2.5</td>
<td>M</td>
<td>Fair (fire damage)</td>
<td>Good</td>
</tr>
<tr>
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<td>Flowering cherry</td>
<td>11</td>
<td>357</td>
<td>N 4</td>
<td>E 4</td>
<td>S 4</td>
<td>W 5e</td>
<td>3</td>
<td>M</td>
<td>Fair (fire damage)</td>
<td>Fair (Deadwood)</td>
</tr>
<tr>
<td>T</td>
<td>Species</td>
<td>H</td>
<td>D</td>
<td>Spread</td>
<td>Clr</td>
<td>Age</td>
<td>P Cond</td>
<td>S Cond</td>
<td>Rec</td>
<td>ERC</td>
<td>Cat</td>
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</tr>
<tr>
<td>11</td>
<td>Hazel</td>
<td>4</td>
<td>MS</td>
<td></td>
<td></td>
<td></td>
<td>Fair (leaning)</td>
<td>Good</td>
<td>Re-coppice 40+</td>
<td>C2</td>
<td></td>
</tr>
<tr>
<td>12</td>
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<td>160</td>
<td></td>
<td></td>
<td></td>
<td>Poor (extensive fire damage)</td>
<td>Fair (Deadwood)</td>
<td>Fell</td>
<td>U</td>
<td></td>
</tr>
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<td>13</td>
<td>Hawthorn</td>
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<td>88</td>
<td></td>
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<td></td>
<td>Poor (extensive fire damage)</td>
<td>Fair (Deadwood)</td>
<td>Fell</td>
<td>U</td>
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<td>Holly</td>
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<td>130</td>
<td></td>
<td></td>
<td></td>
<td>Fair (Suppressed)</td>
<td>Fair (unbalanced)</td>
<td>Rebalance crown 20+</td>
<td>B2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Common ash</td>
<td>9</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td>Fair (extensive fire damage)</td>
<td>Poor (whip)</td>
<td>Fell</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Field maple</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lost to storm October 2015</td>
<td>See Appendix</td>
<td></td>
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</tr>
<tr>
<td>17</td>
<td>Flowering cherry</td>
<td>9</td>
<td>203</td>
<td></td>
<td></td>
<td></td>
<td>Poor (suppressed)</td>
<td>Poor (included bark union; unbalanced)</td>
<td>Fell</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Flowering cherry</td>
<td>11</td>
<td>408</td>
<td></td>
<td></td>
<td></td>
<td>Poor (sparse crown; spur blight; resin spots; large amounts of deadwood)</td>
<td>Poor (included bark union)</td>
<td>Fell</td>
<td>U</td>
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</tr>
<tr>
<td>19</td>
<td>Field maple</td>
<td>11</td>
<td>334</td>
<td></td>
<td></td>
<td></td>
<td>Fair (squirrel damage; sporadic minor deadwood)</td>
<td>Good</td>
<td>Reduce crown by 30%</td>
<td>20+</td>
<td>B2</td>
</tr>
<tr>
<td>20</td>
<td>Hornbeam</td>
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<td>111</td>
<td></td>
<td></td>
<td></td>
<td>Poor (suppressed)</td>
<td>Poor (overlong branches; unbalanced)</td>
<td>Fell</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Holly 'Silver Milkmaid'</td>
<td>6</td>
<td>93</td>
<td></td>
<td></td>
<td></td>
<td>Poor (suppressed)</td>
<td>Fair (leaning)</td>
<td>Maintain height 20+</td>
<td>B2</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Hawthorn</td>
<td>5</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td>Poor (suppressed; dieback)</td>
<td>Poor (poor stem form; deadwood)</td>
<td>Fell</td>
<td>U</td>
<td></td>
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<tr>
<td>23</td>
<td>Norway spruce</td>
<td>13</td>
<td>238</td>
<td></td>
<td></td>
<td></td>
<td>Good</td>
<td>Good</td>
<td>None</td>
<td>20+</td>
<td>B2</td>
</tr>
<tr>
<td>24</td>
<td>Holly 'Silver Milkmaid'</td>
<td>5</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
<td>Good</td>
<td>Fair (leaning)</td>
<td>None</td>
<td>20+</td>
<td>B2</td>
</tr>
<tr>
<td>T</td>
<td>Species</td>
<td>H</td>
<td>D</td>
<td>Spread</td>
<td>Ctr</td>
<td>Age</td>
<td>P Cond</td>
<td>S Cond</td>
<td>Rec</td>
<td>ERC</td>
<td>Cat</td>
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</tr>
<tr>
<td>25</td>
<td>Red Robin</td>
<td>5.5</td>
<td>159</td>
<td>N 2</td>
<td>E 5</td>
<td>2</td>
<td>M</td>
<td>Good</td>
<td>Poor (unbalanced)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S 2</td>
<td>W 1</td>
<td></td>
<td></td>
<td></td>
<td>Remove limb to E; S Cond</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Cider gum</td>
<td>15</td>
<td>487</td>
<td>N 4</td>
<td>E 4</td>
<td>4</td>
<td>M</td>
<td>Good</td>
<td>Fair (overlong limb to N; long limb to S)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S 6</td>
<td>W 4</td>
<td></td>
<td></td>
<td></td>
<td>Remove long limb to N; shorten limbs to E and S; reduce height by 2m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Hawthorn</td>
<td>3</td>
<td>93</td>
<td>W 0.5</td>
<td>E 1</td>
<td>1.5</td>
<td>EM</td>
<td>Fair (suppressed)</td>
<td>Good</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Holly 'Silver Milkmaid'</td>
<td>5</td>
<td>65</td>
<td>W 1.5</td>
<td>E 1.5</td>
<td>1</td>
<td>EM</td>
<td>Fair (suppressed)</td>
<td>Fair (crooked stem)</td>
<td>None</td>
<td>20+</td>
</tr>
<tr>
<td>29</td>
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<td>10</td>
<td>245</td>
<td>N 3</td>
<td>E 4</td>
<td>2</td>
<td>M</td>
<td>Good</td>
<td>Fair (unbalanced)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S 3</td>
<td>W 2</td>
<td></td>
<td></td>
<td></td>
<td>Reduce crown by 30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Hawthorn</td>
<td>4</td>
<td>115</td>
<td>W 0.5</td>
<td>E 1</td>
<td>0.5</td>
<td>EM</td>
<td>Fair (suppressed)</td>
<td>Fair</td>
<td>None</td>
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<tr>
<td>31</td>
<td>Flowering cherry</td>
<td>10</td>
<td>160</td>
<td>N 2</td>
<td>E 4</td>
<td>2.5</td>
<td>M</td>
<td>Fair (ivy)</td>
<td>Fair (unbalanced)</td>
<td>Rebalance crown</td>
<td>20+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S 2</td>
<td>W 2</td>
<td></td>
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<tr>
<td>32</td>
<td>Black Mulberry</td>
<td>3</td>
<td>100</td>
<td>N 1</td>
<td>E 1</td>
<td>2</td>
<td>M</td>
<td>Good</td>
<td>Fair (unbalanced)</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td>S 1.5</td>
<td>W 0.5</td>
<td></td>
<td></td>
<td></td>
<td>None</td>
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<td></td>
</tr>
<tr>
<td>33</td>
<td>Cultivated apple</td>
<td>3</td>
<td>138</td>
<td>N 1</td>
<td>E 0</td>
<td>1.5</td>
<td>M</td>
<td>Good (apple scab)</td>
<td>Good</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Cultivated apple</td>
<td>5</td>
<td>285</td>
<td>N 3</td>
<td>E 3</td>
<td>3</td>
<td>M</td>
<td>Good (apple scab)</td>
<td>Good</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S 3.5</td>
<td>W 3</td>
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<td>Cultivated apple</td>
<td>3</td>
<td>100</td>
<td>N 0</td>
<td>E 3</td>
<td>2</td>
<td>M</td>
<td>Good (apple scab)</td>
<td>Fair (long limb to E)</td>
<td>Shorten limb</td>
<td>40+</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>S 2</td>
<td>W 0</td>
<td></td>
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</tr>
<tr>
<td>36</td>
<td>Cultivated plum</td>
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<td>130</td>
<td>N 0.5</td>
<td>E 0.5</td>
<td>0.5</td>
<td>M</td>
<td>Good</td>
<td>Good</td>
<td>Thin regrowth</td>
<td>40+</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S 0.5</td>
<td>W 0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Fig</td>
<td>5</td>
<td>240</td>
<td>N 2</td>
<td>E 3</td>
<td>3</td>
<td>M</td>
<td>Good</td>
<td>Fair (long regrowth)</td>
<td>Shorten &amp; thin regrowth</td>
<td>40+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S 3</td>
<td>W 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Sweet cherry</td>
<td>6</td>
<td>385</td>
<td>N 3</td>
<td>E 4</td>
<td>1.5</td>
<td>M</td>
<td>Fair (few resin spots)</td>
<td>Fair (unbalanced)</td>
<td>Reduce crown by 30%</td>
<td>20+</td>
</tr>
<tr>
<td>T</td>
<td>Species</td>
<td>H</td>
<td>D</td>
<td>Spread</td>
<td>Clr</td>
<td>Age</td>
<td>P Cond</td>
<td>S Cond</td>
<td>Rec</td>
<td>ERC</td>
<td>Cat</td>
</tr>
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<td>----</td>
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<td>-----</td>
</tr>
<tr>
<td>39</td>
<td>Cherry laurel</td>
<td>5</td>
<td>MS</td>
<td>N 3</td>
<td></td>
<td>0.5 M</td>
<td>Good</td>
<td>Good</td>
<td>Trim</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Olive</td>
<td>6</td>
<td>140</td>
<td>N 2</td>
<td></td>
<td>1 M</td>
<td>Fair (aphid attack)</td>
<td>Good</td>
<td>Spray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Elder</td>
<td>6</td>
<td>130,79,149</td>
<td>N E 3</td>
<td>S 3</td>
<td>1.5 M</td>
<td>Good</td>
<td>Fair</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Common ash</td>
<td>12</td>
<td>395</td>
<td>N E 4</td>
<td>S 4</td>
<td>5 M</td>
<td>Fair (Localised dieback next to road; ivy; at risk from Chalara)</td>
<td>Unknown - ivy</td>
<td>Lift crown over road &lt;10</td>
<td>B2</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Hawthorn</td>
<td>5</td>
<td>ND</td>
<td>N 2</td>
<td></td>
<td>1.5 M</td>
<td>Good</td>
<td>Unknown - ivy</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Common ash</td>
<td>12</td>
<td>380</td>
<td>N E 3.5</td>
<td>S 5</td>
<td>5 M</td>
<td>Good; at risk from Chalara</td>
<td>Unknown - ivy</td>
<td>Lift crown over road &lt;10</td>
<td>B2</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Hawthorn</td>
<td>7</td>
<td>180</td>
<td>N S 2</td>
<td>W 3</td>
<td>3 M</td>
<td>Fair (ivy)</td>
<td>Unknown - ivy</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Common ash</td>
<td>14</td>
<td>425</td>
<td>N E 3</td>
<td>S 4</td>
<td>4 M</td>
<td>Fair (ivy; at risk from Chalara)</td>
<td>Unknown - ivy; deadwood over road</td>
<td>Remove deadwood &lt;10</td>
<td>B2</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Field maple</td>
<td>11</td>
<td>285,270e,3040e</td>
<td>N E 5</td>
<td>S 4.5</td>
<td>2.5 M</td>
<td>Fair (ivy)</td>
<td>Unknown - ivy</td>
<td>Lift crown over road 20+</td>
<td>A2</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Common ash</td>
<td>9</td>
<td>ND</td>
<td>N 2</td>
<td></td>
<td>3 M</td>
<td>Good - at risk from Chalara</td>
<td>Fair (overlong limb to SE)</td>
<td>Remove long limb &lt;10</td>
<td>B2</td>
<td></td>
</tr>
<tr>
<td>G1</td>
<td>Copper beech x10</td>
<td>9</td>
<td>c.85</td>
<td>N E 2</td>
<td>S 2.5</td>
<td>2.5 EM</td>
<td>Good</td>
<td>Fair (whip orm due to aerodynamic grouping)</td>
<td>Trim</td>
<td>40+</td>
<td>B2</td>
</tr>
<tr>
<td>G2</td>
<td>Bullace, elder, Cornus, hawthorn, ivy to 5m</td>
<td>N E S W</td>
<td>Understorey to T41-44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G3</td>
<td>Bullace x3</td>
<td>5</td>
<td>70,62,92</td>
<td>N 2</td>
<td></td>
<td>2 EM</td>
<td>Poor (fire damaged)</td>
<td>Poor (deadwood)</td>
<td>Fell</td>
<td></td>
<td>U</td>
</tr>
</tbody>
</table>
Key:
T: Tree reference number
H: Height in metres.
D: Trunk diameter at 1.5m above ground in mm. (Or diameter derivative where tree multi-stemmed).
Spread: Crown spread at four cardinal compass points in metres.
Clr: Crown clearance above ground in metres.
P Cond: Physiological condition.
S Cond: Structural condition.
ERC: Estimated remaining contribution in years.
Cat: BS5837:2012 Retention Category
4.0 Arboricultural Impact Assessment:

Assessment based on Proposed Site Plan 1 (DRG No. XXX) which has been overlaid on the Tree Survey Plan as follows:

Tree survey plan with proposed buildings at XXX.

Green: Category A trees; Blue – Category B trees; Red – Category C trees; Grey – Category U trees.

Labels show tree number, retention category, species and height in metres.

Proposed buildings are shown in light blue.
4.1: Trees to be removed.

- The following trees are of low quality, contribute little to the overall appearance of the property and are not relevant to preservation of the character of the Conservation Area. These trees are shown in red on the plan and should be removed: T2, 7, 8, 12, 13, 18 and 20.

- Retention of the following trees is considered incompatible with the building proposal: T11, 14, 19, 21, 33-39 and the first for west-most plants of G1.
  T19 is a Field maple (Acer campestre) and is a native species of relevance. The loss of this tree cannot be avoided under the current scheme but could be mitigated with replacement planting.

- Due to the large amount of proposed vegetation removal on a site with a clay soil, foundation design should take into account the possibility of soil movement caused by heave. Formal assessment of the likelihood, magnitude and duration of heave effects is beyond the scope of this report.

- Trees are to be removed by competent, trained and insured arboriculturists according to BS3998:2010. Stumps may be carefully ground out to avoid damage to the roots of nearby retained trees.

4.2: Trees to be retained.

- All other trees are to be retained.
Plan showing retained trees and proposed buildings at XXX.

Green: Category A trees; Blue – Category B trees.
Labels show tree number, retention category, species and height in metres.
Proposed buildings are shown in light blue.
4.3: Impact of retained trees - Tree Constraints Plan

Root protection areas (black circles); Crown spreads (green, blue, grey and red crosses);
Dashed blue lines represent estimated crown dimensions; dashed black circles represent estimated RPA’s).
For clarity G2 has been omitted.
Shade arcs shown in magenta.
A. Sessile oak T4
- Relevant properties of T4: large, wide-spreading deciduous tree. Foliage dense, can survive for several hundred years but 100-150 is common in urban settings. Roots relatively insensitive to construction pressures; root disturbance tolerated moderately well. However, advanced age of the tree creates greater uncertainty over likely response. Branch pruning well tolerated. Casts dense shade. Seasonal nuisance from leaves (gutters, slippery surfaces) and acorns (Johnson, 2004; Matheny & Clark, 1998).
- T4 is 17.5m tall against a maximum height of 38m (NHBC 4.2 cites 20m max height). Crown clearance of 4m is sufficient for construction. Potential for direct damage from branches low (if pruned); from structural roots – low.
- Risk of indirect damage caused by moisture abstraction is unknown as this is dependent on soil Plasticity Index but is likely to be significant.
- RPA of 499m² can be envisaged as a circle of 13.5m radius centred on T4 minus the area currently occupied by the house. This treatment allows for root distortion caused by the existing building.
- The relocated garage of XXX and the proposed new garage lie within the RPA of T4 under the proposed scheme. Allowing for construction space an encroachment of 39m² (7.8%) on to the rooting area is indicated. The permanent encroachment conferred by the buildings is 3.4% and within acceptable limits.

B. Lawson’s cypress T9
- Relevant properties of T9: densely columnar evergreen tree. Foliage very dense, survives for around 200 years but 100-120 is common in urban settings. Roots of Chamaecyparis sp. are relatively insensitive to construction pressures; root disturbance well tolerated. Branch pruning very well tolerated provided either whole limbs removed or trimmed so as to leave green foliage in place. Casts deep shade (Johnson, 2004; Matheny & Clark, 1998).
- T9 is 14m tall against a maximum height of 42m (NHBC 4.2 cites 18m max height); up to 24m is common in urban settings. Crown clearance of 2.5m is sufficient for construction given the tree’s location. Potential for direct damage from branches low; from structural roots – low.
- Risk of indirect damage caused by moisture abstraction on a clay soil – moderate.
- RPA of 92m² envisaged as a circle of 5.4m radius centred on T9.
- Based on the current drawings, the proposed construction does not encroach on the RPA of T9. However, the RPA should be protected from soil compaction or other construction damage.

C. Cherry plum T5 & cherry T10
- Trees are 9 & 11m tall against a maximum height of 15-18m (NHBC 4.2 cites 9-12m max height). Crown clearances of 2 & 3m are sufficient for construction given their location. Potential for direct damage from branches low; from structural roots – moderate.
• Risk of indirect damage caused by moisture abstraction on a clay soil – moderate.
• RPA of 34 and 55m² envisaged as circles of 3.3 and 4.2m radius centred on T5 & 10, respectively.
• Based on the current drawings, the proposed construction does not encroach on the RPA of either tree. However, the RPA should be protected from soil compaction or other construction damage.

D. Spruce T23
• Relevant properties of T23: large and vigorous coniferous tree. Foliage dense, survives for around 120 years but 80 is common in urban settings. Roots of Abies sp. are relatively tolerant of construction pressures; root pruning well tolerated. Branch removal relatively well tolerated but branch shortening not favoured. Casts deep shade (Johnson, 2004; Matheny & Clark, 1998).
• Tree is 13m tall against a maximum height of 58m (NHBC 4.2 cites a maximum height of 18m for this species). Crown clearance of 3m is insufficient for construction. Potential for direct damage from branches low; from structural roots – low.
• Risk of indirect damage caused by moisture abstraction on a clay soil - moderate.
• RPA of 23m² envisaged as circle of 2.7m radius.
• Based on the current drawings, the proposed construction does not encroach on the RPA. However, the RPA should be protected from soil compaction or other construction damage.

E. Red Robin T25
• Relevant properties of T25: evergreen shrub. Foliage light, survives for around 30 years. Roots of Photinia fraseri are considered to tolerate urban conditions well. Casts light shade.
• Shrub is 5.5m tall against a maximum height of 10m (NHBC 4.2 does not cite a maximum height for this species). Crown clearance of 2m is insufficient for construction. Potential for direct damage from branches low; from structural roots – low.
• Risk of indirect damage caused by moisture abstraction on a clay soil - low.
• RPA of 10m² envisaged as circle of 1.8m radius.
• Based on the current drawings, the proposed construction does not encroach on the RPA. However, the RPA should be protected from soil compaction or other construction damage.
• Access facilitation pruning required.

F. Cider gum T26
• Relevant properties of T26: large and vigorous evergreen tree. Foliage light, survives for around 120 years but 80 is common in urban settings. Roots of Eucalyptus sp. are moderately tolerant of construction pressures; root disturbance moderately tolerated. Branch pruning very well tolerated. Casts light shade (Johnson, 2004; Matheny & Clark, 1998).
• Tree is 15m tall against a maximum height of 38m (NHBC 4.2 cites a maximum height of 18m for this species). Crown clearance of 4m is insufficient for construction. Potential for direct damage from branches moderate; from structural roots – high.
• Risk of indirect damage caused by moisture abstraction on a clay soil - high.
• RPA of 113m² envisaged as circle of 6m radius.
• Based on the current drawings, the proposed building would encroach onto the RPA by 19% which is within acceptable limits. However, this also coincides with roots vital to the stabilisation of this asymmetrical tree. The RPA should therefore be protected from soil compaction, trenching or other construction damage.

• Large-scale access facilitation pruning will be required.

4.4: Design constraints.

1. Garage location: proposed permanent 3.4% encroachment into RPA of T4 is acceptable.

2. Foundations: Vegetation-related soil volume changes are a foreseeable risk under the current proposal. Concrete strip footings may not withstand the expected loadings and sleeved micro-piles should be used. Furthermore, the excavation required for strip footings would destabilise T26 making pile & beam construction necessary. The piling rig must stand outside RPAs.

3. The design should incorporate adequate sources of natural light to offset the dense shade created by retained trees.

4. The close proximity of the trees is likely to promote damp conditions. The use of building materials and coatings that retard algal growth is desirable.

5. Services should be laid in a single common trench where possible, positioned radially with respect to trees to minimise root damage; soakaways etc. to be positioned outside RPAs.

6. Significant interference with broadcast satellite and TV signals can be expected; connection to digital services via cable are therefore recommended.

7. Vehicle transits over unprotected RPAs not permitted. Load-spreading boards suitable for the loads expected are to be used.

8. Driveway does not encroach onto RPAs and may be of any suitable construction.

9. Hard landscaping within RPAs should be avoided as far as possible. Where absolutely necessary, such surfaces should be minimised and in any event result in less than 20% encroachment to trees in general, and less than 10% of the RPA of T4. The depth of shade is likely to promote the formation of slippery surfaces therefore non-slip surfaces should be used.

10. Further new tree planting is not recommended since it is unlikely that new plants would thrive under the existing tree canopy.

11. Tree protection barriers and ground protection to be used to protect RPAs as per BS5837:2012.

12. Gutter leaf guards are essential.

4.5: Post-construction mitigation.

• Trees have been identified for removal based on poor form, safety, health and future prognosis. Most trees are of low amenity value, of non-native species and of little relevance to preservation of the character of the Conservation Area. Replacement of these trees is not considered appropriate and is unlikely to succeed given the shade created by the existing canopy.
• Loss of Field maple T19 is regrettable but it could be replaced with one 14-16cm girth semi-mature container-grown plant conforming to BS3936-1:1992. Planting to take place between April and September and is to conform to the general requirements of BS4043:1989. Plant to be sited in a purpose-made planting pit back-filled with a 50:50 mixture of top-soil and compost, supplemented with mycorrhizae spores, fitted with an irrigation hose and covered with a 30mm depth of composted woodchip mulch. Plant to be staked and tied with two 50mm diameter pressure-treated stakes.

• English oak T4 and Cider Gum T26 will be monitored every three months for one full annual cycle. The appearance of symptoms consistent with root-related physiological stress will trigger the use of site remediation strategies to include (but not limited to): compressed gas soil decompaction, installation of an irrigation system, soil fertilisation, application of mulch.

4.6: Impact on Conservation Area.

• The Conservation Area appraisal produced by BEAMS (2009) makes the following observations relating to trees on the site:
  ▪ ‘The green and hedged, tree-lined road, XXX Lane’ is a ‘principal feature’ of the Conservation Area.
  ▪ ‘The XXX Conservation Area has retained a strong rural character’.
  ▪ Tree T47 is a ‘Significant Tree’.
  ▪ XXX Lane at the point where XXX Road backs on to it is considered a ‘significant view or vista’.
  ▪ ‘Hedge boundaries should be retained…’

• As the following images show (see next page), trees T41-47 and G2 produce a dense screen between XXX Lane and the property.

• With the sole exception of T26 (Cider gum), none of the trees to be removed are visible from XXX Lane.

• None of the trees that comprise the ancient boundary and which are visible from XXX Lane will be affected by the current proposal.

• The significant tree, T47, and the view down XXX Lane are unaffected by this proposal.
5.0 Tree Protection

5.1 Tree Protection Plan.

Solid red line – course of tree protection barrier.

Shaded area between barrier and buildings – area to be protected by ground protection boards.

Area to east, south and west of barrier to be a Construction Exclusion Zone.
5.2: Tree Protection Barriers

- Protection barriers MUST be erected BEFORE any other work commences on site.
- Barriers are to be situated along lines shown on the attached Tree Protection Plan and installed under the supervision of the project arboriculturist. This allows for a 1.5m working space between the barrier and the outer wall of the building.
- Once installed, the barriers MUST NOT be moved.
- Since the barriers extend well inside the RPA and there is a risk of root damage from the default standard of fence construction, the barriers should be constructed according to BS5837:2012, as illustrated in Appendix 2 and as described in Clause 6.2.2.3 as follows:
  ‘...2m tall welded mesh panels on rubber or concrete feet...The fence panels should be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The distance between fence couplers should be at least 1m and should be uniform throughout the fence. The panels should be supported on the inner side by stabiliser struts... the stabiliser struts should be mounted on block trays.’
- All-weather notices should be attached to the barrier with words such as ‘CONSTRUCTION EXCLUSION ZONE – NO ACCESS’.
- Barriers are to remain in place along this line for the duration of the construction phase.

5.3: Ground Protection

- The ground area enclosed by the Tree Protection Barrier is to be regarded as a Construction Exclusion Zone (CEZ), in other words, it is a NO-GO zone.
- Construction personnel, tools, machinery, materials or other items MUST NOT enter the CEZ for ANY reason.
- Additional ground protection is required as follows:
  1. Extending from the barrier fence in a 1.5m wide strip to the walls of - and between the footprints of - the new buildings sufficient to cover the entire area of encroachment into the RPAs of T4 and T26. A protection system suitable for pedestrian use only and consisting of a single thickness of scaffold boards on top of a 100mm layer of woodchip laid over a geotextile membrane MUST be installed. Protection is to remain in place for the duration of the construction phase.
6.0 References


Built Environment Advisory & Management Service (BEAMS; 2009). XXX


LandIS (Land information system; Soilscape viewer). Cranfield University. http://www.landis.org.uk/soilscape2/


7.0 Appendices

Appendix 1 - Ash dieback disease.
In 2012, the first cases of ash dieback disease in the UK were discovered. The disease is caused by the fungus Chalara fraxinea and has crossed to the UK from continental Europe by natural means and also by introduction of infected nursery stock. The disease is progressive and results in the death of young trees within 1 year, and of older mature trees in 3-5 years. Although ash is a genetically diverse tree species, around 90% of all trees are believed to be susceptible. The rate of westward spread across the UK is unknown but by extrapolation of experiences in Europe, widespread tree loss can be expected within 10 years. Retention and protection of ash trees affected by this development is therefore considered to be of no long term value.
Further information is available on the Forestry Commission website at: http://www.forestry.gov.uk/chalara

Appendix 2 - Tree Protection Barrier construction

Figure 3 Examples of above-ground stabilizing systems

a) Stabilizer strut with base plate secured with ground pins

b) Stabilizer strut mounted on block tray