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**TREE SURVEY & CONDITION AND MANAGEMENT REPORT**

**OUR REF:** JM/150364R/sh Rev A

**YOUR REF:** N/A

**DATE:** Wednesday 29th July 2015

(Rev A 6th November 2015)

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**CLIENT:** Goodenough College,

**SITE ADDRESSES:**  Mecklenburgh Square,

London,

WC1N 2AB

**TIME & DATE OF VISIT:** AM and PM Monday 13th July 2015

**PEOPLE PRESENT:** Mr. Jason Mills – Bartlett Consulting

**REPORT COMPLETED BY:** Mr. Jason Mills – Bartlett Consulting

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**Summary:**

In reading and understanding the contents of this report, it should be remembered that no tree can be deemed risk free. As with all things in the natural environment, they are subject to unpredictable forces such as extreme weather, effects of disease, and man’s influence upon them. We investigate every obvious and available facet of the structure of the tree and its surroundings, in reaching a conclusion as to a level of risk.

Where applicable, these conclusions and recommendations seek to reduce the risk to a level as low as reasonably practical, given the location of the tree and the perception of its value to the environment, the site’s use, and the owner’s acceptance of the level of risk.

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# 1.0 SCOPE OF REPORT

## 1.1 Survey Brief

To inspect the trees under the ownership and responsibility of Goodenough College, within the grounds of Mecklenburgh Square, London, WC1N 2AB, assess their condition, describe their features and make suitable management recommendations, in accordance with current Arboricultural best practice and tree health care techniques.

The tree survey was conducted in accordance with the guiding principles of a Level 2\* ground level inspection (please see page 3).

In addition, this report includes a brief summary of the findings of the climbing inspections to check for presence of Massaria disease and the removal of affected branches, conducted by Bartlett Tree Experts, (London Local Office) between the 6th and 18th July 2015.

## 1.2 Background

The owners of the site wish to ensure a greater level of understanding of the tree stock, its condition and what risks (if any) it poses and have instructed Bartlett Consulting to conduct a tree survey and report.

## 1.3 Report References

As a progressive company, we keep abreast of research data relating to arboriculture. All observations, recommendations and works are based on current industry standard reference material and extensive FA Bartlett research findings derived from the company’s own facilities at the University of Reading in England, as well as in Charlotte, North Carolina, in the USA. A selection of pertinent items is shown in Appendix 2.

Tree survey methodologies and references applied by Bartlett Consulting for this project include:

• Smiley, T, Fraedrich, B & Hendrickson, N. (2011) *Tree Risk Management*.

Bartlett Tree Research Laboratories. Charlotte, NC.

• Dunstar, J.A, Smiley. T, Matheny. N, Lilly. S. (2013) *Tree Risk Assessment Manual*.

International Society of Arboriculture. Champaign, IL.

• Lonsdale, D. (1999) *The Principles of Tree Hazard Assessment & Management (Research for Amenity Trees)*

Department of the Environment. London.

• Schwarze, F. W. M. R, Engels. J, Mattheck. C. (2000) *Fungal Strategies of Wood Decay in Trees.*

Springer-Verlag. Berlin. Heidelberg. New York.

• Schwarze, F. W. M. R. (2008) *Diagnosis & Prognosis of the Development of Wood Decay in Urban Trees.*

ENSPEC. Pennsylvania State University. State College, PA.

• Shigo, A. (1991) *Modern Arboriculture*. Shigo & Trees Associates. Durham, NH.

**1.0 SCOPE OF REPORT (continued….)**

## 1.4 Report Methodology and Limitations

This report is restricted to those trees shown on the attached Tree Location Plan(s) and described in the tree survey schedule. The statements, findings and recommendations made within the report do not take into account any effects of extreme climate and weather incidences, vandalism, changes in the natural and built environment around the trees after the date of this report nor any damage whether physical, chemical or otherwise.

Bartlett Consulting cannot accept any liability in connection with the above factors nor where recommended tree management is not carried out in accordance with modern tree health care techniques, within the timelines proposed.

The trees were not climbed at the time of the ground level tree survey. 17 No. mature London Plane trees were, however, climbed by Bartlett Tree Experts in order to inspect the aerial branches for presence of Massaria disease. Where this was observed, affected branches were removed and a note of the tree made.

All tree information and data during the ground level survey was captured using Pear Technology tree management software; the trees were plotted using GPS on an Ordnance Survey base map, using a Trimble hand-held computer. This combination of technology has resulted in the production of the Tree Location Plan(s) found at the end of this report. The tree dimensions are accurate as captured on the day.

It is important to understand that as trees are living and dynamic organisms, it is not possible to maintain them totally free of risk. Some level of risk must be accepted in order to experience the full range of benefits that trees provide. As such, we reference the recently published document by the National Tree Safety Group (NTSG): Common Sense Risk Management of trees (Forestry Commission 2011). This document provides guidance on trees and public safety in the UK for owners, managers and advisors.

**Note: \* Levels of Tree Assessment**

**Level 1 Limited Visual Assessment:** A visual assessment of an individual tree or a population of trees near a specified target, conducted from a specific perspective, in order to identify certain obvious defects or specified conditions. Observations are made from ground level and the tree is not climbed.

**Level 2 Basic Assessment:** A detailed visual inspection and assessment of a tree and the surrounding site. The basic assessment requires the tree risk assessor to walk completely around the tree. Tree dimensions are recorded using hand tools such as a diameter tape, laser range finder and a measuring tape. Further information is gathered using a “sounding hammer”, binoculars and other tools, such as a depth probe.

**Level 3 Advanced Assessment:** An advanced assessment is performed to provide detailed information about specific tree parts, defects, targets or site conditions. Methods of advanced assessment can include climbing inspections, decay detection, root excavations, lean monitoring and pull tests.

# 

# 2.0 TREE PRESERVATION ORDER & CONSERVATION AREA PROTECTION STATUS

Town & Country Planning Act (Tree Preservation) (England) Regulations 2012 and the Town & Country Planning Act 1990 (as amended) provide legislative protection for trees within England.

## 2.1 Tree Preservation Order Status

We had not received confirmation of TPO status at the site from the Local Planning Authority (LPA) at the time of writing this report and will forward our findings via email once received.

## 2.2 Conservation Area Status

It has been established via the Interactive map on the Camden Council website that the site does stand within a designated Conservation Area (CA), administered by the LPA; Camden Council. The CA is named: Bloomsbury.

## 2.3 Tree Management Implications

Conservation Area status affects all trees of a stem diameter greater than 75mm, when measured at 1.5m above ground level. Therefore trees will be protected by virtue of their location in the designated CA.

Under the Town and Country Planning (Tree Preservation) (England) Regulations 2012, a Section 211 Notice must be served upon the LPA, providing them with 6 weeks’ notice of any intention to implement works to protected trees.

The purpose of this notice is to provide the LPA an opportunity to consider whether a TPO should be made in respect of the trees.

# 3.0 GENERAL SITE DETAILS

## 3.1 Weather Conditions at Time of Survey

The weather during the survey on the 13th July 2015 was bright, clear and dry.

## 3.2 Site Location

Mecklenburgh Square is a private area located in central London, which is bordered by public footways and carriageways to the north, east and south and Coram’s Fields, a large playground and park, to the west.

## 3.3 Local Landscape Evaluation

The dominant tree species located within the Square is London Plane. These mature trees are found growing close to the boundaries among shrub beds and as a group at the centre of the site (barbecue area). The site also contains a diverse range of deciduous and evergreen species including Common Lime, Tulip tree, False Acacia, Holly, Pride of India and Ornamental Cherry, as well as a collection of exotic trees predominantly endemic to New Zealand.

**3.0 GENERAL SITE DETAILS (continued…)**

Collectively the trees provide highly valuable greenspace in the locality and are important components of the character of a typical London public square, forming an integral part of the wider London canopy cover.



Figure 1: Image of the central barbecue area within the square, with the group of four mature London Plane trees.

## 3.4 Underlying Soils

(Ref: British Geological Survey materials © NERC [2015] – Website data as of 24/07/2015)

Using the British Geological Survey’s “Geology of Britain” viewer ([www.bgs.ac.uk](http://www.bgs.ac.uk)) it has been determined that the underlying geology is:

● London Clay – Clay and Silt.

## 3.5 Grounds

Mecklenburgh Square is a private open space predominantly laid to lawn with perimeter shrub beds containing young through to mature trees and planted individual and small, tree groups scattered throughout the grounds. There is a tennis court located within the northern end of the site and a communal barbecue area at the approximate centre. The main entrance into the square is from the east, which links into the perimeter pathway situated between the lawns and the shrub beds.

## 3.6 Slopes

The site is predominantly level.

**3.0 GENERAL SITE DETAILS (continued…)**

## 3.7 Assessment of Ecological Status & Potential Constraints

Following the site visit and tree survey, we believe that there is a moderate potential for wildlife across the site. This would include nesting birds in any of the trees, as well as smaller mammals.

The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000, provides statutory protection to birds, bats, insects and other species that inhabit trees, hedgerows or other associated vegetation.

These could impose significant constraints on the use, management and development of these areas, as well as the timing of tree works. The finer points of these matters are beyond Bartlett Consulting’s area of expertise and you must seek advice from an ecologist to confirm the opinion of Bartlett Consulting and check if any such constraints apply to this site.

Trees must be thoroughly and properly assessed for nesting birds, prior to the commencement of tree works.

# 

# 4.0 FUNGAL, DISEASE, OR INSECT PATHOGEN

|  |  |
| --- | --- |
| **Artist Pallet Fungus (*Ganoderma australe*.)**  An old fungal fruiting body, suspected to be Artist Pallet Fungus (*Ganoderma australe*) was found attached to a wound on the main stem of Ornamental Cherry tree T482 at 2.0 metres; similar fruiting bodies were observed attached to the base of the tree.  This fungus is commonly found close to ground level but can also extend several metres up the main stem and can be found in major limbs. It is reported to predominantly cause butt and root rot on many deciduous trees.  The fungus is classified as causing white rot and can selectively degrade the lignin in wood but it can also cause simultaneous rot, during which both lignin and cellulose are broken down together. When extensively decayed, this can lead to a brittle or ductile fracture that mainly occurs in the stem of host trees. | C:\Users\jmills\Documents\Photos\Photo dump 23.07.15\IMG_1245.JPG  Figure 2, The fungal bracket attached to T482 |
| ***Ganoderma applanatum***  A large active fungal fruiting body, suspected to be *Ganoderma applanatum* was found attached to the base of the mature London Plane tree T497.  *Ganoderma applanatum* has a similar pattern of decay formation as that described above but is reported to be mainly confined to already damaged wood. | C:\Users\jmills\Documents\Photos\Photo dump 23.07.15\IMG_1254.JPG  Figure 3, The fungal bracket attached to the base of T497 |

|  |  |
| --- | --- |
| **Shaggy Polypore *(Inonotus hispidus)***  Desiccated fungal fruiting bodies suspected to be Shaggy Polypore *(Inonotus hispidus)* were found attached to London Plane trees T490 and T500.  This fungus develops an annual orangey-brown fleshy bracket, when fresh quickly degrading as it reaches maturity to become a black spongy bracket, which sometimes remain attached before falling to ground.  The fungal fruiting body appears annually, usually forming in summer or early autumn. The type of decay is classed as a simultaneous ‘white rot’ attacking both cellulous and lignin at a similar rate.  The pathogen enters the tree through wounds on the branches or the main stem and decomposes the heartwood. It can cause bark death and the timber to become brittle. This can lead to fractures of the affected branches and stems.  Green. T & Watson. G. (2011)  *Fungi on Trees - An Arborists Field Guide*. Arboricultural Association, Stonehouse. | Figure 4, An example of a bracket of the decay fungus Inonotus hispidus |
| ***Massaria disease (Splanchnonema platini)***  Whilst this disease, which causes lesions on branches and can cause branch drop, was not observed during the ground level survey, all of the large mature London Planes were climbed in July 2015 to check each for the presence of Massaria disease (‘Massaria’). It was established that five London Plane trees, T489, T492, T494, T495 and T497 had branches affected by the disease.  The fungus affects London Plane, to which it is thought to be host-specific. The disease is initially confined to the strip running along the top of the affected branch and therefore not usually visible from ground level. Both large and small branches can be affected, which are commonly found in shaded locations within the lower and mid crown zones of the tree.  The affected sapwood strip is subsequently decayed, it is thought possibly by a secondary fungus and branches can be shed shortly following the on-set of the disease.  Drought conditions are thought to render trees more susceptible to the effects of the disease.  Ref: Watson. G. (2013)  *Tree pests and diseases- Arborists Field Guide*. Arboricultural Association, Stonehouse.  And Forest Research website. | |

# 5.0 RECOMMENDATIONS

The individual tree work recommendations have been assigned a time-scale based on their priority; this will allow for effective budgeting and planning over the next three years.

Recommendations for tree works and their respective timescales are included in section 8.0, the Tree Schedule and at 5.1 below.

In addition to the tree work recommendations given for individual trees, consideration is recommended for management of the site to improve groundwater availability for the use of the mature London Plane trees.

Appropriate management techniques are included in section 9.0.

## 5.1 Tree Management recommended within 6 months

The following list is an extract from the main tree schedule (Section 8.0), which gathers together the most urgent recommendations, whether that is re-inspection, tree works, tree removal or soil treatments. The specifications included below should be prioritized first within the recommended timescales.

| **Tree No.** | **Species** | **Works Required** | **Time Scale** |
| --- | --- | --- | --- |
| T455 | Ehretia dicksonii | * Root collar excavation and de-compaction of soils at base, minimum radius of 1.5 metres from main stem. * Install woodchip mulch ring. * Take soil samples and test for nutrient levels – Treat accordingly to optimize soil conditions for tree to thrive. | Within 6 Months |
| T479 | Almond | * Tighten planting ties. | Within 3 Months |
| T488 | London Plane | * Conduct non-invasive Picus test at 3.5 metres and close to base to establish extent of underlying decay * On-going Massaria climbing inspections. | Within 6 Months  Within 6 Months |
| T489 | London Plane | * Sever girdling roots <25mm dia. * Root collar excavation and de-compaction of soils at base, minimum radius of 2.0 metres from main stem. * Install woodchip mulch ring. * Take soil samples and test for nutrient levels – Treat accordingly to optimize soil conditions for tree to thrive. * On-going Massaria climbing inspections. | Within 6 Months  Within 6 Months |
| T490 | London Plane | * Climbing inspection with Resistograph test to establish structural integrity in zone of cavities at approximately 18 metres. * On-going Massaria climbing inspections. | Within 6 Months  Within 6 Months |
| T491 | London Plane | * On-going Massaria climbing inspections. | Within 6 Months |
| T492 | London Plane | * Reduce lateral spread of crown to south-west and west by approximately 2 metres to reduce weight. * At the same time conduct climbing inspection and Resistograph test at 15 metres in zone of woodpecker hole to establish structural integrity and inspect the cable bracing at 17 metres. * On-going Massaria climbing inspections. | Within 6 Months |
| T494 | London Plane | * Install cobra bracing at approximately 18 metres to the co-dominant to north with the two co-dominants to west and south. * On-going Massaria climbing inspections. | Within 6 Months  Within 6 Months |
| T495 | London Plane | * On-going Massaria climbing inspections. | Within 6 Months |
| T496 | London Plane | * On-going Massaria climbing inspections. | Within 6 Months |
| T497 | London Plane | * Conduct non-invasive Picus test to establish extent of decay at base of main stem. * On-going Massaria climbing inspections. | Within 1 month  Within 6 months |
| T498 | London Plane | * Climbing inspection with Resistograph test to establish structural integrity in zone of wounds and cavities at approximately at 7.0 and at 9.0 metres. * On-going Massaria climbing inspections. | Within 6 Months  Within 6 months |
| T499 | London Plane | * Climbing inspection with Resistograph test to establish structural integrity in zone of woodpecker hole at approximately at 13.0 metres. * On-going Massaria climbing inspections. | Within 6 Months  Within 6 months |
| T500 | London Plane | * On-going Massaria climbing inspections. | Within 6 Months |
| T501 | London Plane | * On-going Massaria climbing inspections | Within 6 Months |
| T502 | London Plane | * Sever ivy at base and remove as high as possible to enable inspection of main stem. * Remove lateral at 20 metres with cavity on west side of crown. * On-going Massaria climbing inspections * Climbing inspection of woodpecker hole at 9 metres on south side of eastern co-dominant. | Within 1 month  Within 6 Months  Within 6 Months  Within 6 Months |
| T503 | London Plane | * Reduce crown above eastern co-dominant by approximately 2 metres, to reduce lever arm and weight. * On-going Massaria climbing inspections | Within 6 Months  Within 6 months |
| T504 | London Plane | * On-going Massaria climbing inspections | Within 6 Months |
| T505 | London Plane | * On-going Massaria climbing inspections | Within 6 Months |

**5.0 RECOMMENDATIONS (continued…)**

## 5.2 Pruning Specifications

For reference of Goodenough College, a description of the various pruning specifications has been provided below. These specifications will also be useful when gathering quotes for the recommended tree works.

**Crown Raising:** Will be carried out in accordance with Section 7.6 of British Standard 3998:2010 so to achieve a final clearance in height above ground level, as detailed in the tables below. Branch removal will be in accordance with Figure 3 of the British Standard and carried out by removing primary branches in the first instance and the secondary branches second instance, unless otherwise specified.

**Crown Reduction:** Will be carried out in accordance with Section 7.7 of BS3998:2010 by reducing the height and/or lateral branch spread, as detailed in the tables below. Pruning cuts will be made by using the selective pruning and ‘drop-crotch’ methodologies, as described in Section 7.7 and 7.8 of the British Standard and as per Figure 4 of the Standard.

**Selective Pruning:** Will be carried out in accordance with Section 7.7 and 7.8 of BS3998:2010 by shortening specified branching to achieve a desired distance of clearance or crown height and/or lateral spread when undertaking the reduction works listed above. The amount of material to be removed and the diameters of the pruning cuts will be the minimum required for the purpose.

**Crown Cleaning**: The removal of deadwood (of all sizes) throughout the tree crown: broken and hanging branches to be removed and safely excised from the crown; stubs and ripped branches to be removed back to the branch bark collar or reduced back to substantial lateral growth; branches exhibiting any disease; branches with structural weakness such as vertical or horizontal cracking.

**Formative Pruning:** The removal of crossing and rubbing branches to prevent further damage; the removal of secondary branches with vertical growth; the removal of branches growing internally; a reduction in length of branches with included branch unions; a reduction back to lateral growth of branches competing for apical dominance; the removal of selective branches to improve and increase branch spacing. This does not include major crown reduction and reshaping works.

**Re-Pollarding**: The removal of epicormic regrowth back to the bole of the tree.

**Coppicing:** Work should be carried out to industry standards and best practice, using guides and books on the subject produced by English Nature, Forestry Commission and individual authors such as *Coppiced Woodlands* by Fuller & Warren and *Ecology and Management of Coppice Woodland* by G.P. Buckley.

When **re-coppicing**, all the live growth will be removed from the trees, retaining small stumps approximately 150 millimetres in height and no more, above ground level or the coppice stool.

When **coppicing trees for the first time**, if the tree is of a species likely to re-sprout profusely and vigorously, the tree can be removed to ground level, such as a Sycamore tree. Other species may need a stump to be retained to help encourage regrowth.

**Pruning Cuts:** All cuts will be made to significant lateral growth, and not back to a bud so that only a stubbed branch end remains – in accordance with Figure 02 of British Standard 3998:2010.

**5.0 RECOMMENDATIONS (continued…)**

All of the above works are in accordance with good tree management, current arboricultural practice and tree health care. The pruning works will not be of detriment to the health or condition of the trees, nor will the works be of detriment to the public amenity and landscape.

The tree works are either to reduce risk and remove hazards to buildings and persons within the target zone or to improve tree health and structural condition, for long-term benefit.

\*\* All trees will require re-assessment within three years, unless specified otherwise within the schedule\*\*

# 6.0 RISK ASSESSMENT

Bartlett Consulting uses the International Society of Arboriculture’s (ISA) Tree Risk Assessment methodology, referred to as TRAQ.  This is a ‘qualitative’ system, which uses a matrix-based combination of ratings to reach a conclusion of associated risk.  The standard Bartlett Consulting time-line within the TRAQ is three (03) years, unless otherwise stated in the report.

Risk is the combination of the ‘likelihood’ of an event; in this case the failure or a tree or part of a tree and the severity of the potential consequences.  A hazard is the likely source of harm.  The two tables below define both the likelihood and risk levels as per the TRAQ system.

Trees which have not been subject to the Level 2 assessment were not risk rated.

**Table 02:  Likelihood of Failure**

|  |  |
| --- | --- |
| **Classification** | **Description of Likelihood** (As per Dunster, Smiley, Matheny, Lilly 2013) |
| Improbable | Failure is not likely during Norm weather conditions, and may not fail during severe weather conditions, within the specified time frame. |
| Possible | Failure could occur, but is unlikely, during Norm weather conditions with the specified time frame. |
| Probable | Failure may be expected under Norm weather conditions within the specified time frame. |
| Imminent | Failure has started, or is most likely to occur in the near future, even if there is no significant wind, weather, or increased load. |

**Table 03:    Risk Rating**

|  |  |
| --- | --- |
| **Risk Level** | **Description of Risk** (As per Dunster, Smiley, Matheny, Lilly 2013) |
| Extreme Risk | Failure is imminent, with a high likelihood of impact on people and/or property with severe consequences. |
| High Risk | Failure likely to very likely with significant consequences; or failure likely with severe consequences – to impact on people and/or property. |
| Moderate Risk | Failure likely to very likely with minor consequences; or failure somewhat likely with significant to severe consequences – to impact on people and/or property. |
| Low Risk | Failure unlikely with negligible consequences; or failure somewhat likely with minor consequences – to impact on people and/or property. |

**6.0 RISK ASSESSMENT(continued…)**

**NOTE: Customer Must Make Tree Workers Aware of this Statement**

**CAUTION:** Trees with structurally weak root systems, main stems or branches may not have sufficient structural strength to withstand dismantling works. The weight of people climbing the tree or using the tree branches as load carrying points may increase the load to the point of tree or branch failure. Persons engaged on such works must undertake a thorough risk assessment of the structure of the tree before finalising a working method. Alternative work methods to consider may include the use of crane or mobile elevated platform.

# 7.0 PREVIOUS CLIMBING INSPECTION FOR MASSARIA

The climbing inspections of the 17 No. mature London Plane trees contained within the square established that trees T481, T492, T494, T495 and T497 had branches with symptoms of colonisation by the Massaria disease. The affected branches were removed at the time of the inspections in July 2015.

|  |
| --- |
| 8.0 TREE SURVEY & CONDITION AND MANAGEMENT SCHEDULE |
| ***Client:*** Goodenough College ***Report No:*** JM/150364R/sh |
| ***Completed by:*** Jason Mills |
| ***Trees Tagged:*** Yes ***Weather:*** Bright, clear and dry |
| ***Site:*** Mecklenburgh Square, London, WC1N 2AB ***Date of Survey:*** 13th July 2015 |

**Timescale for Works**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| ASAP – 6 months | 1 Year | 2 Years | 3 Years |

| **Tree No.** | **Location** | **Species** | **DBH (mm)** | **Ht (m)** | **Crown**  **Spread**  **(m)** | **Age** | **Vig.** | **Condition** | **Works Required** | **Time Scale** | **Risk Factor** | **Remaining life expectancy**  **(years)** | **Re-Survey** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| T452 | Western boundary | Himalayan White Birch | 35 | 4.5 | 1.5 | NP | Norm | * Good structural condition and form | * No works presently required | N/A | Low | 40+ | 3 years |
| T453 | Adjacent gardeners shed | Red Oak | 270 | 11 | 5 | SM | Norm | * Good structural condition and form. * Historically raised, wounds are occluding. | * No works presently required | N/A | Low | 40+ | 3 years |
| TG454 | Southern boundary | 3 No. Mallow trees | 90 | 4 | 1.5 | Y | Norm | * Tagged tree is in good structural and physiological condition. * One tree dead, one tree is in fair condition. | * Remove dead tree. | Within 1 Year | Low | 20+ | 3 years |
| T455 | South west corner of gardens | Ehretia dicksonii | 210 | 10.5 | 3 | SM | Low | * Fair structural condition. * Minor mower damage to exposed roots. * Soils compacted at base. * Cankers on main stem and laterals between 4 and 8 metres. * Crown thinning and sparse. * 5% minor deadwood in crown. | * Root collar excavation and de-compaction of soils at base, minimum radius of 1.5 metres from main stem. * Install woodchip mulch ring. * Take soil samples and test for nutrient levels – Treat accordingly to optimize soil conditions for tree to thrive. | Within 6 Months | Low | 10+ | 3 years |
| T456 | Western boundary | Staghorn sumac | 80 | 5.5 | 2.5 | SM | Norm | * Good structural condition and form. | * No works presently required | N/A | Low | 20+ | 3 years |
| T457 | Western boundary | Common Lime | 850 | 25 | 6 | M | Norm | * Fair structural condition. * Large, 400 x 250mm wound on west side of main stem at 1.6 metres; cavity is 150mm deep, response growth adequate. * 2% minor deadwood in crown | * No works presently required | N/A | Low | 20+ | 1 year |
| T458 | North west corner of gardens. | Tulip Tree | 290 | 15.5 | 5 | SM | Norm | * Good structural condition and form. * Twin-leaders from 8.0 metres, currently adequate. | * No works presently required | N/A | Low | 40+ | 3 years |
| T459 | Adjacent sub-station. | Common Holly | 295 | 10 | 2.5 | SM | Norm | * Fair structural condition. * Untidy form, but adequate. | * No works presently required | N/A | Low | 20+ | 3 years |
| T460 | North west corner of gardens | Staghorn sumac | 50 | 4.5 | 2 | Y | Norm | * Good structural condition and form | * No works presently required | N/A | Low | 20+ | 3 years |
| TG461 | Northern boundary | 3 No. Ribbonwood (Plagianthus regius) | 100 | 5 | 1.5 | Y | Norm | * Group of three even-aged planted exotics. * Fair structural condition. * Form has been and will continue to be affected by shading and suppression by T595, but adequate. | * No works presently required | N/A | Low | 20+ | 3 years |
| T462 | Northern boundary | London Plane | 100 | 5.5 | 2.5 | Y | Norm | * Young tree, suspected replacement planting. * Poor structural condition; main stem leans 25 degrees toward north over public footpath, remedial works not considered viable. | * Fell and replace | Within 2 Years | Low | <10 | 3 years |
| T463 | Northern boundary | Golden Robinia (False Acacia) | 90 | 8 | 2 | SM | Norm | * Good structural condition and form | * No works presently required | N/A | Low | 20+ | 3 years |
| T464 | Northern end of gardens | Pride of India | 80 | 5 | 2 | SM | Norm | * Good structural condition and form | * No works presently required | N/A | Low | 20+ | 3 years |
| T465 | To north east of tennis court. | Common Lime | 690 | 19 | 5 | M | Norm | * Dense basal growth prevents inspection of base. * Minor decay at old wounds throughout crown. * Co-dominant to west heavily weighted with two vertical poles re-growing from suspected storm damage. | * Reduce crown in height and lateral spread by approximately 1.0 metre. | Within 1 Year | Low | 20+ | 3 years |
| T466 | To east of tennis court | Ornamental Cherry | 180 | 7 | 3 | EM | Norm | * One of a group of three even-aged planted trees. * Fair structural condition. * Trees are tightly spaced which has affected form but adequate. * Minor decay at old wounds throughout crown. | * No works presently required | N/A | Low | 20+ | 3 years |
| T467 | To east of tennis court | Ornamental Cherry | 210 | 7 | 3 | EM | Norm | * One of a group of three even-aged planted trees. * Fair structural condition. * Minor wound and swelling at base, not currently significant. * Trees are tightly spaced which has affected form but adequate. * Minor decay at old wounds throughout crown. | * No works presently required | N/A | Low | 20+ | 3 years |
| T468 | To east of tennis court | Ornamental Cherry | 210 | 8.5 | 3 | SM | Norm | * One of a group of three even-aged planted trees. * Fair structural condition. * Trees are tightly spaced which has affected form but adequate. * Minor decay at old wounds throughout crown. | * No works presently required | N/A | Low | 20+ | 3 years |
| T469 | North east corner of gardens | Fig | 7 | 6.5 | 4.5 | M | Norm | * Fair structural condition. * Multi-stemmed from ground level. * Previously reduced. * Good shape and Form. | * Re-reduce back to previous pruning points. | Within 2 Years | Low | 20+ | 3 years |
| T470 | North east corner of gardens | Ornamental Cherry | 385 | 9.5 | 6.5 | EM | Norm | * Fair structural condition * Poor stem taper, and swelling at 1.5 metres, but no evidence of underlying decay. * Crown has been previously reduced and thinned, currently untidy. * Vigorous vertical shoots. | * Reduce in height and lateral spread by approximately 1.5 metres to improve shape. | Within 2 Years | Low | 10+ | 3 years |
| T471 | Northern end of gardens | Silver Birch | 110 | 6 | 3 | SM | Norm | * Fair structural condition. * Minor basal wound. * Vigorous growth, with rubbing and crossing branches throughout crown. | * Formative prune, removing any rubbing, crossing and conflicting branches. | Within 1 Year | Low | 20+ | 3 years |
| T472 | Adjacent eastern boundary | Common Hawthorn | 185 | 5.5 | 3.5 | EM | Norm | * Fair structural condition. * Multiple wounds on main stem from 0.5 to 2.0 metres, cavities and decay present, surrounding response growth is adequate. * Poor form. | * Reduce crown in height and lateral spread by approximately 1 metre too improve shape and reduce weight. * Remove any rubbing and conflicting branches. | Within 2 Years | Low | 20+ | 3 years |
| TG473 | North-east corner of gardens | Mixed group of trees | 120 | 4 | 1.5 | SM | Norm | * Mixed group of 5 No. Lilac, 1 No. holly and 1 No. Mallow. * Fair structural condition. * Minor crown encroachment of internal footpath | * No works presently required | N/A | Low | 20+ | 3 years |
| T474 | Between tennis court and eastern boundary | Plum | 3 | 7 | 3 | EM | Norm | * Fair to poor structural condition. * Splits in bark at base, minor cankers throughout. * Rudimentary support has been provided by installation of 3 metre length of rope attached around main stem and horizontally aligned central stem, which is heavily weighted. Risk of rope girdling and damaging cambium. | * Reduce horizontally aligned central stem growing toward south by 2.5 metres and lateral spread to north by 1.0 metre. * Remove rope support following reduction works. | Within 1 year | Low | 10+ | 3 years |
| T475 | Between tennis court and eastern boundary | Ornamental Cherry | 185 | 7.5 | 3.5 | SM | Low | * Fair structural condition and form. * Die-back of 50% of last year’s shoots. * Latent buds have sprouted this season. * Condition liable to be the result of several factors including succession of wet winters. | * Root collar excavation and de-compaction of soils at base, minimum radius of 1.5 metres from main stem. * Install woodchip mulch ring. * Take soil samples and test for nutrient levels – Treat accordingly to maximize soil conditions for tree to thrive. | Within 1 Year | Low | 20+ | 3 years |
| T476 | Central garden | Ornamental Cherry | 330 | 10 | 6.5 | M | Norm | * One of a group of three even-aged specimens. * Fair structural condition. * Decay at old pruning wound at 2.3metres, not currently significant. * Crown previously reduced. | * No works presently required | N/A | Low | 10+ | 3 years |
| T477 | Central garden | Ornamental Cherry | 605 | 10 | 7 | M | Norm | * One of a group of three even-aged specimens. * Fair to poor structural condition. * Numerous exposed rots. Poor stem taper. * Extensive canker on main stem at 1.5 metres, which is decaying, probing with metal spike does not indicate that decay ends into stem. * Tight fork unions at 3 metres. * Wide-spreading crown. | * Reduce lateral spread to east and south by approximately 2.0 metres to reduce weight | Within 1 Year | Low | 10+ | 3 years |
| T478 | Central garden | Ornamental Cherry | 450 | 10 | 6.5 | M | Norm | * One of a group of three even-aged specimens. * Fair structural condition. * Poor stem taper. * Crown over-extended to the south | * Reduce lateral spread to south by 2 metres to reduce weight | Within 1 Year | Low | 10+ | 3 years |
| T479 | Adjacent to tennis court | Almond | 50 | 4 | 1 | NP | Norm | * Good structural condition. * Planting ties are loose. | * Tighten planting ties. | Within 3 Months | Low | 20+ | 3 years |
| TG480 | Eastern boundary adjacent entrance | Mixed Group | 80 | 4 | 1 | Y | Norm | * Group of 10 No. exotics. Species include *Afectryon excelsius, Nothofagus fusca, and Hoberia populnea.* * Fair to Good structural condition. | * No works presently required | N/A | Low | 20+ | 3 years |
| TG481 | Eastern boundary adjacent entrance | Mixed Group | 100 | 6 | 1.2 | Y | Norm | * Group of 14 No. Exotics. Species include *Aristotelia serrata, Sophora microphylla, Nothofagus soulandi, Pseudopanax, Plagianthus regius*. * Fair To Good structural condition | * No works presently required | N/A | Low | 20+ | 3 years |
| T482 | Central garden | Ornamental Cherry | 315 | 6 | 5 | EM | Norm | * Fair to poor structural condition. * Main stem leans 15 degrees toward south-west. * Old decay fungal brackets attached to base on east and west sides, considered to be that of *Ganoderma australe;* hollow sound emanates from surrounding area when tapped with a mallet. * Old decay fungal bracket also considered to be that of *Ganoderma australe* attached main stem at 2 metres; white rot beneath can be probed 50mm. * Wide-spreading crown with previous failures. | * Fell to ground level or reduce lateral spread by approximately 2.5 metres. | Within 1 Year | Low | 10+ | 1 |
| T483 | South-eastern corner | Mountain Ash | 110 | 6.5 | 3 | Y | Norm | * Good structural condition and form. | * No works presently required | N/A | Low | 20+ | 3 years |
| T484 | Southern end of gardens | Common Lime | 740 | 27 | 5 | M | Norm | * Fair structural condition * Twin co-dominants from 4.5 metres. Historically crown raised, wounds are occluding. | * No works presently required | N/A | Mod | 20+ | 1 year |
| T485 | Southern boundary | London Plane | 70 | 5.5 | 1.5 | Y | Norm | * Fair structural condition * Forced growth, relatively poor form, due to competition with neighbouring tree’s but currently adequate | * No works presently required | N/A | Low | 10+ | 3 years |
| T486 | Central garden | Pride of India | 90 | 5 | 1.5 | Y | Norm | * Good structural condition and form | * No works presently required | N/A | Low | 20+ | 3 years |
| T487 | Southern end of gardens | Common Hazel | 5 | 5 | 2.5 | SM | Norm | * Fair structural condition and form | * No works presently required | N/A | Low | 20+ | 3 years |
| T488 | Barbecue area | London Plane | 1410 | 34 | 13 | M | Norm | * Swelling at base, possibly indicative of internal decay; tapping with mallet reveals no evidence of internal decay. * Large wound on west side at 3.5 metres, unable to view inside, hollow sound emanates down to 2.2 metres. * Crown historically thinned and minor reduction. | * Conduct non-invasive Picus test at 3.5 metres and close to base to establish extent of underlying decay. * On-going Massaria climbing inspections. | Within 6 Months  Within 6 Months | Mod\* | 20+ | 1 year |
| T489 | Barbecue area | London Plane | 1320 | 32 | 13 | M | Low | * Fair structural condition. * Numerous girdling roots at base, some large and long-standing. * Compacted ground at base, semi-permeable hard surfaces to east 30%. * Historically thinned, wounds are occluding. * Sparse crown. | * Sever girdling roots <25mm diameter. * Root collar excavation and de-compaction of soils at base, minimum radius of 2.0 metres from main stem. * Install woodchip mulch ring. * Take soil samples and test for nutrient levels – Treat accordingly to optimize soil conditions for tree to thrive. * On-going Massaria climbing inspections. | Within 6 Months  Within 6 Months | Mod | 10+ | 1 year |
| T490 | Barbecue area | London Plane | 1360 | 32 | 1 | M | Norm | * Crown breaks at 4.5 metres. * Heavily weighted lateral to south-west previously reduced. * Cavities evident at old wounds at approximately 18.0 metres within co-dominants to east and north. * Decaying fungal fruiting brackets attached in area of cavities at 18.0 metres, thought to be I*inonotus hispidus*. * Otherwise fair structural condition. | * Climbing inspection with Resistograph test to establish structural integrity in zone of cavities at approximately 18 metres. * On-going Massaria climbing inspections. | Within 6 Months | Mod\* | 10+ | 1 year |
| T491 | Central garden | London Plane | 1570 | 33 | 1 | M | Norm | * Fair structural condition. * Bench beneath crown. * Swelling at base, with no hollow sounds to confirm underlying decay. * Crown breaks at 7 metres. * Crown historically thinned. | * On-going Massaria climbing inspections. | Within 6 Months | Mod | 20+ | 1 year |
| T492 | Western boundary | London Plane | 1340 | 31 | 10.5 | M | Low | * Minor decay at old cankers on main stem at 1.5 and 2.0 metres, not currently significant. * Top of crown thinning slightly. * Woodpecker holes in zone of old wound at approximately 15 metres. * Heavily weighted lateral on south-west side of main stem overhangs third-party, no evidence of structural weakness. * Cable bracing attached at approximately 17 | * Reduce lateral spread of crown to south-west and west by approximately 2 metres to reduce weight. * At the same time conduct climbing inspection and Resistograph test at 15 metres in zone of woodpecker hole to establish structural integrity, and inspect the cable bracing at 17 metres. * On-going Massaria climbing inspections. | Within 6 Months | Mod\* | 20+ | 1 year |
| T493 | Western boundary | London Plane | 295 | 13 | 3.5 | SM | Norm | * Good structural condition and form | * No works presently required | N/A | Low | 40+ | 3 years |
| T494 | Northern boundary | London Plane | 1500 | 33 | 11 | M | Norm | * Fair structural condition. * Crown breaks at 5.5 metres into wide-spreading multi-stems. * Historically thinned wounds are occluding. * Screw eyes at 18.0 metres, indicating that these stems have previously been cable braced. | * Install cobra bracing at approximately 18 metres to the co-dominant to north with the two co-dominants to west and south. * On-going Massaria climbing inspections. | Within 6 Months | Mod | 20+ | 1 year |
| T495 | Northern boundary | London Plane | 1600 | 31 | 10 | M | Norm | * Fair structural condition. * 3 No. 90-130mm diameter lateral branches removed recently between 15 and 20 metres. * Extensive burring at base, no evidence of underlying decay. | * On-going Massaria climbing inspections. | Within 6 Months | Mod | 20+ | 1 year |
| T496 | Northern boundary | London Plane | 1100 | 31 | 10 | M | Norm | * Crown breaks at 4.5 metres. * Decay cavity at old wound within co-dominant to south, unable to assess extent, but response growth appears strong. * Fair structural condition. | * Climbing inspection of old wound within co-dominant to south. * On-going Massaria climbing inspections. | Within 6 Months  Within 6 Months | Mod | 20+ | 1 year |
| T497 | Northern boundary | London Plane | 1000 | 30 | 10 | M | Norm | * Large active *Ganoderma* spp. fungal bracket attached to base of main stem on north east side. | * Conduct non-invasive Picus test to establish extent of decay at base of main stem. * On-going Massaria climbing inspections. | Within 1 month  Within 6 months | Mod\* | 20+ | 1 year |
| T498 | Eastern boundary | London Plane | 1300 | 31 | 10 | M | Norm | * Wound at 7 metres on south lateral, surrounding response growth appears strong, but unable to confirm depth of cavity from ground level. * Cavity at 9 metres within co-dominant to north-west extends at least 150mm into stem. * Historically thinned, wounds are occluding. | * Climbing inspection with Resistograph tests to establish structural integrity in zone of wounds and cavities at approximately at 7.0 and at 9.0 metres. * On-going Massaria climbing inspections. | Within 6 Months  Within 6 months | Mod\* | 20+ | 1 year |
| T499 | Eastern boundary | London Plane | 1470 | 30 | 11 | M | Norm | * Crown breaks at 4.5 metres. * No external evidence of weakness at unions. * Crown previously thinned and reduced, wounds are occluding. * Woodpecker hole at 13.0 metres within lateral to east, birds entering cavity | * Climbing inspection with Resistograph test to establish structural integrity in zone of woodpecker hole at approximately at 13.0 metres. * On-going Massaria climbing inspections. | Within 6 Months  Within 6 months | Mod\* | 20+ | 1 year |
| T500 | Eastern boundary | London Plane | 1830 | 33 | 10 | M | Norm | * Decaying fungal attachment thought to be that of *Innonotus hispidus* at 300mm above ground level on south side of main stem. * Wood beneath exhibiting white rot, which can be probed no more than 50 mm. Surrounding area, returns a solid sound when tapped with a mallet, not currently significant. * Crown breaks at 4.5 metres. * Historically thinned, wounds are occluding. | * On-going Massaria climbing inspections. | Within 6 Months | Mod | 20+ | 1 year |
| T501 | South eastern corner | London Plane | 1350 | 30 | 13 | M | Norm | * Fair Structural condition. * Crown breaks at 7 metres. * Historically thinned wounds are occluding. | * On-going Massaria climbing inspections. | Within 6 Months | Mod | 20+ | 1 year |
| T502 | Southern boundary | London Plane | 1200 | 30 | 11 | M | Norm | * Ivy encroaching stem to 7 metres prevents full inspection. * Single-stem divides into twin stems at 5 metres, ivy obstructs view of union. * Historically thinned, wounds are occluding. * Lateral at 20 metres emanating on west side with large wound and cavity approximately half way along its length estimated to occupy 50% of cross-section. * Woodpecker hole at 9.0 metres on south side of eastern co-dominant. | * Sever ivy at base and remove as high as possible to enable inspection of main stem. * Remove lateral at 20 metres with cavity on west side of crown. * On-going Massaria climbing inspections * Climbing inspection of woodpecker hole at 9 metres on south side of eastern co-dominant. | Within 1 month  Within 6 Months | Mod\* | 20+ | 1 year |
| T503 | Southern end of gardens | London Plane | 1490 | 32 | 10 | M | Norm | * Single stem divides into 2 co-dominants at 4.5 metres. * Canker on eastern codominant at 6 metres with evidence of minor decay * Crown heavily weighted above with few low laterals, which commences at 14 metres, further wound at 10 metres. | * Reduce crown above eastern co-dominant by approximately 2 metres, to reduce lever arm and weight. * On-going Massaria climbing inspections | Within 6 Months | Mod | 20+ | 1 year |
| T504 | Southern end of gardens | London Plane | 1200 | 30 | 1 year | M | Norm | * Fair structural condition. * Single stem bifurcates at 5 metres, no evidence of weakness at union. * Crown historically thinned wounds are occluding. | * On-going Massaria climbing inspections | Within 6 Months | Mod | 20+ | 1 year |
| T505 | Southern end of gardens | London Plane | 750 | 29 | 8 | EM | Norm | * Fair structural condition * Single-main stem. * Large lateral historically removed at 6 metres, wound has fully occluded. * Historical storm damage suspected, vigorous small diameter poles above large wound (500 x 200mm) with decay at 21 metres at point of previous lateral failure - Evidence of response growth surrounding wound, not currently significant. | * On-going Massaria climbing inspections | Within 6 Months | Mod | 20+ | 18 |

**Tree No** – tree reference on Tree Location Plan and /or tree tags where used (\* = Previous tree tag number). **Species** – tree species giving English common name. **DBH** – the individual trunk diameter when measured at 1.5m above ground. **Ht.** – tree height recorded in metres. **Crown Spread** - crown spread as average using one radial spread. **Age** - recorded as Y (young) recently planted; SM (semi-mature) within first 1/3 life; EM (early-mature) within middle 1/3 of life; M (mature) fully developed and grown; OM (over-mature) is exceptional age for species; Vet (veteran) exceptional age for species, with Arboricultural features such as cavities and decay which enhance biological associations and value of tree. **Vig. (Vigour)** – an assessment of the health physiological condition of the tree. **Condition** – is reference to structural observations of the tree as a whole and individual parts. **Time Scale** – period in which recommended management should be completed. **Risk Factor** – as per Section 7.0 of report. \* Denotes subject to further testing

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# 9.0 DISCUSSION OF FUTURE MANAGEMENT OF THE MATURE LONDON PLANE TREES

The ‘London Tree Officers Association’ has produced a document entitled ‘Massaria disease of Plane - Practical management guidance’ which contains a listed table of potential interventions for management of trees or tree stock affected by the disease.

Potential interventions include the following;

1. Repeated Massaria branch removal.
2. Crown Reduction works (2 year pollard cycle).
3. Crown reduction works (6 year crown volume reduction cycle)
4. Retrenchment pruning.
5. Irrigation
6. Mulching
7. Soil and foliar organic feed.
8. Natural leaf litter retained
9. Soil structure improvement/decompaction.
10. Physical replacement of soil.
11. Survey - Ground Level
12. Survey - Aerial

Items 1, 2 and 3 are reported to have an initial negative effect on a tree, which can shorten the life span of the tree and disfigure the canopy to varying extent; however item 1 is recorded as having a short term effectiveness against Massaria and items 2 and 3 (crown reductions) as being effective against Massaria as it appears to stop branch failures.

Item 4 Retrenchment pruning is reported to have a minimal effect on a tree, but its effectiveness against Massaria is yet to be evaluated.

Item 5 Irrigation is reported to have an initial positive impact on a tree and reduced Massaria branch incidence with high volume applications.

Items 6, 7, 8, 9 and 10 Mulching, Soil and foliar organic feed, retention of leaf litter, soil structure improvements and physical replacement of soil are all reported to have an initial positive effect on a tree, however the effectiveness against Massaria has not yet been evaluated.

Items 11 and 12 Ground level and Aerial Surveys have none and minimal initial impact on the tree respectively, but provide no effectiveness against the disease.

There would appear to be two options for an overriding approach to the management of the 17 No. mature London Plane trees in order to reduce the risk of failing branches as follows;

1. Continue the existing regime of on-going inspections, followed by the removal of affected branches; together with the employment of techniques to improve ground conditions in which the trees are located.
2. To initiate a crown reduction pruning regime.

Option1 is the preferred option in the first instance as a result of the reduced impact on the trees; as such the following is recommended;

**9.0 DISCUSSION OF FUTURE MANAGEMENT (continued…)**

1. Continue with aerial inspections to highlight affected branches.
2. Continue removal of affected branches as they are found.
3. Install mulch in the root zones of each of the 17 No. mature London Plane trees, extending out where possible to the extent of the drip–line, which will improve conditions for the trees and reduce competition.
4. Thin out and remove the shrub layer adjacent to and beneath the London Plane trees around the perimeter of the square to remove as much competition from roots for moisture and decrease rainwater interception.
5. Soil feeding following laboratory testing of soils for nutrient levels.
6. De-compact the root-zones of those four London Plane trees located centrally within the site.
7. Re-assess regime in 3 years.

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| 10.0 SITE PLAN – Mecklenburgh Square. | |
| C:\Users\jmills\Documents\PT Mapper - Maps\Goodenough College\Micklenburgh Square Map.bmp | |
| Drawn: JM | Not to scale |
|  | JM/150364R/sh |

We trust that the contents and recommendations contained within this report were informative, easy to understand and helpful to you, with regards to managing your Pine tree. Should you have any further questions or concerns, please do not hesitate to contact us again.

**REPORT CLASSIFICATION:** **Tree Survey & Condition and Management Report**

**REPORT STATUS:** **Final**

**REPORT COMPLETED BY:** **Mr. Jason Mills**

***Arboricultural Consultant***

**SIGNATURE:**  **DATE: 28.07.15**

**REPORT REVIEWED BY:** **Mr. John Lawson BSc Hons (For.), CBiol, MRSB**

***Chartered Biologist***

***Arboricultural Consultant***

**SIGNATURE:** **** **DATE: 30.07.15**