HILLINGDON MANOR SCHOOL

ARBORICULTURAL IMPACT ASSESSMENT

Client: Options Autism (7) Ltd

Report No: HTL17123

Date: May 2019

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REPORT VERIFICATION

This study has been undertaken in accordance with British Standard 5837:2012 “Trees in relation to design, demolition and construction - Recommendations”.

Report Version	Date	Completed by:
Final	16/05/19	Edmund Lusk HND, PTI, MArborA (Arboricultural Consultant)

DISCLAIMER

The contents of this report are the responsibility of Helicopter Trees Ltd. It should be noted that, whilst every effort is made to meet the client’s brief, no site investigation can ensure complete assessment or prediction of the natural environment.

Helicopter Trees Ltd accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

VALIDITY OF DATA

The findings of this study are valid for a period of 12 months from the date of survey. If works have not commenced by this date, an updated site visit should be carried out by a suitably qualified and experienced arboriculturist to assess any changes to the trees, groups and hedgerows on site and to inform a review of the conclusions and recommendations made.

It should be noted that trees are dynamic living organisms that are subject to natural changes as they age or are influenced by changes in their environment. As such following any significant meteorological event or changes in the growing environment of the trees they should be re-assessed by a suitably qualified and experienced arboriculturist.

SUMMARY

Helicopter Trees Ltd was commissioned to prepare an Arboricultural Impact Assessment in respect of the proposed development of land at Hillingdon Manor School.

Helicopter Trees Ltd previously completed a BS5837 Tree Survey of the proposed development site (Report No. 17110) in April 2019.

This assessment is based upon the results of the survey completed in April 2019 with reference to the design proposals prepared by the scheme architects; Space M Studio. Helicopter Trees Ltd have provided the architects with informal feedback during the design process to assist in minimising the potential impact that the proposed development may have upon trees within the site.

This assessment has been prepared by Edmund Lusk, Arboricultural Consultant, who has 18 years professional experience in the field of arboricultural consultancy and who holds the HND in Arboriculture, is a LANTRA qualified Professional Tree Inspector and is a professional member of the Arboricultural Association and of the Consulting Arborist Society.

A desk study undertaken to inform the BS5837 Tree Survey has established that none of the trees within the site are protected by a Tree Preservation Order and that the site is not situated within a Conservation Area.

The proposed development of the site is the construction of a new forest school comprising four classrooms, a new canteen / café space and associated works including the construction of a new car parking area.

The proposed development will require the removal of two trees, a Goat Willow (T4) which is of a low quality and value, and a young Elm tree (T16) which was assessed as being unsuitable for long-term retention due to the likelihood that it will succumb to Dutch Elm Disease within a short time frame. It is not considered that the loss of these trees will have a significant impact upon the character and appearance of the site or local landscape as they are immature specimens of little visual merit.

All other trees considered within the BS5837 Tree Survey are to be retained within the development. However, due to other site constraints, particularly the need to respect the openess of the adjacent greenbelt, some development will occur within the initial Root Protection Areas of two trees within the site. It is noted that the layout of the proposed development has been amended during the design process to reduce these impacts and that, subject to the adoption of an appropriate construction methodology, it is considered that the scheme as proposed can be constructed without causing significant harm to retained trees.

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1. INTRODUCTION

1.1 PROJECT BRIEF

In May 2019, Options Autism (7) Ltd instructed Helicopter Trees Ltd to prepare an Arboricultural Impact Assessment in respect of the proposed development of land off Harlington Road in Hillingdon.

The purpose of this report is to detail the impact that the proposed development will have upon the site's existing tree stock and set out recommendations for the subsequent mitigation or avoidance of impact.

1.2 SITE DESCRIPTION

The site under consideration is located off Harlington Road within the London Borough of Hillingdon. It extends to approximately 1.5ha in size and is centred on Ordnance Survey Grid Reference TQ 0766 8164.

The site comprises an area of rough grassland with established trees and hedgerows present around its perimeter. It is bound by Harlington Road to the east, the existing Hillingdon Manor School development to the south, by woodland to the north and by agricultural land to the west.

The site is situated within a pocket of greenspace on the edge of a predominately residential area to the south of Hillingdon. The directly neighbouring landscape to the north and west is of an agricultural character with residential development to the east and residential and commercial uses to the south. The wider landscape is dominated by residential development interspersed with areas of greenspace.

Details of the trees are provided within the BS5837 Tree Survey Report (HTL17110) contained at Appendix 1 and the locations of the trees are detailed upon the Preliminary Tree Protection Plan, D17123-01, in Section 5.

1.3 DESCRIPTION OF DEVELOPMENT

The proposed development of the site is the construction of a new forest school comprising four classrooms, a new canteen / café space and associated works including the construction of a new car parking area.

1.4 DOCUMENTATION CONSIDERED

This assessment is based upon the information provided by the client along with a survey of the site undertaken by Helicopter Trees Ltd in April 2019. The documents and drawings considered are detailed within Table 1.1.

Author	Document	Drawing Number	Date
Oakley Building Surveyors	Land Survey	4573-01	April 2019
Space M Studio	Horticultural & Forest Schools Provision - Existing OS Map	1594-01 A	May 2019
Space M Studio	Horticultural & Forest Schools Provision - Block Plans as Existing & Proposed	1594-02 A	May 2019
Space M Studio	Horticultural & Forest Schools Provision - Plan Layout Proposals & Proposed Elevations	1594-03 A	May 2019

Table 1.1: Documentation Considered

2. TREE PROTECTION AND PLANNING POLICY

2.1 STATUTORY TREE PROTECTION

A search undertaken using the Protected Trees map provided by the London Borough of Hillingdon (London Borough of Hillingdon. 2019. Protected Trees. [ONLINE] Available at: http://lbhillingdon.maps.arcgis.com/apps/View/index.html?appid=7b18f60872a94d38a0c9bf1aea032760. [Accessed 23 April 2019].) has established that none of the trees surveyed are protected by a Tree Preservation Order and that the site is not within a Conservation Area.

2.2 PLANNING POLICY

National Policy and Guidance

Guidance within the National Planning Policy Framework states that “planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss".

None of the trees within the site are of a veteran status. However, it is considered that the large Ash tree (T3), which is a fully mature specimen, has the potential to attain veteran status. It is noted that further investigation into the health and condition of the tree is merited as at the time of the survey inspection of the tree was restricted due to it being clad in Ivy growth.

BS5837:2012, provides guidance to the consideration of trees in relationship to proposed development. This document is recognised as best practice when assessing trees on a site that is being considered for development.

In respect of this it can be noted that Category A, B or C trees or tree groups are those that should be a material consideration in the planning process whilst Category U trees are those which would be lost in the short term for reasons connected to their physiological or structural condition and hence they should not be a consideration in the planning process.

3. ARBORICULTURAL IMPACT ASSESSMENT

3.1 INTRODUCTION

This section of the report details the potential impacts that the proposed development may have upon the site's tree stock. The assessment has been based upon the documents detailed in Table 1.1.

3.2 IMPACTS FROM DEMOLITION AND RELATED OPERATIONS

3.2.1 Building Demolition

The proposed development requires the relocation of a freestanding temporary classroom from the existing school car park. The works to remove this existing modular building will not impact upon retained trees.

3.2.2 Removal of Hard Surfaces

The proposed development does not require the removal of any existing hard surfaces within the site.

3.2.3 Removal of Services

There are no areas on site where the removal of existing underground services is likely to require works within the RPAs of retained trees.

3.2.4 Ground Remediation

No information regarding proposed soil remediation works have been considered. However, the previous usage of the site is considered unlikely to have resulted in areas of soil contamination that would require excavation and disposal, or treatment works, to be undertaken.

3.3 IMPACTS FROM DEVELOPMENT LAYOUT

3.3.1 Tree Removal

The proposed development of the site requires the removal of an early-mature Goat Willow tree (T4) to permit construction of the proposed new classrooms and the removal of a young Elm tree (T16). The Goat Willow tree to be removed is considered to be of a low retention value, BS5837 Category C, and it is not considered that its loss will have a significant amenity impact. The Elm tree to be removed is considered to be unsuitable for long-term retention, BS5837 Category U, due to the likelihood that it will succumb to Dutch Elm Disease (*Ophiostoma novo-ulmi*) in the near future.

3.3.2 Tree Pruning

In addition to the proposed tree removal it will be necessary to undertake some access facilitation pruning works to the crown of the retained mature Ash tree (T3) to minimise the potential for branch damage to occur during construction of the new car parking area and associated access. In this respect it is proposed to crown lift this tree on the northern and western side to provide a clearance of 3.5m above ground level.

In addition to the above works some pruning of the existing vegetation within the tree group G1 will be undertaken to form a maintained hedgerow. Established individual trees within the group will be retained as is.

The proposed pruning works are of a minor extent and are routine in nature and as such it is not considered that they will have a detrimental impact upon the visual quality, or long-term health, of the tree.

All tree pruning works should be undertaken by appropriately qualified and insured arboricultural contractors in accordance with current best practice guidance.

3.4 DIRECT IMPACTS FROM CONSTRUCTION

3.4.1 Works within RPAs

There are some aspects of the proposed development that will require works to be undertaken within the Root Protection Areas of retained trees as discussed below.

The relocation of the existing freestanding classroom block to form part of the new school area will result in a minor encroachment into the Root Protection Area of a mature Lime tree (T5). This tree has a Root

Protection Area of 327m^2 and the proposed location for the classroom block will encroach into this area by approximately 3%. The extent of encroachment is minimal and it is not considered that the works will have a detrimental impact upon the long-term health of the tree.

The creation of a new access, and formation of a car parking area, will encroach into the Root Protection Areas of an existing Lime tree (T2) and an existing Ash tree (T3). The Lime tree (T2) has a Root Protection Area of 255m^2 and the works will affect approximately 4% of this area. Again, it is not considered that this level of encroachment is likely to cause significant harm to the retained tree.

However, with respect to the Ash tree (T3), which has a Root Protection Area of 652m^2, the works will encroach by approximately 14% which, given the likely asymmetrical rooting pattern of this tree due to existing site constraints, could have a detrimental impact upon its long-term condition unless appropriate precautions are taken during the detailed design and construction processes.

In this respect it is noted that BS5837:2012 recommends that new permanent hard standing should not extend to exceed greater than 20% of any existing unsurfaced ground within the RPA of a retained tree.

As such whilst works within the RPA of T3 will fall within this limit it is essential that steps are taken to minimise the potential impact of the development on the health of the tree.

To minimise the potential for harm to occur to this tree during construction of the access and car park it is proposed to use a three-dimensional cellular confinement system (e.g. Geosynthetics Cellweb) to construct the car park.

The general approach to the installation of the three-dimensional cellular confinement system to form the car park will be to lay it above existing ground level which will avoid the need for excavation that may cause root damage and severance. Additionally, it is recommended that the car parking area is finished with a permeable surface to ensure conditions for root growth and function are maintained post development.

Overall it is considered that, subject to adherence to the methodology for hard surface construction detailed in Section 4, the works to construct the car park can be completed in such a way that significant harm to the retained trees can be avoided and that the trees will successfully adapt to the change in their growing environment resulting from this aspect of the development.

3.4.2 Works within Canopy Spreads

Construction of the proposed new car park will require works to be undertaken within the canopy spread of the Ash tree (T3). To minimise the potential for branch damage to occur to this tree during development it is recommended that some access facilitation pruning works, as detailed in 3.3.2, are proposed. Following completion of these works it is not considered that a significant risk of branch damage occurring to retained trees due to development exists.

3.4.3 Working Space

Construction of the new car park, and the relocation of the existing modular classroom, will require working space to provided within the Root Protection Areas of tree numbers T2, T3 and T5. To prevent such activities causing harm to the trees it will be necessary to install temporary ground protection measures during construction.

3.5 IMPACTS FROM CONSTRUCTION RELATED OPERATIONS

3.5.1 Site Access

It is understood that construction access to the site will be provided from the proposed new entrance that is to be constructed off the existing school driveway.

It will be necessary to ensure the retained trees in proximity to the access point are protected from potential impact damage by the installation of tree protection barriers prior to the commencement of the development.

The proposed locations for the installation of tree protection barriers are detailed on the Preliminary Tree Protection Plan, Drawing Number D17123-01, in Section 5.

3.5.2 Delivery and Storage of Materials

Material deliveries to the site will utilise the existing school driveway and the new access from this. Retained trees will be protected from harm by the prior installation of tree protection barriers.
Areas for materials storage have not been determined at this stage. However, there is space for the storage of materials in areas outside of the RPAs of retained trees in locations throughout the site.

3.5.3 Site Compound

The proposed location for a site compound and associated welfare facilities has not been determined at this stage. However, there are various areas within the site where a site compound could be established without impacting upon retained trees.

3.5.4 Contractor's Parking

It is recommended that contractor's car parking is provided within the existing school car park. No car parking is to occur on areas of unsurfaced ground within the Root Protection Areas of retained trees.

3.6 POST-DEVELOPMENT IMPACTS

3.6.1 Shading

The nature of the proposed development is such that future conflicts due to shading by retained trees are not anticipated.

3.6.2 Privacy and Screening

The proposed development does not require the removal of any trees that contribute significantly to privacy and screening of the site.

3.6.3 Direct Damage to Structures

There are no areas on site where the continued growth of retained trees is likely to cause conflict with the proposed development.

3.6.4 Future Pressure for Removal

The layout of the proposed development is such that future pressure for tree removal is considered unlikely to result.

3.6.5 Seasonal Nuisance

It is not considered that a significant degree of seasonal nuisance will occur, although it is acknowledged that leaf litter from the retained trees may cause some seasonal conflict with maintenance of the parking area.

3.7 SUMMARY OF IMPACTS

The proposed development of the site will not have a significant impact upon the visual amenity of the local area because of the proposed tree removal necessary to facilitate it. Additionally, the proposed works are not considered to be likely to result in significant harm occurring to retained trees, subject to the adoption of appropriate working practices and the installation of tree protection measures as detailed in Section 4.

4. TREE PROTECTION MEASURES

4.1 INTRODUCTION

This section of the report details the initial protection, mitigation and avoidance measures suggested to prevent or reduce harm to the retained trees.

4.2 GENERAL TREE PROTECTION

4.2.1 Tree Protection Barriers

To minimise the potential for harm to occur to the root systems and canopies of retained trees during development it will be necessary to implement protected areas throughout the site.

These are areas surrounding the trees' RPAs and canopies in which any construction works, or related activities, will only be undertaken in accordance with an Arboricultural Method Statement for the proposed development and any such works must be supervised by an arboricultural consultant.

On a day to day basis construction access to the protected areas should be avoided. It is recommended that the protected areas are afforded protection at all times using tree protection barriers and/or ground protection (specified in accordance with BS5837:2012).

No works that cause compaction of the soil or severance of tree roots, except where undertaken in accordance with the guidance provided within this document or an Arboricultural Method Statement, will be undertaken within any protected area.

The protective barriers should be erected prior to the commencement of any site works e.g. before any materials or machinery are brought on site or the stripping of soil commences.

Drawing Number D17123-01 in Section 5, provides a Preliminary Tree Protection Plan indicating the potential location of protective barriers.

The protective barriers are to be constructed in accordance with the specification detailed in BS5837:2012. Any variation to the specification of the protective barrier will be agreed with the Local Planning Authority Arboricultural Officer.

4.2.2 Ground Protection

To minimise the potential for soil compaction to occur across the site ground protection measures will be installed as identified on the Preliminary Tree Protection Plan (Drawing Number D17123-01, Section 5) and discussed below.

The ground protection measures to be installed shall comprise a 150mm deep layer of woodchip overlaid upon a geo-textile membrane and surfaced with scaffold planks or oriented strand board (OSB).

The following methodology shall be adhered to for the installation of the ground protection:

1. Prior to commencement of the works the location of the ground protection shall be marked out and investigated to identify if any existing services are present.

2. The existing ground cover and vegetation present within the area will be carefully stripped / strimmed using hand tools.

3. The exposed soil will be covered with a permeable geotextile membrane. The geotextile layer shall be laid with overlaps of 300 mm beyond the edge of the proposed ground protection and it shall be temporarily retained with pins, stakes or weights.

4. A 150mm deep layer of woodchip shall then be placed over the geotextile membrane. This shall be brought to the working area and spread manually using hand tools.

5. Scaffold planks or OSB will then be installed upon the layer of woodchip. These will be prevented from lateral displacement by retaining them in position with driven road pins.

4.3 MITIGATION OR AVOIDANCE OF IMPACTS

4.3.1 Design Amendments

Design amendments have been made during the evolution of the scheme to minimise the potential for impacts upon retained trees and to permit the retention on the large Ash (T3). Due to other constraints, such as the need to maintain the openness of the greenbelt, it is understood that further amendments to reduce impacts upon trees can not be achieved. However, as discussed in Section 3 it is considered that, subject to the adoption of appropriate working and construction practices, the proposed development will not have a significant impact upon the health of retained trees.

4.3.2 Site Setup and Logistics

Prior to commencement of development a plan should be prepared detailing the locations in which activities related to the establishment of a site compound, contractors car parking areas, material storage areas and associated works are to occur. All such areas should be located outside of the RPAs of retained trees.

4.3.3 Underground Services

Details of the proposed underground services for the development were not available at the time of writing. Where possible all new underground services shall be located outside of the RPAs of retained trees. Where works to install new services within the RPAs of retained trees are required they shall be completed in such a way that harm to the root systems of the trees can be minimised; which shall be specified within an Arboricultural Method Statement for the proposed development.

4.4 WORKING PRACTICES FOR TREE PROTECTION

4.4.1 Hard Surface Construction within Root Protection Areas

The following methodology shall be adhered to for the installation of the new car park and associated access road where works are to occur within the RPAs of retained trees:

1. Prior to commencement of the works the extent of the new hard surface will be marked out and investigated to identify if any existing services are present.

2. The existing ground cover and vegetation present within the area will be carefully stripped / strimmed using handheld tools.

3. The exposed soil will be covered with a permeable geotextile membrane. The geotextile layer shall be laid with overlaps of 300 mm beyond the edge of the proposed construction and it shall be temporarily retained with pins, stakes or weights.

4. The cellular confinement system will then be installed and fixed in position in accordance with the manufacturer's recommendations.

5. The cellular confinement system to be used should be specified by an engineer though the use of Geosynthetics 150 mm or 200 mm Cellweb or similar is typically appropriate for tree root protection beneath areas of this type.

6. The edges of the cellular confinement system shall be retained by hardwood sleepers retained in place by countersunk rebar. These will form the final kerb edge to the proposed car park area.

7. The cellular confinement system will then be filled with the specified aggregate in accordance with the manufacturer's recommendations. The stone used to fill the cellular confinement system must not contain any limestone or other soluble materials that may contaminate the underlying soil through water runoff.

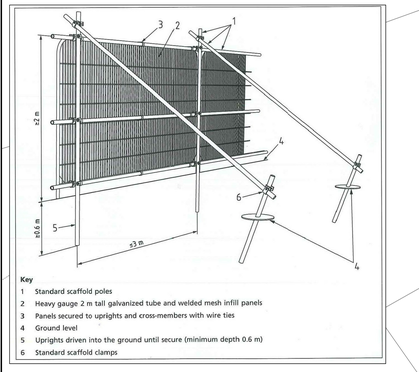
8. All works involved in filling the cellular confinement system with aggregate will proceed in a northerly direction from the existing school driveway with the equipment used to fill the cells only progressing into the RPA of the tree across the filled cellular confinement system sections.
9. The infill aggregate will then be rolled or whacked to ensure cohesion with the cellular confinement system.

10. A second geotextile fabric layer will then be laid over the filled cellular confinement system.

11. The desired finished surface shall then be installed. This will be permeable and gas porous.

5. DRAWINGS

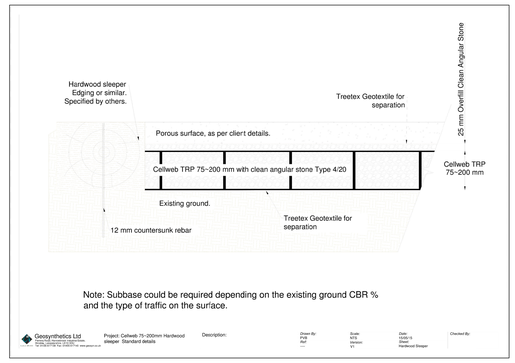
Drawing Number D17123-01 – Preliminary Tree Protection Plan



Key

1. Standard scaffold poles
2. Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3. Panels secured to uprights and cross-members with wire ties
4. Ground level
5. Uprights driven into the ground until secure (minimum depth 0.6 m)
6. Standard scaffold clamps

Tree Protection Barrier Specification



Standard Detail for No-dig Construction



Example Tree Protection Signage

D17123-01

Key:

- Tree Position and Canopy Spread - To be Retained
- Tree Position and Canopy Spread - to be Removed
- Tree Group - Retained
- Tree Group - Removed
- T1 / G1 — Tree or Group Number
- Root Protection Area
- Tree Protection Barrier
- Ground Protection
- Area of 'No-dig' Construction
- Survey Area

Tree positions based upon Land Survey, Oakley Building Surveyors, Drawing No. 4573-01. Where trees were not plotted to Land Survey drawing their positions are estimated.

The original of this drawing was produced in colour - A monochrome copy should not be relied upon.

N

Client:	Project:
Options Autism (7) Ltd	Hillingdon Manor School
Drawing:	**Drawing No:**
Preliminary Tree Protection Plan	D17123-01
Revision:	**Date:**
-	16/05/19
Scale at A0:	**Drawn:**
1:250	EL

Helicopter Trees
Professional Arboricultural Consultancy

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APPENDICES

Appendix 1: HTL17110 BS5837 Tree Survey

HILLINGDON MANOR SCHOOL

BS5837 TREE SURVEY

Client: Options Autism (7) Ltd

Report No: HTL17110

Date: April 2019

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REPORT VERIFICATION

This study has been undertaken in accordance with British Standard 5837:2012 “Trees in relation to design, demolition and construction - Recommendations”.

Report Version	Date	Completed by:
Final	23/04/19	Edmund Lusk HND, PTI, MArborA (Arboricultural Consultant)
Rev A	24/04/19	Edmund Lusk HND, PTI, MArborA (Arboricultural Consultant)

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Helicopter Trees Ltd accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

VALIDITY OF DATA

The findings of this study are valid for a period of 12 months from the date of survey. If works have not commenced by this date, an updated site visit should be carried out by a suitably qualified and experienced arboriculturist to assess any changes to the trees, groups and hedgerows on site and to inform a review of the conclusions and recommendations made.

It should be noted that trees are dynamic living organisms that are subject to natural changes as they age or are influenced by changes in their environment. As such following any significant meteorological event or changes in the growing environment of the trees they should be re-assessed by a suitably qualified and experienced arboriculturist.

SUMMARY

Helicopter Trees Ltd was commissioned to undertake a pre-development tree survey, in accordance with BS5837:2012, in respect of the proposed development of land off Harlington Road in Hillingdon.

A survey of the trees growing on the site was undertaken on the 16th April 2019 by Edmund Lusk, Arboricultural Consultant, who has 17 years professional experience in the field of arboricultural consultancy and who holds the HND in Arboriculture, is a LANTRA qualified Professional Tree Inspector and is a professional member of the Arboricultural Association and of the Consulting Arborist Society.

A desk study undertaken to inform this report has established that none of the trees within the site are protected by a Tree Preservation Order and that the site is not situated within a Conservation Area.

The survey identified that the site's tree stock is composed of several established mature trees and several groups of trees, formed by unmaintained hedgerows and scrub vegetation, that are situated around the periphery of the site.

The most significant trees surveyed are the Category A and B specimens that are located adjacent to the southern boundary of the site and those forming the Category A tree group, which is off-site, to the north of the site.

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1. INTRODUCTION

1.1 PROJECT BRIEF

In April 2019, Options Autism (7) Ltd instructed Helicopter Trees Ltd to undertake a pre-development tree survey, in accordance with BS5837:2012, in respect of the proposed development of land off Harlington Road in Hillingdon.

The purpose of this report is to:

- Record the current condition of the trees found on the site and categorise them using criteria outlined in BS5837:2012 “Trees in relation to design, demolition and construction - Recommendations”.
- Provide a Tree Constraints Plan that identifies any constraints to development presented by the trees to include root protection areas for the retained trees as described in BS5837:2012.
- Provide guidance detailing arboricultural constraints to development and factors to be considered during the detailed design of the proposed development.

1.2 SITE DESCRIPTION

The site under consideration is located off Harlington Road within the London Borough of Hillingdon. It extends to approximately 1.5ha in size and is centred on Ordnance Survey Grid Reference TQ 0766 8164.

The site comprises an area of rough grassland with established trees and hedgerows present around its perimeter. It is bound by Harlington Road to the east, the existing Hillingdon Manor School development to the south, by woodland to the north and by agricultural land to the west.

The site is situated within a pocket of greenspace on the edge of a predominately residential area to the south of Hillingdon. The directly neighbouring landscape to the north and west is of an agricultural character with residential development to the east and residential and commercial uses to the south. The wider landscape is dominated by residential development interspersed with areas of greenspace.

All of the trees surveyed are located around the perimeter of the site. The locations of the trees and groups surveyed can be found on Drawing Number D17110-01 in Section 7 of this report.

2. METHODOLOGY

2.1 DESK STUDY

A desk study was undertaken to identify if any of the trees present within the site are protected by a Tree Preservation Order (TPO), or by virtue of the site being situated within a Conservation Area.

2.2 TREE ASSESSMENT

To determine the retention value of the trees within the site a full arboricultural survey has been undertaken, assessing the species and status of all trees present. This survey has been carried out in accordance with British Standard 5837:2012 'Trees in relation to design, demolition and construction – Recommendations'.

All trees have been assigned a unique reference number. Individual trees above 75 mm in diameter (at 1.5 m above ground level) have had their position plotted to a survey drawing.

The trees were visually assessed and a schedule prepared listing: tree number, species, trunk diameter at 1.5 m above ground level (or in accordance with Annex C of BS5837:2012), tree height, crown spread (cardinal points), crown clearance (cardinal points), height of first branch and growth direction, age class and estimated remaining life expectancy in years.

Measurements for tree height, first branch height, crown clearance and crown spread were taken to an accuracy of 0.5 m. Stem diameter measurements were recorded to the nearest 10 mm. Any specific observations or recommendations for management were also noted.

Each tree was assessed and assigned to one of the following categories:

- Category A: Those trees of high quality and value with an estimated remaining life expectancy of at least 40 years.
- Category B: Those trees of moderate quality and value with an estimated remaining life expectancy of at least 20 years.
- Category C: Those trees of low quality and value with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter below 150 mm.
- Category U: Trees 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.

Categories A, B and C have further sub-categories with regards to the reasons for tree retention:

1: Mainly arboricultural qualities
2: Mainly landscape qualities
3: Mainly cultural values, including conservation.

2.3 ROOT PROTECTION AREA (RPA)

The RPA has been calculated for each of the Category A, B and C trees. This is a minimum area around a tree which is deemed to contain a sufficient number of roots, and rooting volume, to maintain a tree's viability.

These figures have been calculated utilising the formulas within Section 4.6 and Annex D of British Standard 5837:2012.

3. TREE PROTECTION AND PLANNING POLICY

3.1 STATUTORY TREE PROTECTION

A search undertaken using the Protected Trees map provided by the London Borough of Hillingdon (London Borough of Hillingdon. 2019. Protected Trees. [ONLINE] Available at: http://lbhillingdon.maps.arcgis.com/apps/View/index.html?appid=7b18f60872a94d38a0c9bf1aea032760. [Accessed 23 April 2019].) has established that none of the trees surveyed are protected by a Tree Preservation Order and that the site is not within a Conservation Area.

3.2 PLANNING POLICY

National Policy and Guidance

Guidance within the National Planning Policy Framework states that “planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss".

The large Ash tree (T3) is a specimen which could potentially attain veteran status and thus it is recommended that this tree is retained within any new development, though it is noted that further investigation into the health and condition of the tree is merited as at the time of the survey inspection of the tree was restricted due to it being clad in Ivy growth.

BS5837:2012, provides guidance to the consideration of trees in relationship to proposed development. This document is recognised as best practice when assessing trees on a site that is being considered for development.

In respect of this it can be noted that Category A, B or C trees or tree groups are those that should be a material consideration in the planning process whilst Category U trees are those which would be lost in the short term for reasons connected to their physiological or structural condition and hence they should not be a consideration in the planning process.

3.3 PROTECTED SPECIES

Bats
Mature trees often contain cavities, hollows, peeling bark or woodpecker holes which provide potential roosting locations for bats. Bats and the places they use for shelter or protection (i.e. roosts) receive European protection under The Conservation of Habitats and Species Regulations 2010 (Habitats Regulations 2010, as amended). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. Causing damage to a bat roost constitutes an offence.

Should the presence of a bat roost be suspected whilst completing works to any trees on site then an appropriately licensed bat worker should be consulted for advice.

Birds
Trees and hedgerows offer potential habitat for nesting birds which are protected under the Wildlife and Countryside Act WCA 1981 (as amended). Some species (listed in Schedule 1 of the WCA) are protected by special penalties. This legislation makes it an offence to intentionally or recklessly damage or destroy an active bird nest or part thereof.

As the trees on, and adjacent, to the site provide potential habitat for nesting birds all tree work should ideally be completed outside the nesting bird season.

If this is not possible then the vegetation should be subject to a nesting bird inspection by a suitably experienced ecologist prior to commencement of works. If any active nests are identified then the vegetation, and a defined buffer zone, will need to remain in place until the young have naturally fledged.

4. SURVEY RESULTS

4.1 WEATHER CONDITIONS AND PERSONNEL

The survey was completed on the 16th April 2019 by Edmund Lusk of Helicopter Trees Ltd. Edmund Lusk holds the HND in Arboriculture, is a LANTRA qualified Professional Tree Inspector and is a professional member of the Arboricultural Association and of the Consulting Arborist Society.

The weather conditions at the time of the surveys are shown in Table 4.1. The weather conditions prevailing on the day of the surveys were not considered to present a constraint to the inspection of the trees.

Conditions	Results
Temperature (°C)	9
Cloud Cover (%)	60
Precipitation	Nil
Wind Speed (Beaufort)	F0-1

Table 4.1: Weather Conditions at Time of Survey

4.2 GENERAL DESCRIPTION OF TREE STOCK

The site's tree stock comprises a mixture of established mature trees and areas of dense tree groups formed by unmaintained hedgerows and scrub vegetation.

The most significant trees are those located along the southern boundary of the site and those within the off-site woodland to the north.

Overall the survey undertaken recorded the presence of 16 individual trees and 5 groups of trees. The locations of the trees and groups surveyed are detailed on the Tree Constraints Plan, Drawing Number D17110-01, in Section 7.

4.3 TREE SPECIES

Tree species recorded during the survey are listed in Table 4.2.

Common Name	Scientific Name
Ash	*Fraxinus excelsior*
Beech	*Fagus sylvatica*
Elder	*Sambucus nigra*
Elm	*Ulmus* sp.
Goat Willow	*Salix caprea*
Hawthorn	*Crataegus monogyna*
Holly	*Ilex aquifolium*
Lime	*Tilia x europaea*
Oak	*Quercus robur*
Sycamore	*Acer pseudoplatanus*

Table 4.2: Tree Species Recorded During Survey

4.4 TREE QUALITY

Physiological Condition

An assessment of the current physiological condition of the trees was made during the site survey.

Trees considered to be in a good physiological condition are those with crown density and shoot extension growth levels within the expected ranges for their age and species. Generally, these trees, subject to being of a suitable structural condition, can be expected to make a lasting contribution to the site. Additionally,

trees within the good condition class are likely to tolerate changes within their growing environment that occur as a result of development; as such their successful retention will be easier to achieve.

Trees considered to be in a fair physiological condition are those specimens exhibiting lower shoot extension growth and reduced crown density than would typically be expected. These specimens have a lower life expectancy than those within the good condition class and will not tolerate significant changes as a result of development as well as those in the good condition class.

Trees considered to be in a poor physiological condition are those exhibiting crown and shoot dieback and significantly reduced crown density. Trees of a poor physiological condition are not likely to make a lasting contribution to the site and whilst their retention in the short term may be beneficial such retention will only be achievable if the trees are fully protected throughout development as they will not tolerate changes in their growing environment.

Chart 4.1 summarises the distribution of tree physiological condition across the study area.

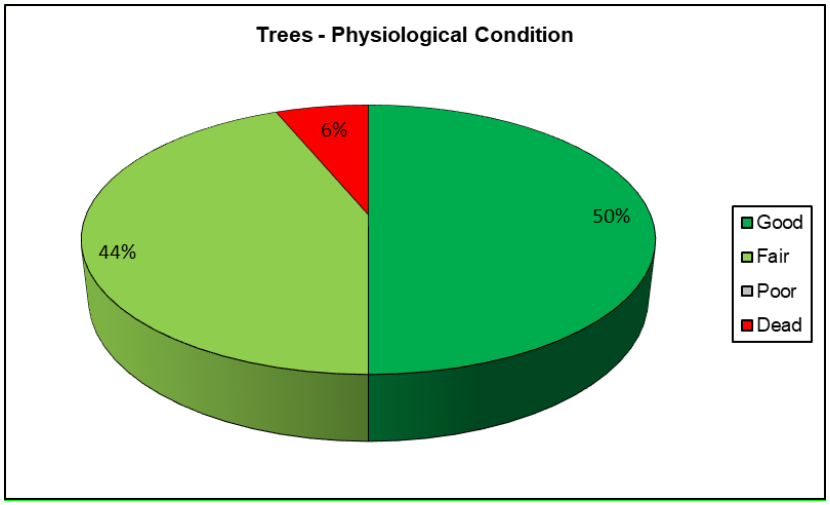


Chart 4.1: Tree Physiological Condition

Structural Condition

Generally, the trees across the site were in a fair to good structural condition and thus are unlikely to present significant hazards to users of the site should they be retained within the proposed development. However, further inspection of the large Ash (T3) following the removal of Ivy from its stem and crown is required and one small dead tree (T8) requires removal.

Age Distribution

Those trees assessed as being young (Y) and semi-mature (SM) in age can generally be considered to have significant growth potential. Whilst these specimens are not likely to make a substantial contribution to the landscape character of the site at present they will, if retained, provide succession for the eventual removal of mature or over-mature trees as a result of declining physiological or structural condition.

Early mature trees (EM) will generally make a contribution to the landscape character and appearance of the site and their retention will provide more immediate succession. These trees will also have significant growth potential.

Mature trees (M) are not considered to have significant future growth potential and have generally reached their maximum expected size for the location. These trees will generally make the highest contribution to the landscape contribution of the site however a tree stock over dominated by mature trees will require careful management to ensure that continuation of canopy cover can be achieved.

Over-mature trees (OM) do not have the potential to increase in size and may in fact reduce in size as their crowns begin to break up. These trees will often make a significant contribution to the landscape character of the site and are likely to have ecological value. However, the retention of these trees within new

development must be carefully planned as they are approaching the end of their useful life expectancy and they will often have structural defects. Where over-mature trees are to be retained in new development it is essential that access is available for their eventual removal.

Veteran trees (V) are those that show features of biological, cultural or aesthetic value that are characteristic of an individual surviving beyond the typical age range for the species. These trees have negligible potential to increase in size. Veteran trees are usually of a high ecological value and they will require sensitive management where they are to be retained in new development. As such it is again essential that they are located in areas where access is available to undertake management operations and where there is a reduced risk of harm occurring from failure of the trees.

Chart 4.2 shows the distribution of the age class of trees within the site.

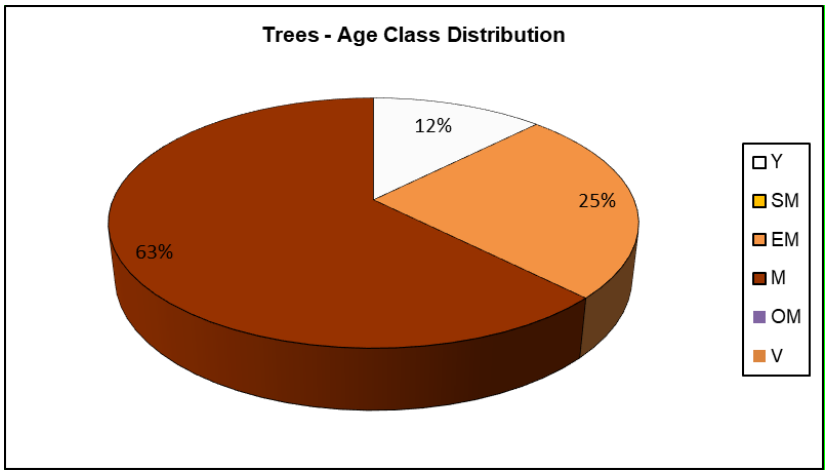


Chart 4.2: Tree Age Class Distribution

Retention Value

The initial stage of a tree survey in accordance to BS5837:2012 looks at the trees on the site in terms of life expectancy and condition. Trees are then categorised according to their retention value.

Category A trees are those that have been assessed as being of a high quality and value; significant amendments to the proposed scheme should be considered in preference to their removal. These trees are shown in Green on the Tree Constraints Plan.

Category B trees are those that have been assessed as being of a moderate quality and value; amendments to the proposed scheme should be considered in preference to their removal. These trees are shown in Blue on the Tree Constraints Plan.

Category C trees are those that have been assessed as being of a low quality and value; the loss of these specimens should not necessarily be considered as a constraint to development. These trees are shown in Grey on the Tree Constraints Plan

Category U trees are those that have been assessed as having no retention value; these trees should not be a material consideration in the planning process. These trees are shown in Red on the Tree Constraints Plan.

Category A, B or C trees are those that should be a material consideration in the planning process whilst Category U trees are those which would be lost in the short term for reasons connected to their physiological or structural condition and hence they should not be a consideration in the planning process.

Overall 16 individual trees and 5 groups of trees have been inspected in accordance with BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'.

A summary of the trees and groups in each of the four categories is given in Table 4.3.

BS5837:2012 Category	Tree Number
A	5, 6, 7, G4.
B	1, 2, 3, 10, 11, 12, 14, 15.
C	4, 9, 13, G1, G2, G3, G5.
U	8, 16.

Table 4.3: Summary of Trees and Groups in BS5837:2012 Categories

4.5 TREE SURVEY SCHEDULE

The full results of the Tree Survey are detailed in Table 4.4.

Tree No.	Species	No. Stems	Diam (mm)	H't (m)	H't 1st Branch (m)	Branch Spread (m)				Age	Phys Cond	Struc Cond	Est. Remain Contrib (Years)	BS5837 Cat	Comments	Works Required
						N	E	S	W							
1	Oak	1	480	12.0	2.0 S	6.0	7.0	7.0	7.0	EM	G	F	20+	B1	• Minor deadwood in crown. • Crown break at 2.0m, with multi-stemmed form from this point. • Dense Ivy on stem and within crown.	-
2	Lime	1	750	21.0	0.5 N	7.5	7.0	6.0	6.5	M	F	F	20+	B1	• Small rot hole on stem at 1.0m, no significant decay evident. • Minor deadwood and branch dieback in crown. • Dense epicormic growth at base restricts inspection of stem. • Small quantity of major deadwood in crown.	Remove epicormic growth and re-inspect.
3	Ash	1	1200	19.0	0.0 W	11.0	9.0	5.0	12.0	M	F	F	20+	B1	• Minor and major deadwood in crown. • Apical branch dieback. • Hazard beam extending north at 3.0m. • Dense Ivy on stem and within crown restricts inspection. • Canopy is pendulous to ground level on western side.	Sever and strip Ivy from stem and crown and re-inspect.
4	Goat Willow	8	320	10.0	1.0 S	5.0	5.0	5.0	5.0	EM	G	F	10+	C1	• Multi-stemmed at base.	-
5	Lime	1	850	24.0	5.0 E	9.0	7.0	8.0	5.0	M	G	F	40+	A1	• Crown shape distorted due to group pressure. • Minor deadwood in crown. • Previously crown lifted.	-
6	Beech	1	800	24.0	4.0 N	9.0	4.0	9.0	2.0	M	G	F	40+	A1	• Ivy on stem restricts inspection. • Crown shape distorted due to group pressure.	-
7	Lime	1	850	24.0	3.0 N	8.0	3.5	8.0	6.5	M	G	F	40+	A1	• Ivy on stem restricts inspection. • Crown shape distorted due to group pressure.	-
8	Elm	2	170	6.0	2.0 W	2.0	2.0	0.0	1.0	Y	D	P	<10	U	• Dead tree.	Fell and remove.
9	Holly	2	250	8.0	0.0 N	3.0	3.0	2.5	3.0	EM	G	G	20+	C1	• Bifurcate at base.	-
10	Ash	1	550	16.0	2.0 W	6.0	6.0	6.0	6.0	M	G	F	20+	B1	• Minor deadwood and branch dieback in crown. • Off-site tree.	-
11	Ash	1	380	14.0	1.5 N	5.0	6.0	5.0	4.0	EM	G	F	20+	B1	• Stem lean east by 10 degrees. • Crown shape distorted due to group pressure. • Minor deadwood in crown.	-

Table 4.4: Tree Survey Schedule (continues)

Tree No.	Species	No. Stems	Diam (mm)	H't (m)	H't 1st Branch (m)	Branch Spread (m)				Age	Phys Cond	Struc Cond	Est. Remain Contrib (Years)	BS5837 Cat	Comments	Works Required
						N	E	S	W							
12	Lime	1	650	18.0	0.0 W	6.0	7.0	7.0	7.0	M	F	F	20+	B1	• Minor deadwood and branch dieback in crown. • Epicormic growth at base and Ivy on stem restrict inspection.	-
13	Sycamore	5	510	14.0	2.0 E	5.0	5.0	4.0	5.0	M	F	F	10+	C1	• Multi-stemmed at base. • Minor deadwood and branch dieback in crown.	-
14	Lime	1	650	18.0	0.0 W	7.0	7.0	6.0	7.0	M	F	F	20+	B1	• Minor deadwood and branch dieback in crown. • Epicormic growth at base and Ivy on stem restrict inspection.	-
15	Lime	1	600	18.0	0.0 W	6.0	7.0	6.0	6.0	M	F	F	20+	B1	• Minor deadwood and branch dieback in crown. • Epicormic growth at base and Ivy on stem restrict inspection.	-
16	Elm	1	150	6.0	2.0 E	2.5	2.5	2.5	2.5	Y	F	F	<10	U	• No long-term potential due to species susceptibility to Dutch Elm Disease.	-
G1	Hawthorn, Holly, Ash	1	200	6.0	0.0 W	2.5	2.5	2.5	2.5	EM	F	F	10+	C1	• Small group of suppressed trees. • Dense Ivy restricts inspection.	-
G2	Holly, Hawthorn, Elm	1	150 - 300	6.0 - 8.0	0.0 E	2.0 - 4.0	2.0 - 4.0	2.0 - 4.0	2.0 - 4.0	EM M	F	F	10+	C1	• Unmaintained hedgerow to site boundary. • Multi-stemmed trees within group. • Minor deadwood and branch dieback in crowns. • Dead and declining Elm within group.	-
G3	Elm, Elder, Hawthorn	1	200	4.0 - 6.0	0.0 S	2.0 - 4.0	2.0 - 4.0	2.0 - 4.0	2.0 - 4.0	EM	F	F	10+	C1	• Unmaintained hedgerow and encroaching scrub vegetation along boundary. • Minor deadwood and branch dieback in crowns.	-
G4	Beech, Oak	1	800	16.0 - 20.0	2.0 S	8.0	8.0	8.0	8.0	M	G	F	40+	A1,2	• Off-site woodland. • Minor deadwood and branch dieback in crowns. • Major deadwood in crowns. • Evidence of previous branch failure.	-
G5	Elm, Holly, Hawthorn, Sycamore	1	150 - 200	6.0 - 12.0	0.0 W	2.0 - 4.0	2.0 - 4.0	2.0 - 4.0	2.0 - 4.0	EM	F	F	10+	C1	• Scrub vegetation and unmaintained boundary hedgerow.	-

Key

Age Class
Y: Young = tree up to approximately 10 years old.
SM: Semi-mature = tree within first third of average life expectancy.
EM: Early mature = tree within second third of average life expectancy
M: Mature = tree within final third of average life expectancy
OM: Over mature = tree beyond average life expectancy

Physiological Condition
G: Good = no health problems
F: Fair = symptoms of ill health that may be remedied
P: Poor = poor health
D: Dead

Structural Condition
G: Good = no structural defects
F: Fair = remedial structural defects
P: Poor = significant structural defects

Table 4.4 (cont'd): Tree Survey Schedule

4.6 ROOT PROTECTION AREA (RPA)

Table 4.5 provides details of the Root Protection Area (RPA) of all trees and groups surveyed which were classified as Category A, B or C specimens.

Tree No.	Species	Diameter (mm)	Root Protection Radius (m)	Root Protection Area (m^2)
1	Oak	480	6.0	113
2	Lime	750	9.0	255
3	Ash	1200	14.4	652
4	Goat Willow	320	3.9	48
5	Lime	850	10.2	327
6	Beech	800	9.6	290
7	Lime	850	10.2	327
9	Holly	250	3.0	28
10	Ash	550	6.6	137
11	Ash	380	4.8	72
12	Lime	650	7.8	191
13	Sycamore	510	6.3	124
14	Lime	650	7.8	191
15	Lime	600	7.2	163
G1	Various Species	200#	2.4*	18*
G2	Various Species	300#	3.6*	41*
G3	Various Species	200#	2.4*	18*
G4	Various Species	800#	9.6*	290*
G5	Various Species	200#	2.4*	18*

Key:

*: From centre of hedgerow / around centre of each tree in group.
#: Diameter of largest trees in group.

Table 4.5: RPA Details of Category A, B and C Trees and Groups Surveyed

5. ARBORICULTURAL DESIGN GUIDANCE

5.1 THE TREE CONSTRAINTS PLAN

The Tree Constraints Plan (Drawing Number D17110-01, contained within Section 7 of this report) is designed to show the influence that the trees have upon the site by virtue of their size and position. The plan seeks to act as a design tool that shows both the above and below ground constraints presented by the trees.

The information provided within this section of the report is to assist in the interpretation of the Tree Constraints Plan and aims to ensure that those trees selected for retention can be successfully integrated within the proposed development.

5.2 TREE RETENTION / REMOVAL

The prioritisation for tree retention should be based upon the guidance contained within BS5837:2012. Category A trees should be seen as the highest priority for retention and Category C the lowest.

Category U trees have no retention value and in most circumstances such specimens will not be considered for retention within new development.

When considering which Category C trees to retain in the new development priority should be given to those trees that have been included within this category solely due to their having stem diameters of less than 150 mm at 1.5 m above ground level. These specimens are normally relatively young trees with future potential.

5.3 BELOW GROUND CONSTRAINTS

Root Protection Areas

Root Protection Areas for each tree and group of trees surveyed have been determined in accordance with BS5837:2012 and a schedule of Root Protection Areas is detailed within this Report as Table 3.4.

Initial Root Protection Areas (RPA's) for the trees have been plotted onto the Tree Constraints Plan as circles, with the tree located centrally, extending to encompass the area of ground, and thus the rootable soil volume, required for protection.

Where possible all development, including new hard landscaping, shall be situated outside of the retained trees designated Root Protection Areas.

New Hard Surfaces and Buildings within Root Protection Areas

The construction of new hard surfaces and buildings around trees has the potential to cause soil compaction, to cause root damage and to reduce nutrient and moisture availability to tree roots to the detriment of tree health and vitality.

To minimise harm occurring as a result of such works, where installation of new hard surfacing is proposed within the Root Protection Areas of retained trees, it must be installed in accordance with no-dig principles.

Should new buildings be proposed within the RPA of an existing tree it will be necessary to take steps to minimise the potential impact to the tree to allow construction. In this respect the guidance contained within BS5837:2012 at clause 7.5 should be considered. This states: "*The use of traditional strip footings can result in extensive root loss and should be avoided. The insertion of specially engineered structures within RPAs may be justified if this enables the retention of a good quality tree that would otherwise be lost (usually Categories A or B). Designs for foundations that would minimize adverse impact on trees should include particular attention to existing levels, proposed finished levels and cross-sectional details. In order to arrive at a suitable solution, site-specific and specialist advice regarding foundation design should be sought from the project arboriculturist and an engineer. In shrinkable soils, the foundation design should take account of the risk of indirect damage.*"

Building Foundations

Any structures built on the site should comply with the foundation depths for buildings near or adjacent to trees and allow for the potential size of the trees at maturity. The soil types throughout the site will need investigating and appropriate measures taken.

If trees are removed across the site the potential for soil heave should be assessed and foundations designed accordingly (see NHBC Chapter 4.2, 2014).

Service Runs

All service runs, utilities and similar infrastructure should take note of trees and allow for working methods that will minimise damage to trees by referring to documents such as NJUG Volume 4 - Guidelines for the planning, installation and maintenance of utility services in proximity to trees (National Joint Utilities Group 2007).

5.4 ABOVE GROUND CONSTRAINTS

Existing Canopy Spreads

The existing canopy spreads of the trees on site are shown on the Tree Constraints Plan (Drawing Number D17110-01, contained within Section 7 of this report).

The current spread of a tree is a constraint due to its dominance, size and movement in strong winds. It will typically be unacceptable to design any built development within the current spread of a tree.

Where built development is proposed in close proximity to existing trees consideration should be given to the amount of working space required to allow its construction.

Additionally, where development is proposed in close proximity to the existing canopy spread of a tree the likelihood of leaf or fruit fall or an accumulation of honeydew causing nuisance must be given.

It should also be noted that where the Root Protection Areas for retained trees do not extend to the edge of existing canopy spreads it is possible that those parts of the trees extending beyond the RPA may sustain damage during construction.

Where this occurs there are two primary options available to manage and minimise the potential for damage to tree canopies during development and these may be used singularly or in combination.

The first option is to create a Construction Exclusion Zone (CEZ), by the erection of protective fencing, around the full extent of the tree's canopy. The second is to undertake pre-development pruning works to the trees to reduce the potential for branch damage to occur.

Future Tree Growth

Some of the trees surveyed are not yet mature and they have the potential for future growth. Where these are to be retained consideration of their ultimate crown spread should be given as future branch growth may result in interference with the proposed development, damage to branches and the need for a tree pruning regime.

Within the area of maximum branch spread, construction activities should be restricted for the long-term health and vigour of the trees. It is considered that within the area of maximum branch spread single storey buildings and the installation of hard surfaces would be an appropriate form of construction, however should car parking be proposed beneath the ultimate spread of trees the likelihood of fruit fall, leaf litter or sap exudation causing a nuisance must be considered.

In addition it is important to consider the likelihood of damage to trees or structures that may be caused by continuous whipping of branches in windy conditions. In such circumstances branches may have to be repeatedly cut back which will introduce wounds in the tree and may spoil its form or shape. In general terms trees should not be retained upon the basis that their ultimate branch spread can be significantly controlled by periodic pruning.

6. RECOMMENDATIONS

The following recommendations are made:

- Further inspections of T2 and T3 should be undertaken following the removal of epicormic growth and Ivy which currently presents a constraint to their full inspection.

- The retention of the Category A and B trees across the site should be considered as a priority as these specimens are those most likely to make a contribution to the continued landscape character of the site.

- The retention of the Category C trees should be considered where possible though it must be noted that these specimens have a low retention value and are likely to only offer a temporary contribution to the landscape character of the site.

- The Category U trees within the site are unsuitable for long-term retention and should be removed prior to commencement of development.

- In general all new development shall be located outside of the RPA or canopy spread of any retained tree.

- Where any new development is proposed within the RPA or canopy spread of a retained tree it must be constructed in such a way that damage of the trees root system or crown can be avoided.

- Should new development require works within the RPA of any retained tree an Arboricultural Method Statement should be prepared to set out what steps are to be taken to protect the trees during the course of development.

The following generic guidance should also be taken into account during the construction phase of the proposed development:

- Any trees, groups or hedgerows that are to be retained should be adequately protected by Heras fencing, in line with BS5837:2012, extending at least to the Root Protection Radius, to prevent accidental damage by vehicles or contractors (see Table 4.5, page 13, for RPA data for each tree).

- All tree works are to be carried out by a competent and qualified arborist to BS3998:2010 standards.

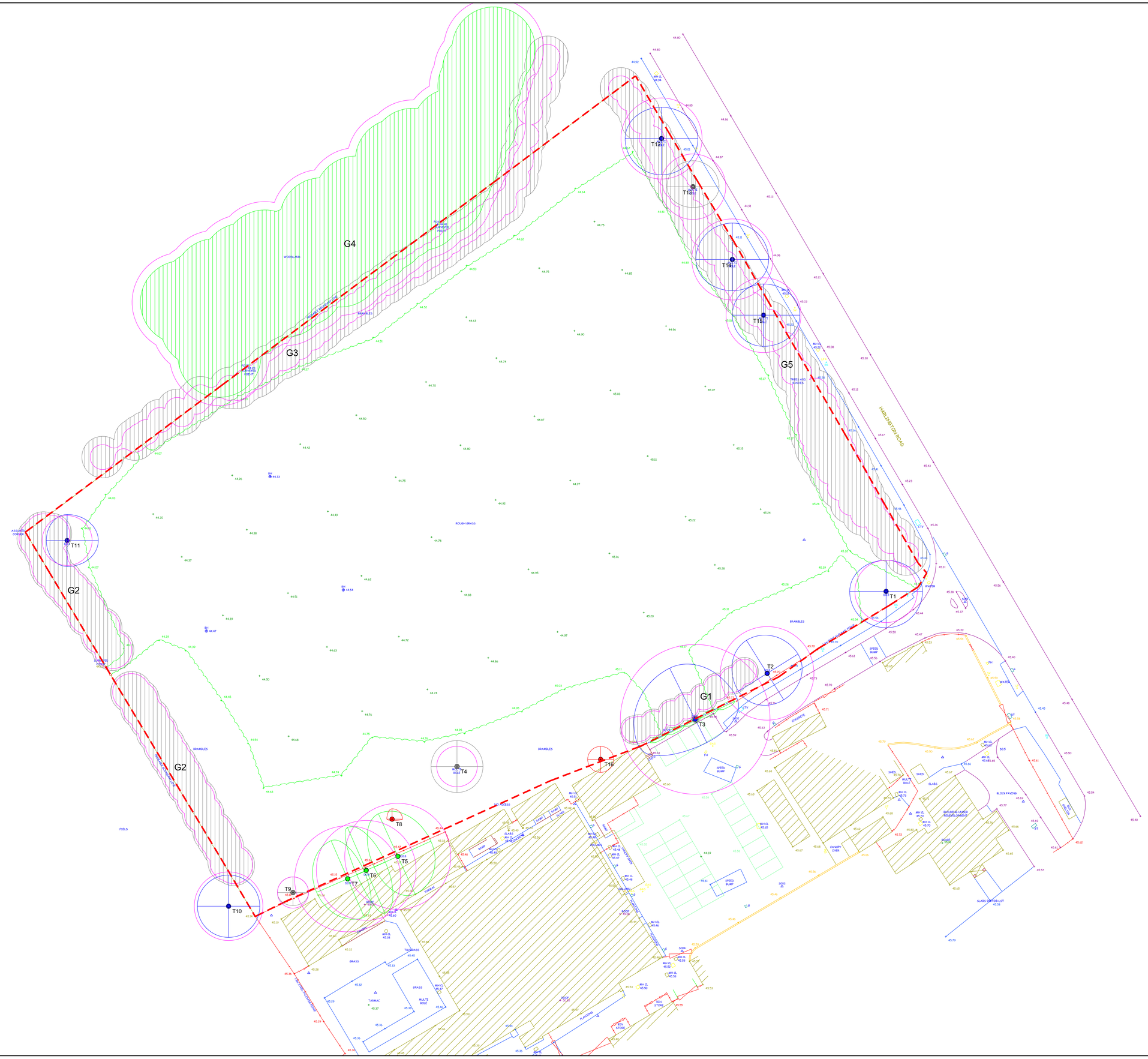
- Tree protection should be included in the induction and/or briefing sessions by the contractors to site personnel.

- Soil compaction, from the storage of large quantities of materials and plant tracking, may result in changes to soil permeability and local drainage. This may lead to waterlogging or loss of soil crumb structure. These effects may in turn lead to root asphyxiation and root death, a cause of instability and or mortality in trees. For this reason, heavy machinery and the storage of materials should be excluded from the crown and Root Protection Radius of all trees.

- The recommendations of BS5837:2012 and National Joint Utilities Group Volume 4 (Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees) (as appropriate to operations) should be followed when working close to trees.

7. DRAWINGS

Drawing Number D17110-01 – Tree Constraints Plan



D17110-01

Key:

- Tree Position and Canopy Spread - Category A
- Tree Position and Canopy Spread - Category B
- Tree Position and Canopy Spread - Category C
- Tree Position and Canopy Spread - Category U
- Tree Group - Category A
- Tree Group - Category B
- Tree Group - Category C
- T1 / G1 — Tree or Group Number
- Root Protection Area
- Survey Area

Tree positions based upon Land Survey, Oakley Building Surveyors, Drawing No. 4573-01. Where trees were not plotted to Land Survey drawing their positions are estimated.

The original of this drawing was produced in colour - A monochrome copy should not be relied upon.

N

Client:	Project:
Options Autism (7) Ltd	Hillingdon Manor School
Drawing:	**Drawing No:**
Tree Constraints Plan	D17110-01
Revision:	**Date:**
-	24/04/19
Scale at A0:	**Drawn:**
1:250	EL

Helicopter Trees
Professional Arboricultural Consultancy

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