

**BROMHAM ROAD, BEDFORD,
BEDFORDSHIRE**

**PRE-DEVELOPMENT
ARBORICULTURAL SURVEY**

A Report to: J. Murphy and Sons Ltd

Report No: RT-MME-129172-01-RevA

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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:	Checked by:	Approved by:
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DISCLAIMER

The contents of this report are the responsibility of Middlemarch Environmental 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.

Middlemarch Environmental 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.

NON-TECHNICAL SUMMARY

Middlemarch Environmental Ltd was commissioned to undertake a Pre-development Arboricultural Survey of a site at Bromham Road, Bedfordshire. To fulfil the project brief a desk study and a field survey of the trees present on site were undertaken in September 2018.

Five of the trees present on site are protected by a Tree Preservation Order, Number 20 (2018). No works must be undertaken on these trees without prior permission from the Local Authority. Additionally, the desk study established that the site is not situated within a Conservation Area.

Duncan Smith (Principal Arboricultural Consultant) undertook the field survey in September 2018. The survey identified that the site contains a number of early-mature and mature trees which are predominantly in a fair or good condition.

The most significant trees recorded within the survey were five London planes, which were located in the northeast of the site adjacent to the railway and Bromham Road, and a Common lime located to the west of the site. All of the above trees were considered to be of a high retention value, Category A, in the Arboricultural Survey.

Several other broadleaf trees were also present within the site and identified to be of a moderate retention value due to their size, age and generally fair condition. The remaining trees and groups of trees were less significant in the local landscape and were thought to have a limited likely future potential, and as such these specimens were typically considered to be of a low retention value.

To ensure the protection of trees selected for retention during the course of the proposed development it is recommended that the guidance set out in Section 5 of this report is considered and that, during development of the site, the retained trees are protected by the erection of tree protection barriers to the specification set out in BS5837:2012.

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1. INTRODUCTION

1.1 PROJECT BRIEF

In September 2018, J. Murphy and Sons Ltd commissioned Middlemarch Environmental Ltd to undertake a Pre-development Arboricultural Survey of trees growing on land at, and adjacent to, Bromham Road in Bedford.

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, hereinafter referred to as the study area, is composed of two parcels of land located to the east and west of the railway and adjacent to Bromham Road. They are approximately 0.3ha and 0.25ha in size respectively and centred on Ordnance Survey Grid Reference TL 039 500.

The study area is located within a predominantly residential area on the north-western fringe of Bedford. Bedford train station lies approximately 350m to the south of the site, and the railway runs from north to south through the site. The site is composed of trees bordering Bromham Road and groups of trees on both sides adjacent to the road. Residential properties lie beyond all site boundaries and Bedford train station car park lies to the south-east.

The location of the trees surveyed can be found on Middlemarch Environmental Ltd Drawing Number C129172-01-RevA-01, contained within 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 or in close proximity to the site are covered by Tree Preservation Orders (TPOs) or if the site is situated within a Conservation Area.

Additionally, an online search using the Multi Agency Geographical Information for the Countryside (*MAGIC*) website for statutory conservation sites was undertaken to determine the presence of any ancient woodlands that have been recorded within a 15m radius of the site.

2.2 CONDITION STATUS

To determine the status 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 with regard to management were also noted. All these observations and measurements are summarised in Section 3.3.

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)

In order to avoid damage to the roots or rooting environment of retained trees, 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 sufficient roots and rooting volume to maintain the tree's viability. Protection of the roots and soil structure in this area should be treated as a priority.

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

3. RESULTS

3.1 DESK STUDY

An internet search using online information provided by Bedford Borough Council confirms that the study area is not situated within a Conservation Area. However, the client provided Tree Preservation Order (TPO) information which confirmed that five London Plane trees within the survey are subject to a TPO (TPO Number 20, 2018).

Reference to the Multi Agency Geographical Information for the Countryside (MAGIC) website indicates that no ancient woodland sites have been recorded within a 15m radius of the survey area.

3.2 WEATHER CONDITIONS AND PERSONNEL

The survey was completed on the 19th September 2018 by Duncan Smith, Principal Arboricultural Consultant. The weather conditions at the time of the survey are shown in Table 3.1.

Conditions	Result
Temperature (°C)	20
Cloud Cover (%)	70
Precipitation	Nil
Wind Speed (Beaufort)	F1

Table 3.1: Weather Conditions at Time of Survey

3.3 SURVEY RESULTS

Tree species recorded during the survey are listed in Table 3.2.

Common Name	Scientific Name
Ash	<i>Fraxinus excelsior</i>
Cherry	<i>Prunus</i> sp.
Common lime	<i>Tilia x europaea</i>
Crab apple	<i>Malus sylvestris</i>
Field maple	<i>Acer campestre</i>
Hawthorn	<i>Crataegus monogyna</i>
London plane	<i>Platanus x hispanica</i>
Sumac	<i>Rhus typhina</i>
Sycamore	<i>Acer pseudoplatanus</i>
White willow	<i>Salix alba</i>
Wych elm	<i>Ulmus glabra</i>

Table 3.2: Tree Species Recorded During Survey

The full results of the Arboricultural Assessment are detailed in Table 3.3.

Tree No.	Species	No. Stems	Diam (mm)	H't (m)	Branch Spread (m)				Min Crown Clearance (m)	Age	Vigour	Struc Cond	Cat	Comments	Preliminary Management Recommendations
					N	E	S	W							
T1	London plane	1	1220	20.0	12.0	11.0	6.0	12.0	4.0	M	G	G	A	<ul style="list-style-type: none"> • Subject to TPO Number 20 (2018). • Old trees with few defects. • Minor deadwood. Previously pollarded. • No significant defects. 	-
T2	London plane	1	1150	21.0	6.0	12.0	8.0	10.0	2.0	M	G	G	A	<ul style="list-style-type: none"> • Subject to TPO Number 20 (2018). • Open wound on northern limb at 4m on southern aspect. 	
T3	London plane	1	890	22.0	12.0	7.0	8.0	10.0	4.0	M	G	G	A	<ul style="list-style-type: none"> • Subject to TPO Number 20 (2018). • Previously pollarded. • Deadwood present. 	-
T4	London plane	1	930	22.0	11.0	8.0	10.0	10.0	2.0	M	G	G	A	<ul style="list-style-type: none"> • Subject to TPO Number 20 (2018). • No significant defects. • Minor deadwood. • Previously pollarded. 	-
T5	London plane	1	940	21.0	10.0	10.0	8.0	7.0	2.5	M	G	G	A	<ul style="list-style-type: none"> • Subject to TPO Number 20 (2018). • No significant defects. • Minor deadwood. • Previously pollarded (stubs). 	-
T6	Ash	2	140	6.0	1.0	3.0	3.0	3.0	1.5	Y	P	P	C	<ul style="list-style-type: none"> • Poor form with fence included. 	-
T7	Field maple	5	400	8.0	3.0	3.0	3.0	3.0	0.0	EM	F	F	B	<ul style="list-style-type: none"> • Self-seeded. • Multi-stemmed from 6m. 	-
T8	White willow	1	400	10.0	3.5	3.5	3.5	3.5	0.5	EM	F	F	B	<ul style="list-style-type: none"> • Unable to gain access due to fencing. • Low crown. • Limited inspection form 8m away due to access. • No significant defects. 	-

Table 3.3 : Results of Arboricultural Survey (continues)

Tree No.	Species	No. Stems	Diam (mm)	H't (m)	Branch Spread (m)				Min Crown Clearance (m)	Age	Vigour	Struc Cond	Cat	Comments	Preliminary Management Recommendations
					N	E	S	W							
T9	Cherry sp.	1	250	6.0	3.5	3.5	3.5	3.5	1.0	EM	F	F	B	• Ivy on stem and in crown.	-
T10	Sycamore	1	140	6.0	2.5	2.5	2.5	2.5	1.5	EM	F	F	C	• Young tree limited value.	-
T11	Wych elm	1	500	14.0	5.0	5.0	5.0	5.0	1.8	EM	F	F	B	• Extensive ivy present on stem and branches. • No signs of decline.	-
T12	Wych elm	4	340	10.0	3.5	3.5	3.5	3.5	2.0	EM	F	F	B	• Multi-stemmed from 6m.	-
T13	Common lime	1	500	9.0	4.0	4.0	4.0	4.0	1.5	M	F	F	B	• Dense ivy. • Previously pollarded.	-
T14	Common lime	1	600	12.0	4.0	4.0	4.0	4.0	1.5	M	G	G	A	• Previously pollarded.	-
G1	Field maple, Sycamore, Common lime, Hawthorn	1	280	9.0	4.0	4.0	4.0	4.0	2.0	EM	F	F	B	• Unmanaged group. • Unable to gain access due to fencing	• Requires severing
G2	Crab apple	1	200	3.0	2.5	2.5	2.5	2.5	2.0	M	P	P	C	• Dense ivy and vegetation limiting inspection. • Fencing restricted access.	-
G3	Sumac	3	240	4.0	3.5	3.5	3.5	3.5	0.0	Y, EM	F	F	C	• Low quality. • Limited value.	-
G4	Field maple, Common lime	1	280	5.0	2.5	2.5	2.5	2.5	2.5	EM	F	F	B	• Typical form. • No obvious defects.	-

Key

Age Class

Y: Young = juvenile tree recently planted

EM: Early mature = tree within first third of average life expectancy

SM: Semi 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

Structural Condition

G: G = no structural defects

F: Fair = remedial structural defects

P: Poor = significant structural defects

RPA: Root Protection Area

Table 3.3 (cont'd): Results of Arboricultural Survey

3.4 ROOT PROTECTION AREA (RPA)

Table 3.4 provides details of the Root Protection Area (RPA) of all trees and groups of trees surveyed which were classified as Category A, B or C specimens. This table also gives an approximate root protection radius for these trees.

Tree No.	Species	Diameter (mm)	Approximate Root Protection Radius (m)	Root Protection Area (m ²)
T1	London plane	1220	14.7	679
T2	London plane	1150	13.8	598
T3	London plane	890	10.8	366
T4	London plane	930	11.4	408
T5	London plane	940	11.4	408
T6	Ash	140	1.8	10
T7	Field maple	<u>400</u>	4.8	72
T8	White willow	<u>400</u>	4.8	72
T9	Cherry sp.	250	3.0	28
T10	Sycamore	<u>140</u>	1.8	10
T11	Wych elm	500	6.0	113
T12	Wych elm	340	4.2	55
T13	Common lime	500	6.0	113
T14	Common lime	600	7.2	163
G1	Field maple, Sycamore, Common lime, Hawthorn	280	3.6*	41*
G2	Crab apple	200	2.4*	18*
G3	Sumac	240	3.0*	28*
G4	Field maple, Common lime	280	3.6*	41*
Key: *: Around centre of each tree within group. <u>000</u> : Estimated dimension.				

Table 3.4 (cont'd): RPA and Approximate Root Protection Radius of Category A, B and C Trees and Groups Surveyed

4. DISCUSSION

4.1 DESK STUDY

Five trees within the study site are subject to Tree Preservation Orders (TPO). Trees T1-T5 (London plane) are included within order TPO 20 (2018). No works must be undertaken on the trees identified as being subject to TPOs that contravene the order. Works include pruning, topping, lopping, uprooting or wilfully damaging these trees. Any proposed pruning works will need to be fully specified and agreed within any planning application. If works are not included within the planning application, a separate TPO application will be required to be submitted to the Local Authority for permission to undertake any works (approximately an 8-week process).

The site is not situated within a Conservation Area.

4.2 TREE QUALITY

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 fourteen trees and four 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 4.1.

BS5837:2012 Category	Tree Number
A	T1, T2, T3, T4, T5, T14.
B	T7, T8, T9, T11, T12, T13, G1,G4.
C	T6, T10, G2, G3.
U	Nil.

Table 4.1: Summary of Trees and Groups in BS5837:2012 Categories

Physiological Condition

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.

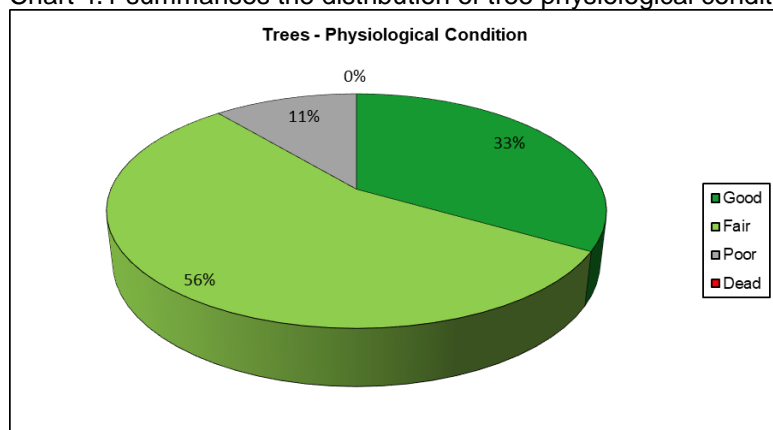


Chart 4.1: Tree Physiological Condition

Age Distribution

Those trees assessed as being young (Y) 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 significant 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 study area.

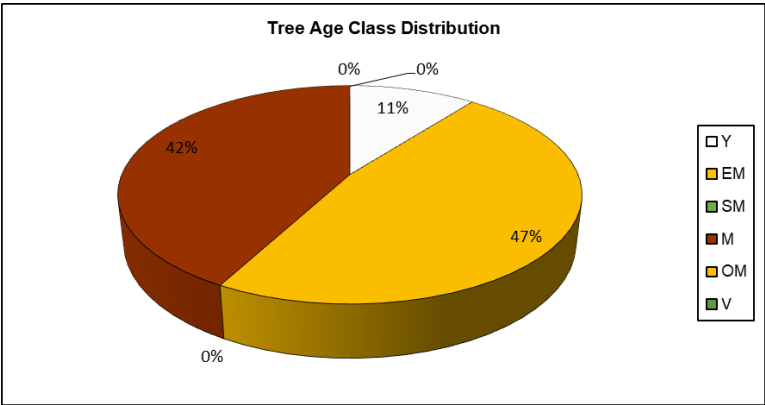


Chart 4.2: Tree Age Class Distribution

Ecological Value

Generally speaking it is known that trees are of ecological value and that they fulfil an important role in the urban landscape. In particular it should be noted that trees may provide habitat for protected species, notably for birds and bats.

5. ARBORICULTURAL DESIGN GUIDANCE

5.1 THE TREE CONSTRAINTS PLAN

The Tree Constraints Plan (Drawing Number C129172-01-RevA-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 (RPAs) 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.

It must be noted that there are areas on site where, due to the presence of existing structures and hard surfaces, tree root development will have been restricted as a result of reduced nutrient or moisture availability and a lack of provision for gaseous exchange. In such areas it may be appropriate to modify the shape of the RPAs, whilst not reducing their area, to take into account the likely root morphology and distribution of the affected trees. However, it is not a simple process to determine exactly where a tree's root system will extend to and whilst roots can generally be considered to be absent beneath substantial buildings, such as houses, they may well be present, if not abundant, beneath lighter structures and areas of hard surfacing.

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

Removal of Existing Hard Surfaces and Buildings

As noted above there are areas on site where buildings and hard surfaces are present within the initial Root Protection Areas of trees on the site.

In addition to the effects that such construction may have upon the shape and location of the Root Protection Area of the tree, the presence of existing construction within the trees initial RPAs is also of note. Removal of such construction, should it be required, has a greater potential to cause harm to the trees due to the need for works in close proximity to them.

Where existing hard surfaces are located within the Root Protection Areas of retained trees care should be taken in their removal and such works should be completed by hand and supervised by an Arboricultural Consultant.

Where existing buildings are located within the Root Protection Areas of retained trees, care shall be taken in their demolition and works should be completed from outside the RPA with buildings being pulled back away from the trees. Again, it is recommended that such works are supervised by an Arboricultural Consultant.

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 C129172-01-RevA-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 site-specific recommendations are made:

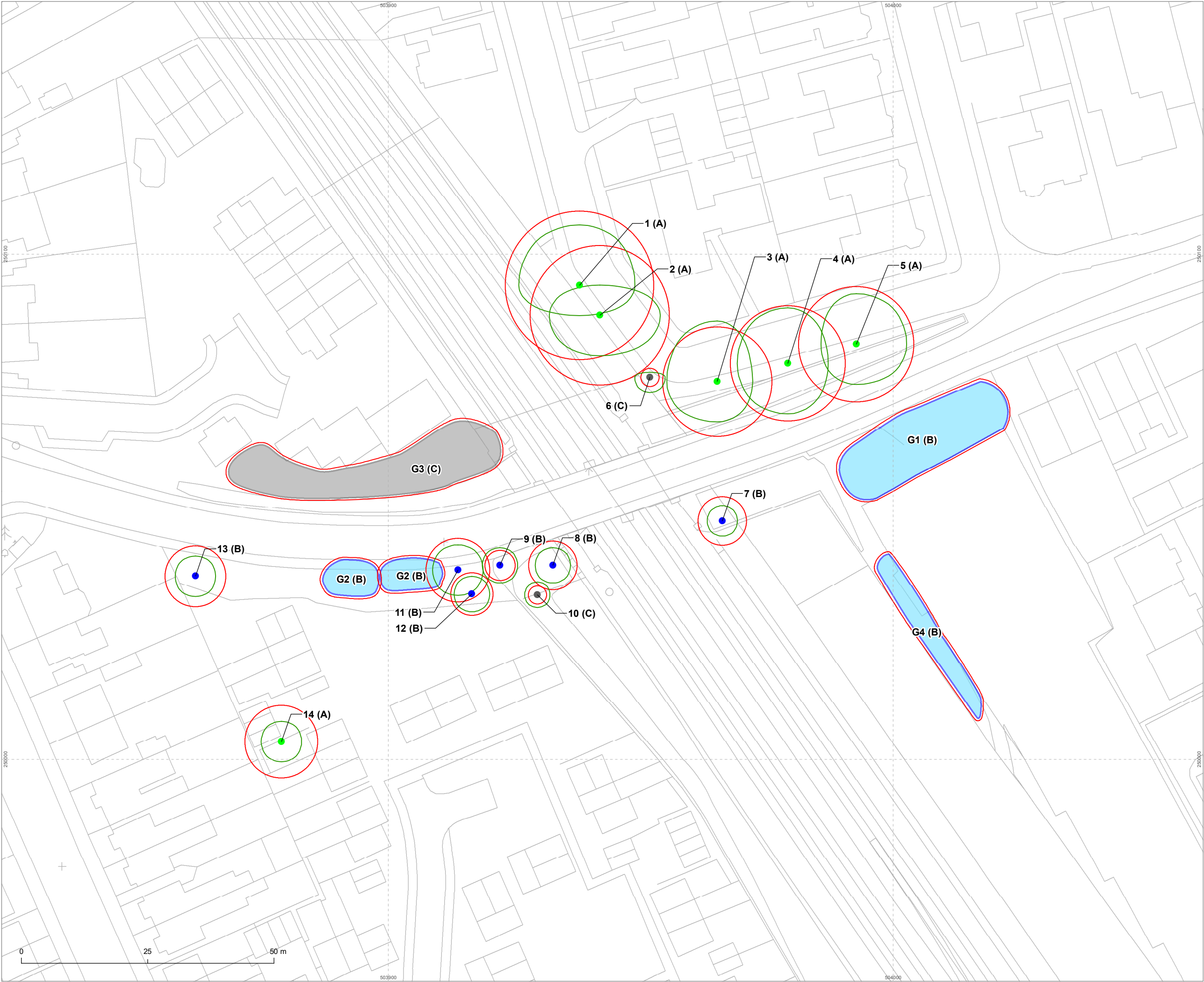
- No works must be undertaken on the trees protected by Tree Preservation Order number 20 (2018) without prior permission from the Local Authority. Works include pruning, topping, lopping, uprooting or wilfully damaging these trees. Any proposed pruning works will need to be fully specified and agreed within any planning application. If works are not included within the planning application, a separate TPO application will be required to be submitted to the Local Authority for permission to undertake any works (approximately an 8-week process).
- The retention of the Category A and B trees across the site should be considered as a priority as these specimens are likely to make a substantial 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.
- 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.
- Any proposed new planting should consist of native and wildlife attracting species with a robust five-year management plan to assist with the development proposal and to offer mitigation for any tree loss.
- This Arboricultural Survey is valid for a period of 12 months. If works are not commenced within this time period then it is advised that the trees are re-inspected to ensure no significant defects have developed since the original survey.

The following generic guidance should also be taken into account during the construction phase of any development, or significant engineering:

- Any trees or groups 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 3.4, page 9, 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.
- If works take place during the bird breeding season, usually from March to September inclusive, trees and hedgerows should be checked for nesting birds. If any trees are to be removed this should be done outside the breeding season or in the presence of a suitably qualified ecologist.
- 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, as amended (Habitats Regulations 2010, as amended). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. Consequently, causing damage to a bat roost constitutes an offence. As such prior to undertaking works to trees a check to see if they are being used for bat roosting should be undertaken by a suitably qualified and experienced ecologist.

7. DRAWINGS

Drawing Number C129172-01-RevA-01– Tree Constraints Plan



C129172-01-01

Legend

●

Category A tree

●

Category B tree

●

Category C tree

Category B group

Category C group

Current canopy extent

Root Protection Area

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

Project

Bromham Road, Bedford

Drawing

Tree Constraints Plan

Client

J. Murphy and Sons Ltd

Drawing Number

C129172-01-01

Revision

00

Scale @ A3

1:700

Date

October 2018

Approved By

DS

Drawn By

CD

MIDDLEMARCH

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