



Arboricultural Implication Assessment

Of Trees At

The Green Dragon Public House,

Salop Road, Wrexham



For

Caldecotte Consultants



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1. Introduction

1.1 We are instructed by Caldecotte Consultants to provide an Arboricultural Implication Assessment (AIA) of the significant trees located on land adjacent to, The Green Dragon Public House, Salop Road, Wrexham.

1.2 This report is produced to evaluate the proposed construction of a new housing development and its associated infrastructure requirements. The juxtaposition with the existing trees is considered.

1.3 We were provided with the following documents:

- Existing plan in digital AutoCAD format
- Proposed development plans in digital AutoCAD format

1.4 This assessment is concerned with recording the species, size and condition of the trees. Recommendations are made where appropriate to establish acceptable levels of safety for the site and also to establish a higher level of arboricultural management.

1.5 The trees are also evaluated for the purposes of British Standard 5837 – Trees in relation to construction - 2005, with regard to their quality and value. The type and size of the root protection area is calculated and the position of the protective barriers is determined. The remaining contribution or safe useful life expectancy is estimated as an indication of the trees period of retention.

1.6 All observations were from ground level without detailed investigation.

1.7 Trees are living organisms whose health and condition may change rapidly and my observations are based on the status of the tree at the time of inspection.

2 Protected Status of Trees

2.1 Trees may be legally protected, this may either be in the form of a Tree Preservation Order (TPO) or that the trees are located within a Conservation area.

2.2 Potentially large penalties may be enforced for illegally carrying out works on protected trees. It is recommended that checks are made before any works are undertaken and no work should commence until permission has been granted.



2.3 AllAboutTrees has been able to ascertain with Wrexham Council (the Local Planning Authority) on Tuesday 19th January 2010 that there are no TPO's however the application site is located within a Conservation Area and 6 week's notice must be supplied to the Local Planning Authority for any proposed tree work not otherwise approved by any relevant planning permission. It is an offence to carry out any tree work without giving the required notice.

3. Site Visit & Description

Site location – N 53° 02' 27.33 W 02°59' 26.65
O/S Grid reference- SJ 336 497 GB Grid

3.1 A site visit was undertaken on Monday 18th January 2010 by Mr Anthony Quigley and Mr Richard Bryson. The weather was fine with no visibility constraints.

3.2 The entrance to the site is from the south just off Bennions Road, which leads into a tarmac car park. From here the public house is located to the northeast and a recycling compound is located in the southern corner.

A 3m ivy clad wall runs in an east to west alignment separating the car park from a rough grassed area to the north.

A possible remnant of a former boundary hedge remains along part of the northern edge, this is now a dense group of trees and shrubs with bramble colonising the ground layer. Ivy is established throughout and prevents thorough inspections of basal areas and lower canopies.

The northern boundary is assumed and is partially demarcated by a dilapidated post and rail fence; beyond this a grass embankment slopes steeply downwards to a supermarket car park.

Little former management is evident consequently the majority of the trees surveyed are low value self set specimens which have been allowed to establish.

The site is relatively flat with no apparent drainage problems.

4. Appraisal

The trees have been surveyed on site and plotted on the site plan. Their positions are considered approximate given the layout and density of planting on the site.

All significant trees have been inspected and some of the smaller specimens have been included for accuracy.

4.1 Tree Removals

It will be necessary to remove some of the existing trees to facilitate the proposed development and to establish a higher level of arboricultural management for the site.

- Trees 1-8, 10-12, 14-23 and groups 1-6 will need to be removed to facilitate the construction of the new buildings, infrastructure modifications and the implementation of new boundary treatments.

To mitigate the above removals new planting should take place throughout the site. Careful consideration should be given to all new planting positions to ensure the trees can grow fully into maturity without requiring major or regular pruning works. New specimens should not be positioned in close proximity to buildings, windows or utility services.

4.2 Retained Trees

Protective barriers as per section 5.1 of this report should be erected around all retained trees in the position indicated by the blue line on the Tree Protection Plan (TPP) prior to any works on site. Signs should also be attached stating that the area is a protected zone and should not be entered.

Individual recommendations are included within Appendix 1 of this report.

4.3 Special 'Tree Friendly' Construction

Tree 13 is located adjacent to the new infrastructure, consequently its root protection area (shown as the red circle on the Tree Protection Plan) extends significantly into an area identified for development.

It is important that no damage is caused to the rooting area, therefore special 'no-dig, tree friendly' methodology as described in section 5.2 of this report should be laid in the area indicated by the green hatching on the Tree Protection Plan (TPP).

For this type of construction to be successful it should be installed following the manufacturer's instructions and under the supervision of a suitably experienced Arboriculturalist who can advise and provide site specific details which will deal with addressing level changes and mitigating any existing or perceived compaction damage.

4.4 Wildlife Habitats

As part of the survey the significant trees were inspected from ground level with the use of binoculars for signs of wildlife habitation, in particular birds and bats.

4.4.1 Bats

All UK bats and their roosts are protected by law. The legislations protecting bats are:

- The Wildlife & Countryside Act 1981 (WCA)
- The Habitat Regulations (also known as) - The Conservation (Natural Habitats, &c.) (Amendment) Regulations 2007

For all countries of the UK, the legal protection for bats and their roosts may be summarised as follows:

You will be committing a criminal offence if you:

1. Deliberately* capture, injure or kill a bat
2. Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats
3. Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time)
4. Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat
5. Intentionally or recklessly obstruct access to a bat roost



**In a court, 'deliberately' will probably be interpreted as someone who, although not intending to capture/injure or kill a bat, performed the relevant action, being sufficiently informed and aware of the consequence his/her action will most likely have.)*

Penalties on conviction - the maximum fine is £5,000 per incident or per bat (some roosts contain several hundred bats), up to six months in prison, and forfeiture of items used to commit the offence, e.g. vehicles, plant, machinery.

No visual signs were found to indicate the presence of bats in the surveyed trees.

When carrying out tree works it is essential that the contractor or other competent person carries out a specific 'bats in trees risk assessment' which can be obtained from the 'Arboricultural Association' or the 'Bat Conservation Trust' (BCT). If evidence of bats is found work must stop immediately and Natural England Batline contacted (0845 1300 228). A further inspection may well be required by a licensed bat handler or roost visitor.

4.4.2 Birds

In the UK, all wild birds, their nests and their eggs are protected by law.

In England, Scotland and Wales the legislation that protects wild birds is:

- The Wildlife and Countryside Act 1981
- The Countryside (or CRoW) Act 2000

No nesting birds were present at the time of inspection.

As with bats the contractor has an obligation to carry out visual checks prior to works. Where possible tree works should be carried out in the period from August to the end of February in order to avoid the bird nesting season.

5. Tree Protection Measure

5.1 Root Protection Area & Barrier Specification

Trees on development sites are prone to damage during the course of demolition and construction works. Retained trees need to be protected in line with British Standard: 5837:2005 Trees in relation to construction - Recommendations.

This usually involves identifying an area around the tree which should remain undisturbed with appropriate protective barriers preventing access to this Root Protection Area during the course of the construction period.

The minimum root protection areas (measured in a radius from the centre of the tree to the protective barrier) are outlined for each individual tree and the barrier layout is indicated on the plan.

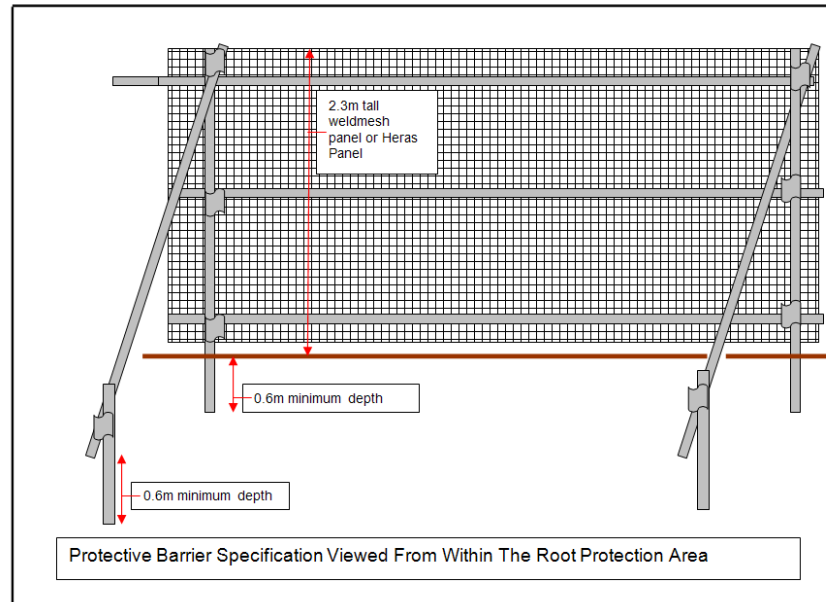
The exact root spread of an individual tree is difficult to quantify, but in general, the bulk of a trees roots are situated in the upper 600mm of the soil with the finer absorbing roots prevalent in the upper 250mm.

Dependant on soil conditions and the species of the tree, the root plate may extend radially for distances in excess of the height of the tree.

In the case of development sites, the root protection area is designed to prevent any significant long term damage to the tree by protecting the root plate and to some extent the lower branches of the tree.

The barriers should be erected prior to work commencing on site and should remain until construction activities have been completed. The root protection area should be considered essential and should not be removed or altered without prior recommendation by an Arboriculturalist and approval of the local planning authority.

The barrier should consist of a vertical and horizontal framework of scaffold tubing which is adequately braced to resist impacts. The vertical scaffold tubes need to be placed at a distance not exceeding 3m apart. The weldmesh or Heras panels need to be 2.3m tall and are securely attached to the scaffold framework with wire or scaffold clamps. The wire or scaffold clamps should be secured on the inside of the barrier to avoid easy dismantling. Panels on rubber or concrete feet are not resistant to impact and should not be used.



Actual barrier being erected on site – incorporating Heras type panels





No fixing shall be made to any tree and all possible care must be taken to prevent damage to tree roots when locating the posts.

All types of barriers must be firmly attached to prevent movement by site personnel or vehicles and all weather signs with the wording "Construction exclusion zone- keep out" should be attached.

5.2 Construction Methodology & Materials Near To Retained Trees

As the site contains a number of trees which will need to be retained as an integral part of the development, it is vital that the trees health and condition is maintained through protective measures and 'tree friendly' construction methods which avoid both short and long term damage to the trees. The areas which require this tree friendly construction are indicated as hatched green on the tree protection plan.

The construction method outlined below is suitable for the construction of permeable footpaths, roads and parking bays. It is not intended as a finished engineering solution but as an outline methodology to allow the construction of the above elements without damaging the nearby tree root system.

If the principles of the 'no dig' construction are followed, no significant permanent damage should occur to the retained trees.

5.2.1 The **principal rules of construction** are as follows:

- 1) No roots are to be severed (except for hand digging to remove rocks or protrusions taking care not to sever any roots over 2.5cm in diameter).
- 2) The soil must not be compacted
- 3) Oxygen and water must be able to diffuse into the soil beneath the engineered surface
- 4) The construction of the road, footpath or parking bay will have to be **above existing ground** level and at least 1.5m away from the trunks of the retained trees.

5.2.2 The method of construction is:

- 1) Ideally construction should be undertaken between the months of May and October when the ground is at its driest and less prone to compaction
- 2) Ground vegetation should be carefully removed with any organic material being removed from the line of the surfacing to prevent the build up of anaerobic conditions beneath the surfacing which will damage the tree roots.
- 3) No digging should take place within the protective zone except for the careful removal of organic matter by hand tools. Any hollows

must be filled with sharp sand, any digging to remove rocks or protrusions must be by hand taking care not to sever any roots over 2.5cm in diameter. Stumps should be ground out rather than excavated to prevent damage to the retained trees roots.



Photo 1- line of new road prior to the commencement of works

5.2.3 The method of providing a permeable surfacing is as follows:

- 1) Lay a Fibretex F4M non woven geotextile material directly on the existing subgrade. Overlap dry joints by 300mm



Photo 2- laying of Fibretex material onto existing subgrade

- 2) Lay and expand the cellular confinement system (e.g. Cellweb by Geosynthetics Ltd) and anchor open during infilling. As a general indication only, a depth of at least 100mm is required for domestic traffic up to approximately 3 tons. A 200 mm depth should accommodate vehicles up to approximately 8 tons.
- 3) The three dimensional cell structure is formed by ultrasonically welding polyethylene (perforated) strips and panels together to create a three dimensional network of interconnecting cells. A high degree of frictional interaction is developed between infill and cell wall, increasing the stiffness of the system. The use of cellular confinement reduces the bearing pressure on the subsoil by



stabilising aggregate surfaces against rutting under wheel loads. Comparisons between cellular confinement and traditional aggregate and grid reinforced structures demonstrate a 50% reduction in construction thickness.

Expand the Cellweb 2.56m wide panels to their full 8.1m length and pin with staking pins to anchor the cells open. Staple adjacent panels together to create a continuous mattress.

Below are illustrations of the correct stapling procedure for joining both edges and ends of panels together.

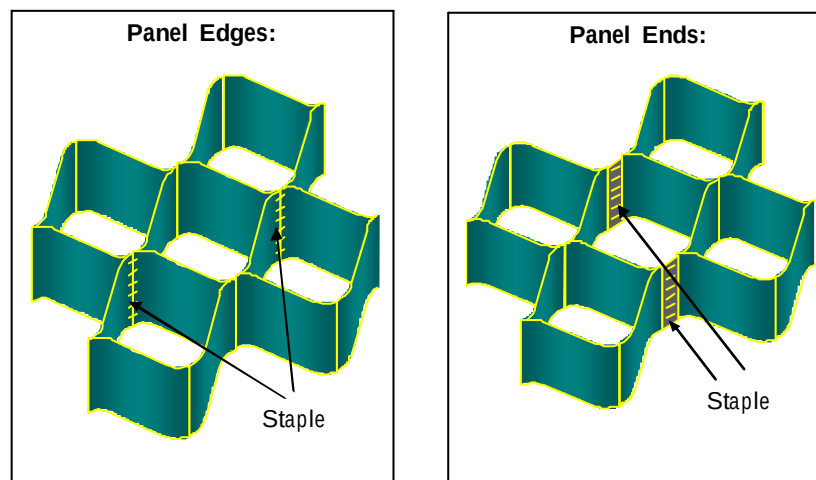


Photo 3- expanding and filling the Cellweb system

- 4) Fill the cellular confinement system with a minimum of 100mm of aggregate (the amount is dependent on the depth of the Cellweb employed). The aggregate should not contain any fines and be of an inert type material such as whinstone chips rather than any lime based product. The angular particle dimensions should be 20-40mm.



As most urban soils are already alkaline in nature, the use of dolomite, limestone or crushed concrete is not suitable for this application as it can react with rain water with the potential to change the soil pH and form impenetrable layers which impede water movement and gaseous exchange



Photo 4- once filled the system can support plant to carry aggregate to the fill area

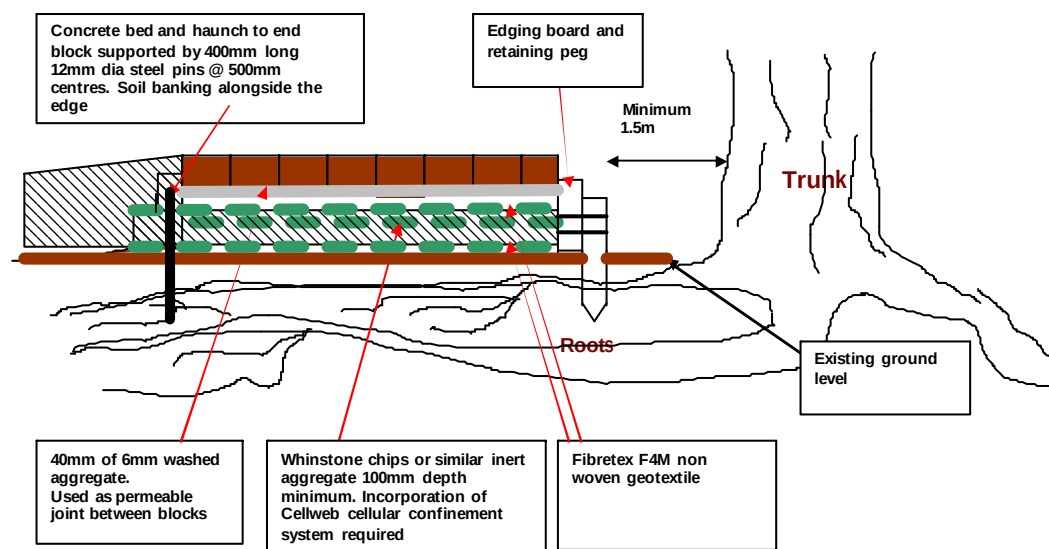
5.2.4 Final surfacing options

- o **Block Paving** –will require the laying of a second layer of Fibrex F4M Geotextile separation fabric over the infilled Cellweb sections. Then lay a sharp sand bedding layer compacted with a vibro compaction plate to the recommended depth. Place paviors as per the manufacturer's instructions using the sand as the jointing material. The use of porous blocks such as 80mm Piora by Marshalls are particularly tree friendly and allow natural rainfall to reach the rooting area.
- o **Porous tarmac** – place 25mm surcharge of the granular material above the Cellweb system and lay the bitumen base and wearing course
- o **Loose Gravel-** Place a second layer of Fibretex F4M Geotextile separation fabric over the infilled Cellweb sections. Place decorative aggregate to the required depth. A treated timber edge should be provided to restrict gravel movement
- o **Grass blocks or gravel infilled blocks** -Lay a second layer of Fibretex F4M Geotextile separation fabric over the infilled Cellweb sections. Place 50/50 rootzone bedding layer to the required depth. Lay recycled Duo Block 500 Grass protection system infilled with 50/50 rootzone mix. Seed as required. Alternatively the grass blocks may be infilled with gravel

It is important that the edging material used does not encroach into the protected area and the use of conventional kerbing is not possible as the depth of excavation required for their installation will sever the tree roots.

Edging supports such as angled steel section or pinned edges are advised as shown in the following drawing although there is a number of varying kerbing options available which do not require any excavation and could be used above the existing ground level.

Diagram of no-dig construction method for minimising root damage (not to scale). Alternative edging materials shown on either side of construction. Block paving surfacing option shown



Where the footpath, road or parking bay goes through a root protection area, it is not usually possible to erect the normal permanent protective barrier at the correct distance from the tree as access to construct the hard surfacing is a requirement. In this situation the permanent protective barrier is erected as per the plan as near to the edge of the working area as possible.

This leaves a portion of the root protection area unfenced and unprotected until the surfacing is laid. Extreme care must be taken to avoid damage to these areas until the cellweb and aggregate is laid and access must be prevented especially to vehicles and plant. This could be achieved by using temporary Heras fencing at distance indicated in the appraisal until such times as the surfacing is constructed.

5.3 Service Runs

It is assumed that the existing service runs will be exploited where possible, but if new works are required it is important that they comply with the National Joint Utilities Group (NJUG) 'Guidelines for the planning, installation, and maintenance of utility services in proximity to trees' and BS 5837. The excavation of open trenches by machine will be unacceptable within the protective zone of any of the retained trees.

Acceptable techniques (fuller details in the appendices) for the laying of services in order of preference are:

- **Trenchless-** by using thrust boring or similar techniques
- **Broken Trench-** to be dug by hand
- **Continuous trench-** to be dug by hand



6. Conclusion

As with any construction exercise near trees, there are potential areas of conflict where damage could be caused to retained trees.

By using the protective elements dictated by British Standard 5837, no significant damage should take place during the construction phase and the tree cover should flourish in the longer term.

It is anticipated that all of the retained trees can be incorporated into the site design; however, it is vital that the ultimate size and spread of the trees should be considered when retaining trees near to the building and that shading and light penetration should also be considered when positioning the windows in the building.

All tree works must conform rigorously to BS 3998 (1989) 'Recommendations for Tree Work' and as modified by more recent research.

For and on behalf of
AllAboutTrees Ltd

Andrew Watson FLS MICFor CBiol MSB FArborA CEnv LCGI
-Chartered Forester and Consultant Arboriculturalist



Appendix 1

Tree Number	Species Common name Latin Name	Height (M)	Crown Spread (M)				Trunk Dia (MM)	Height Of Crown Clearance (M)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimate Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size (M)		Priority
			N	S	E	W												Height Spread		
1	Cherry plum <i>Prunus cerasifera</i>	7.3	3.3	4.8	4.3	5	350	0	Mature	Fair	Poor	3.5	20-40	B- Moderate	Diameter estimated. Ivy is established on the stem and in the canopy and prohibits a thorough inspection. Crossing / rubbing branches. Minor/small diameter deadwood.	This tree conflicts with proposed housing and will need to be removed to facilitate the development.	Low	10	8	A
2	Hawthorn <i>Crataegus monogyna</i>	7.7	0.8	2.8	1.2	2	130	1.6	Middle aged	Fair	Fair	1.6	10-20	C- Low	Multiple stems from ground level and above form numerous tight bark unions. Superficial bark wounds. Crossing / rubbing branches. Asymmetric crown spread. Hanging branches in crown. Ownership unclear due to lack of boundary treatment. But swept to the south.	This low value tree conflicts with the proposed boundary fence and will need to be removed to facilitate its installation.	Low	10	8	A
3	Hawthorn <i>Crataegus monogyna</i>	6	2	1.9	1.6	1.6	160	1	Middle aged	Fair	Fair	1.6	10-20	C- Low	Leans to the south. Ivy is established on the stem and in the canopy and prohibits a thorough inspection. Crossing / rubbing branches. Asymmetric crown spread. Ownership unclear due to lack of boundary treatment.	This low value tree conflicts with the proposed boundary fence and will need to be removed to facilitate its installation.	Low	10	8	A
4	Hawthorn <i>Crataegus monogyna</i>	6.4	2.7	1.7	1.6	1.6	150	1	Middle aged	Fair	Fair	1.5	10-20	C- Low	Multiple stems from 0.5m. Ivy is established on the stem and in the canopy and prohibits a thorough inspection. Crossing / rubbing branches. Asymmetric crown spread. Ownership unclear due to lack of boundary treatment. Trunk divides at ground level to form 2x codominant and 2x subdominant stems. Leans to the north.	This low value tree conflicts with the proposed boundary fence and will need to be removed to facilitate its installation.	Low	10	8	A
5	Hawthorn <i>Crataegus monogyna</i>	6.5	3.6	1.2	2.2	2.7	160	2	Middle aged	Fair	Fair	1.9	10-20	C- Low	Ivy is established on the stem and in the canopy and prohibits a thorough inspection. Crossing / rubbing branches. Asymmetric crown spread.	This low value tree conflicts with the proposed boundary fence and will need to be removed to facilitate its installation.	Low	10	8	A

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			N	S	E	W														
																				Height Spread
															Ownership unclear due to lack of boundary treatment. Leans to the north. Ivy is established on the stem and in the canopy and prohibits a thorough inspection. Crossing / rubbing branches. Asymmetric crown spread.	This low value tree conflicts with the proposed boundary fence and will need to be removed to facilitate its installation.	Low	10	8	A
6	Hawthorn <i>Crataegus monogyna</i>	6.5	3.3	1	2	2.3	240	2	Middle aged	Fair	Fair	2.9	10-20	C-Low	Ownership unclear due to lack of boundary treatment. Branches of adjacent cherry plum entwined in canopy. Ivy starting to climb the stem. Crossing / rubbing branches. Torn stubs.					
7	Cherry plum <i>Prunus cerasifera</i>	7	4	5	5	2.5	280	0	Mature	Fair	Fair	2.9	10-20	C-Low	Minor/small diameter deadwood. Ownership unclear due to lack of boundary treatment. Low spreading form. In contact with adjacent hawthorn.	This low value tree conflicts with the proposed boundary fence and will need to be removed to facilitate its installation.	Low	10	8	A
8	Hawthorn <i>Crataegus monogyna</i>	6.9	3.9	3.1	3	2.1	160	0.5	Middle aged	Fair	Fair	1.6	10-20	C-Low	Multiple stems from ground level and above. Ivy is established on the stem and in the canopy and prohibits a thorough inspection. Crossing / rubbing branches. Minor/small diameter deadwood. 5 stems from ground level in linear arrangement.					
9	Norway maple <i>Acer platanoides</i>	11.8	4	3.6	3.9	4.4	300	3.5	Middle aged	Fair	Fair	3.6	20-40	B-Moderate	Ownership unclear due to lack of boundary treatment. No major visible defects. Leans to the northeast. Ivy starting to climb the stem. Suckers around basal area.	This tree is adequately protected by the position of the protective barrier as indicated by the blue line on the Tree Protection Plan (TPP). Sever ivy at ground level and remove basal suckers. Levels within the RPA must not be altered and the landscaping of the grassed area must take this into consideration. It	Low	18	18	B
														Ownership unclear due to lack of boundary treatment.						

AI**about**Trees

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			N	S	E	W												Height Spread		
																may be necessary to grade the land to the RPA edge.				
10	Japanese cherry <i>Prunus serrulata</i>	7.7	3.1	3.2	1.3	3.4	270	1.5	Mature	Poor	Fair	2.7	10-20	C-Low	Poor form and shape. Ivy established in the upper canopy. Low vitality indicated by poor shoot elongation. Major deadwood in crown. Crown distorted due to group pressure. Ownership unclear due to lack of boundary treatment. Trunk divides at 1.0m to form 2x codominant stems. Barbed wire girdling stem. Large rutble mound at base. Canopy overalls neighbouring property. Leans to the northeast.	This low value tree conflicts with the proposed boundary fence and will need to be removed to facilitate its installation.	Low	9	8	A
11	Hornbeam <i>Carpinus betulus</i>	10.5	3.6	0.7	2.8	1.4	140	1.6	Young	Fair	Poor	1.7	20-40	C-Low	Superficial bark wounds. Asymmetric crown spread. But swept. Soil mound base, possible root rule movement.	This tree conflicts with the proposed driveway/turning area and will need to be removed to facilitate the development.	None	18	16	A
12	Sycamore <i>Acer pseudoplatanus</i>	10.9	2.8	0.4	0.9	0.8	140	7	Young	Fair	Fair	1.7	20-40	C-Low	Superficial bark wounds. Asymmetric crown spread. But swept to the north.	This tree conflicts with the proposed driveway/turning area and will need to be removed to facilitate the development.	None	22	20	A
13	Silver birch <i>Betula pendula</i>	15	2.6	2.5	1.8	2.1	240	7.3	Mature	Fair	Fair	2.9	20-40	B-Moderate	Excessively crown lifted. Wound to eastern flank of stem starting to occlude. This tree is adequately protected by the position of the protective barrier as indicated by the blue line on the Tree Protection Plan (TPP). Special "tree friendly, no-dig" construction methodology as per section 5.2 of this report must be implemented in the area shown as green hatching on the Tree Protection Plan (TPP). Levels within the RPA must not be altered and the landscaping of the grassed area must take this into consideration. It		None	14	14	-

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			N	S	E	W												Height Spread		
																may be necessary to grade the land to the RPA edge.				
14	Hornbeam <i>Carpinus betulus</i>	10	2	3.2	4.2	2	140	2.3	Young	Fair	Fair	1.4	20-40	C- Low	5 entwining stems from ground level. Close to and overalls adjacent building. Girdling roots.	This group of stems conflicts with the proposed turning area and will need to be removed to facilitate the development.	None	18	16	A
15	Goat willow <i>Salix caprea</i>	6.3	4.1	3.8	3.5	3.6	450	0.5	Mature	Fair	Poor	4.5	10-20	C- Low	Ivy starting to climb the stem. Trunk divides at ground level to form multiple stems the resulting fork unions are tight and are considered structurally compromised. Stems lean to the north. Vandal damage - snapped lower branches. Tree house erected in crown, (limbs lopped to facilitate). Basal decay on eastern flank extent unknown. Ivy and rubble at base prevents thorough inspection.	This tree conflicts with the proposed access road and will need to be removed to facilitate the development.	Low	16	14	A
16	Elder <i>Sambucus nigra</i>	4	0.5	2	1.6	0.3	80	0	Middle aged	Fair	Fair	0.8	10-20	C- Low	Minor/small diameter deadwood. Asymmetric crown spread. 2x codominant stems from ground level. Self set in verge of car park.	This shrub conflicts with the proposed access road and will need to be removed to facilitate the development.	None	10	8	A
17	Sycamore <i>Acer pseudoplatanus</i>	6.6	1.8	2	1.6	2	80	0.2	Young	Fair	Poor	0.8	20-40	C- Low	Self set in verge of car park. Multiple stems from ground level from numerous tight fork unions.	This tree conflicts with the proposed access road and will need to be removed to facilitate the development.	None	22	20	A
18	Sycamore <i>Acer pseudoplatanus</i>	5.3	1.6	1.4	1.4	1.5	60	0	Young	Fair	Fair	0.6	20-40	C- Low	Self set in verge of car park. Multiple stems from ground level.	This tree conflicts with the proposed footpath and will need to be removed to facilitate the development.	None	22	20	A
19	Sycamore <i>Acer pseudoplatanus</i>	5.8	1.6	2	1.8	2	90	0	Young	Fair	Fair	0.9	20-40	C- Low	Self set in verge of car park. Multiple stems from ground level. Bark wound from 1.6m to 2.3m, (now occluding).	This tree conflicts with the proposed footpath and will need to be removed to facilitate the development.	None	22	20	A
20	Sycamore <i>Acer pseudoplatanus</i>	7.2	2	2.6	3.1	3.2	100	0	Young	Fair	Fair	1	20-40	C- Low	Asymmetric crown spread. Self set in verge of car park. Multiple stems from ground level. Elder growing at base fuses with the trunk.	This tree conflicts with proposed car parking and will need to be removed to facilitate the development.	None	22	20	A
21	Hawthorn <i>Crataegus</i>	6.1	3	2.9	1.6	2.3	140	0	Middle aged	Fair	Poor	1.4	20-40	C- Low	Minor/small diameter deadwood. Self set in verge of car park.	This low value specimen conflicts with proposed re-landscaping and will	None	10	8	A

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Tree Number	Species Common name Latin Name	Height (M)	Crown Spread (M)				Trunk Dia (MM)	Height Of Crown Clearance (M)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimate Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size (M)		Priority
			N	S	E	W												Height	Spread	
	<i>monogyna</i>														Trunk divides at ground level to form 1x dominant and 1x entwining subdominant stem the resulting fork union is tight with included bark.	restrict movement of construction vehicles in this area. Remove tree and replace with a suitable specimen chosen as part of a cohesive planting scheme.				
22	Sycamore <i>Acer pseudoplatanus</i>	7.3	2	2.6	3	1.8	230	0	Young	Fair	Fair	2.3	20-40	C- Low	Ivy starting to climb the stem. Crossing/ rubbing branches. Self set in verge of car park. Multiple stems from 0.7m and above. Dog rose in lower canopy.	This low value specimen conflicts with proposed landscaping and will restrict movement of construction vehicles in this area. Remove tree and replace with a suitable specimen chosen as part of a cohesive planting scheme.	None	22	20	A
23	Ash <i>Fraxinus excelsior</i>	4.2	1.5	1.8	1.6	1.3	80	0.2	Young	Fair	Poor	0.8	10-20	C- Low	Self set in verge of car park. Abuts against the boundary brick wall. Trunk divides at ground level to form 1x dominant and 1x subdominant stem. The resulting fork union is tight and is likely to become structurally compromised as the tree matures.	This tree conflicts with the proposed frontage wall and will need to be removed to facilitate the development.	None	23	18	A
Group 1	Ash, Dog rose, Oak, Apple	<4	-	-	-	-	<80	0	Young	Fair	Fair	1.0	20-40	Low	A sparse unmanaged scrub group comprising of self set saplings and sporadic dog rose.	This group conflicts with the proposed development and will need to be removed to facilitate the scheme.	None	23	18	A
Group 2	Sycamore, Hawthorn	<7.5	-	-	-	-	<110	0	Young	Fair	Fair	1.3	20-40	Low	A small group of self set young trees comprising of approximately 10 specimens.	This group conflicts with the proposed development and will need to be removed to facilitate the scheme.	None	22	20	A
Group 3	Buddleia, Sycamore, Elder	<4	-	-	-	-	<80	0	Young	Fair	Fair	0.7	20-40	Low	An unmanaged scrub group comprising of self set saplings.	This group conflicts with the proposed development and will need to be removed to facilitate the scheme.	None	22	20	A
Group 4	Ivy, Elder	<3.5	-	-	-	-	<50	0	Young	Fair	Fair	0.6	10-20	Low	A linear group of ivy which envelopes the 3m wall to the south (contains sporadic self set elder specimens).	This group conflicts with the proposed development and will need to be removed to facilitate the scheme.	Low	10	8	A
Group 5	Hornbeam	<1	-	-	-	-	<120	0	Young	Fair	Fair	1.4	10-20	Low	A small group of hornbeam specimens which have been reduced to 0.5-1.0m stumps (several now have regrowth).	This group conflicts with the proposed development and will need to be removed to facilitate the scheme.	None	18	16	A

AI**about**Trees

Tree Number	Species Common name Latin Name	Height (M)	Crown Spread (M)				Trunk Dia (MM)	Height Of Crown Clearance (M)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimate Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size (M)		Priority
			N	S	E	W												Height	Spread	
Group 6	Bramble, Cherry plum, Hawthorn, Ivy	<7.0	-	-	-	-	<140	0	Young	Fair	Fair	1.7	20-40	Low	A dense, unmanaged scrub group comprising of self set specimens. Bramble dominates the ground layer. Ivy is established on several specimens prohibiting a thorough inspection.	This group conflicts with the proposed development and will need to be removed to facilitate the scheme.	Low	10	8	A

Appendix 2(1)

Glossary of Terms

1	Reference number:	An individual identifying number
2	Species:	Species identification is based on visual field observations and lists the common name. In some cases the botanical name will be used where there is no common alternative. On in-depth surveys the botanical name only may be used
3	Height:	Height is estimated to the nearest metre. On computerised surveys this may be within a range of heights. When measured height is required, a clinometer is used to measure to the nearest metre
4	Diameter:	Trunk diameter measured at 1.5 metres from ground level to the nearest centimetre. In some surveys this is indicated as a range
5	Spread:	Measurement of canopy from the trunk to the nearest metre in four directions, North, South, East, and West in metres
6	Lower crown Clearance:	Height in metres of crown clearance above adjacent ground level
7	Age :	Either an estimate (or statement if accurately known) of the age of the tree, classified as: Y = Young tree, established tree usually up to one third of expected ultimate height & spread MA = middle aged, usually between one third and two thirds of ultimate height & spread M = Mature, more or less at full height but still increasing in girth & spread OM = Over mature, grown to full size and becoming senescent, V = Veteran tree, individuals surviving beyond the typical age range for the species
8	Physiological Condition:	Good = Healthy tree with good vitality. Fair = Moderate health and vitality normal or slightly less for species and age Poor = Poor shape or form - signs of decline in crown, may have structural weakness. Dead = dead or dying tree
9	Structural Condition:	Good = No visible structural defects Fair = Only minor structural defects Poor = Defects which may need to be rectified or regularly monitored Remove = Severe defects which may result in immanent failure or collapse
10	Management Recommendation s:	General comments on the condition of the tree or group and any action required. potential for wildlife habitats
11	Estimated Remaining Contribution:	Safe Useful Life Expectancy (SULE): in some cases the age ranges are modified Short: 0 – 10years Medium: 10– 20 Years Intermediate: 20-40 Long: 40+ years
12	Tree Quality:	Assessment of tree quality see following cascade chart for details
13	Priority:	A - Works to achieve an acceptable level of safety or required to facilitate the development B - Works to achieve higher levels of arboricultural management. C - To improve the aesthetic appearance.
12	Ultimate Size:	Taken from Arboriculture Research Note 8490ARB or NHBC Standards Chapter 4.2 as appropriate The Normal Ultimate Height in an Urban Situation in metres. Ultimate spread of the Crown in metres.
13	Root Protection Area:	The distance at which the protective barrier should be erected measured in a radii from the centre of the trunk in metres.
14	Pruning:	Pruning shall be defined as the removal of living or dead parts of a plant by the Contractor. Such parts may be soft growth, twigs, branches, limbs or sections of the tree trunk. The cut material may vary from small to large in size.
15	Crown Cleaning:	Cleaning out is defined as the removal of dead, dying or diseased branchwood, broken branches or stubs left from previous tree surgery operations (see also 16 Deadwooding) together with all unwanted objects, which may include ivy (if specified) and/or other climbing plants, nails, redundant cable bracing, rope swings, tree houses and windblown rubbish from the tree, and any such debris from any cavities within the tree.
16	Deadwood Removal:	Dead-wooding shall be defined as the removal of all dead and dying branches and limbs from the tree.
17	Crown Lifting:	Crown lifting shall be defined as the removal of all soft growth and branches or parts thereof which are below or which extend below the height specified in the tender documents. It is recognised that the resultant canopy base might not be one single level but might be stepped to allow for different clearances, for example where a tree overhangs both the footway and the road where different height clearances are required.
18	Crown Reduction:	Crown reduction shall be defined as the reduction of the complete outline dimension of the canopy, from the tips of limbs and branches to the main trunk, by pruning growth to an acceptable branch, twig or but to leave a flowing silhouette.

Appendix 2(11) Cascade Chart For Assessing Tree Quality

Cascade chart for assessing tree quality					
Category and definition		Criteria – Subcategories			Identification on plan
		1 Mainly arboricultural values	2 Mainly landscape values	3 Mainly cultural values, including conservation	
Category High = A Those of high quality and value in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested)		Trees that are particularly good examples of their species, especially, if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups)	Trees, groups or woodlands of significant conservation historical, commemorative or other value (e.g. veteran trees or wood – pasture)	Green
Category Moderate = B Those of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20 years is suggested)		Trees that might be included in the high category, but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage)	Trees present in numbers, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating than they might as individuals but which are not, individually, essential components of formal or semi-formal arboricultural features (e.g. trees of moderate quality within an avenue that includes better, A category specimens), or trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality	Trees with clearly identifiable conservation or other cultural benefits	Blue
Category Low = C Those of low quality and value currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested), or young trees with a stem diameter below 150mm		Trees not qualifying in the higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit	Trees with very limited conservation or other cultural benefits	Yellow
Category Remove = R Those of such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed for reasons of sound arboricultural management		• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unstable after removal of other R category trees (i.e. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate and irreversible/overall decline • Trees infected with pathogens, of significance to the health and/or safety of other trees nearby (e.g. Dutch elm disease) or very low quality trees suppressing adjacent trees of better quality • Habitat reinstatement may be appropriate (e.g. R category trees used as a bat roost- installation of bat box in nearby tree)			Red

Appendix 2(111)
Guidelines for the Planning, installation and
Maintenance of utility services in proximity to trees-
Based on information from National Joint Utilities
Group (NJUG)

Ideally all services should be placed outside of the trees root protection area, but in some situations this is not feasible due to the confines of the site. If services must be laid within the root protection area acceptable techniques are detailed below in order of preference.

- **Trenchless-** by use of thrust boring or similar techniques. The pit excavations for starting and receiving the machinery should be located outside of the root protection area.
To avoid root damage, the mole should run at a depth of at least 600mm.
Use of external lubricants on the mole other than water (eg oil or bentonite) should be avoided.
- **Broken trench-** by using hand dug trench sections together with trenchless techniques. It should be limited to practical access and installation around or below the roots. The trench must be dug by hand (see following comments re continuous trenching) and only be long enough to allow access for linking to the next section. The open sections should be kept as short as possible.
- **Continuous trench-** the trench is excavated by hand and retains as many roots as possible. The surface layer is removed carefully and hand digging of the trench takes place. No roots over 2.5cm diameter or clumps of smaller roots (including fibrous) should be severed. The bark surrounding the roots must be maintained. Cutting of roots over 2.5cm diameter should not be attempted without the advice of a qualified Arboriculturalist.
If roots have to be cut, a sharp tool (defined as spade, narrow spade, fork, breaker bar, secateurs, handsaw, post hole shoveller, hand trowel) should be used.

Backfilling

Reinstatement of street works must comply with the code of practice New Roads and Streetworks Act 1991 (Specification for the reinstatement of openings in highways), but where tree roots are involved backfilling should be carefully carried out to avoid direct damage to retained roots and excessive compaction of the soil around them.

The backfill should incorporate an inert granular material mixed with top soil or sharp sand (not builder's sand) around the retained roots. This will allow a measure of compaction for resurfacing whilst creating an aerated zone around the roots.

Roots and in particular fine roots, are vulnerable to desiccation on exposure to air. The roots are at greatest risk when there are rapid fluctuations in the air temperature around them (especially winter diurnal temperatures). It is vitally important that the roots are covered with sacking whilst the trench is open. The sacking should be removed once the trench is backfilled.

Planning of services

When laying new or replacement services it is wise to plan ahead to prevent future direct damage to the services from root growth by placing the services within a duct.

If roots have grown into a drain or duct and proliferated to cause a blockage, removal of the root mass will only have a temporary affect and the root will regrow. The fault is in the pipe or duct, not the tree roots and the only answer is to repair or replace the damaged area. Particular problems occur with old salt glazed pipes where clay has been used to seal the joints and has subsequently dried out leaving a gap for the roots to infiltrate.

A popular myth has arisen that tree roots are attracted to water or nutrients within piped systems, this is not so. Roots are adventitious and grow in all directions proliferating in areas where moisture or nutrients are present. They tend to grow near to the pipe to make use of the condensation or moisture build up on the outside of the pipe but will enter the pipe through any crack or damaged joint. They are not capable of breaking into sound pipes.



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