Tree Survey

In accordance with

BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'

Site Ref:	**Harlequin Shopping Centre, Exeter**

Instructed by:	**Rhomco**
Aspect Ref:	**05215-Tree Survey-09.01.2019**
Survey Date(s):	**09.01.2019**
Surveyor(s):	**James Greig**

Accompanying Plans:	**05215 TCP 15.01.2019**

Using the Tree Survey Data

Species

Consideration should be given to whether trees are evergreen or deciduous, density of foliage, and potential nuisance factors such as susceptibility to honey dew drip, branch drop, fruit fall etc.

Canopy Spread

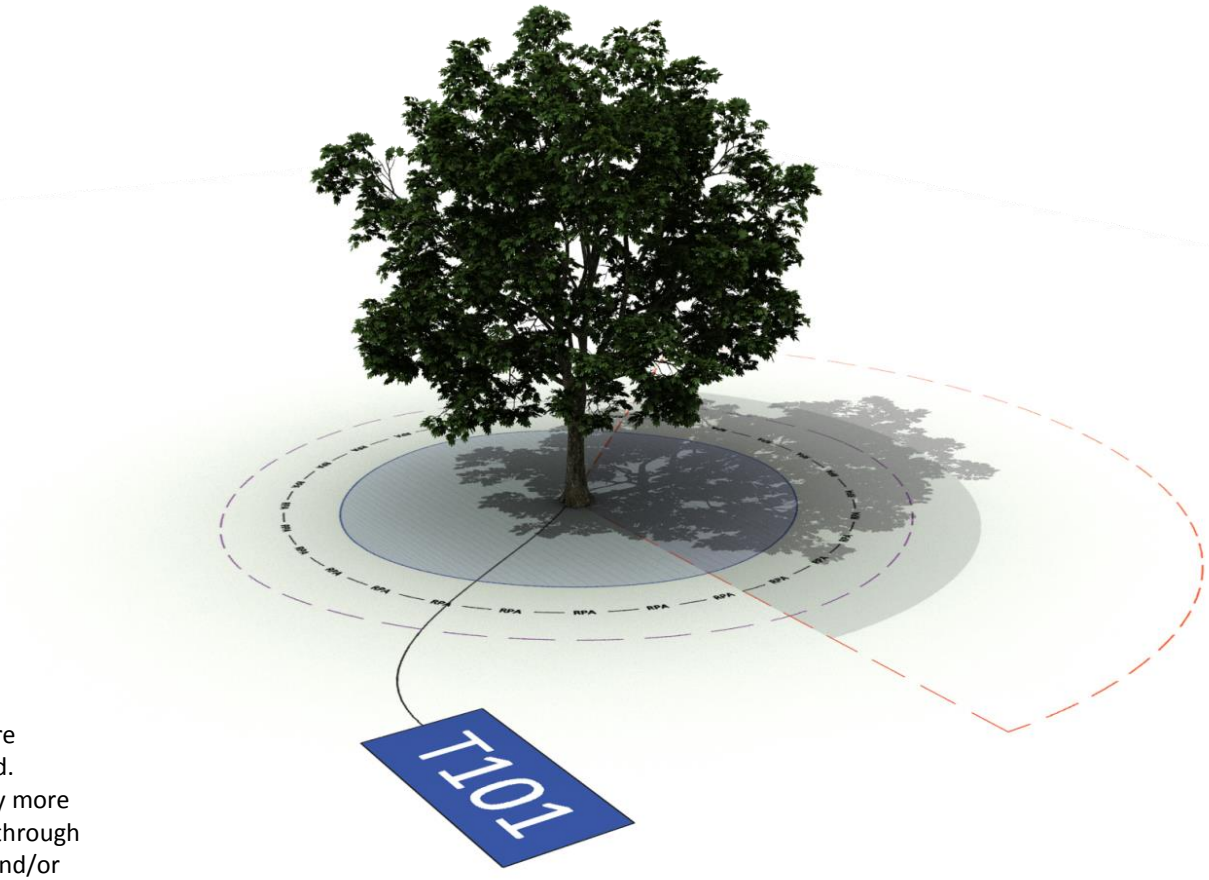
Measured on accessible compass points (estimated where access is restricted) - illustrating approximate current canopy size/shape. Consideration should be given to the existing and future spread of retained trees. Suitable separation between structures and tree canopies should be designed to avoid future nuisance, domination and unreasonable spatial relationships.

Tree Height

Tree heights are shown in the survey data and represented on plan by the shadow arc (existing height = radius of shadow arc).
Future potential height may also be shown - represented by a second arc.

Age Class

Young trees (up to ½ their potential age) generally require enough space to mature if long term retention is planned. Care must be taken with older trees as they are generally more susceptible to damage, and less tolerant of injury/harm through a) root damage; b) compaction of soil; and c) excessive and/or repeated pruning. Adequate space should be allowed for long term physical retention and future maintenance.



Root Protection Area - RPA

Radial **Root Protection Areas** assume a circular area of rooting - calculated in accordance with BS5837:2012.
RPAs represent minimum soil rooting area required to sustain the tree (capped at 707m^2).
RPAs may have been modified to reflect actual site conditions and may not be shown as circular on accompanying plans.
Incursion into the RPA during any part of the investigation, demolition, design & construction phases of the project will require specialist arboricultural input.
Early assessment of impact will facilitate the process and avoid abortive design works.
The RPA is circular by default - any deviation from this must be supported with professional arboricultural assessment.

Shadow Arc

A construct of BS5837 illustrating the general nature & influence where trees might obstruct **direct sunlight**.
The shadow arc represents the most significant area affected by obstruction of sunlight averaged over the year. It is not intended to be definitive and requires an amount of interpretation – it is a good starting point.
Where habitable buildings or useable amenity space are planned within the shadow arc areas it is recommended that further analysis is undertaken using Aspect's tailored software to assess the actual implications.
The shadow arc is not a representation of the absence of skylight/daylight and does not take into account the natural transmissivity of the trees crown – this varies depending on the species etc.
The internal layout, use of buildings and the arrangement of windows is also important. Heavy or prolonged shadowing (effects will be exemplified where trees form groups) of main living areas may be inadvisable whilst the shadowing of side elevations and ancillary rooms may be insignificant.

Demolition, Design & Construction Issues

When planning investigations, demolition, design & construction, layouts and configuring buildings it is important to consider the following against potential negative impacts on retained trees: Investigations (archaeological trenches); Construction space required to build the scheme; location of services/utilities; Highway visibility requirements; hard surfacing (a maximum of 20% coverage of previously undisturbed RPA may be acceptable – further specialist advice should be sought); and other infrastructure provisions such as substations, refuse stores, lighting, signage, satellite dishes and CCTV sightlines. Trees can effect and be affected by many aspects of site operations, during the conception and design process the project arboriculturist should be involved in the on-going review of layout, architectural, engineering and landscape drawings.

Proximity of trees to structures[1]: The default position should be that structures are located outside the RPAs of trees to be retained. However, where there is an overriding justification for construction in the RPA, technical solutions might be available that prevent damage to trees. Account should be taken of the proposed orientation and aspect of new buildings, the type of building, its use and location relative to the tree, and the species attributes of the tree. Buildings, footpaths and hard-standing areas should be designed with due consideration to the proximity of retained trees, especially in terms of their foliage, flowering and fruiting habits. Where conflicts might arise, detailed design should address these issues.

Planning Applications

Local Authorities have a **statutory duty** to consider the protection and planting of trees when granting planning permission for proposed development. The potential effect of development on trees, whether statutorily protected (e.g. by TPO/Con Area) or not, is a material consideration that is taken into account in dealing with planning applications. Consideration should be given to:

- Legal designations e.g. Tree Preservation Orders / Conservation Areas
- Planning policy – National policy (NPPF) / Regional / Local
- Guidance and best practice: BS8545:2014, **BS5837:2012**, BS4428:1989, NHBC Chapter 4.2, BRE CP75/75, BRE 209.

The level of arboricultural information required for planning may depend on the particular LPA or the type of application being made.

[1] Structure is defined in **BS5837:2012** as any manufactured object e.g. building, carriageway, path, wall, service run, and built or excavated earthwork.

BS5837:2012 provides the following guidance relating to levels of information required for planning:

DELIVERY OF TREE-RELATED INFORMATION INTO THE PLANNING SYSTEM:

Stage	Minimum detail	Additional information
Pre-application	• Tree survey.	• Tree retention/removal plan – draft.
Planning application	• Tree survey. • Tree retention/removal plan (final). • Retained trees and RPAs shown on proposed layout • Strategic hard and soft landscape design, including species and location of new tree planting • **Arboricultural impact assessment**	• Existing & proposed levels. • Tree protection plan (TPP). • Arboricultural method statement (heads of terms). • Details for all special engineering within the RPA and other relevant construction details.
Reserved matters/ planning conditions	• Alignment of utilities (including drainage), where inside the RPA or where installed using a trenchless method. • Dimensioned TPP & Detailed AMS. • Schedule of works to retained trees. • Detailed hard/soft landscape design.	• Arboricultural site monitoring schedule. • Tree and landscape management plan. • Post construction remedial works. • Landscape maintenance schedule.

ARBORICULTURAL IMPACT ASSESSMENT (INFORMATION REQUIRED):

- Evaluation: Impact of tree losses.
- Effect of construction on amenity value.
- Shadow influence on dwellings/buildings/amenity space.
- End use of space near retained trees - risk assessment.
- Designations: Tree Preservation Orders / Conservation Areas.
- Potential incompatibilities between layout and retained trees.
- Potential for new planting to provide mitigation for any losses.
- Canopy protection during construction (extension of RPA).
- Pruning works to facilitate development.
- Future pressure for tree removal.
- Direct & Indirect Damage.
- Proximity of trees to structures.
- Excavations or changes in ground levels near retained trees.
- Installation of hard surfacing in RPAs.
- Infrastructure requirements – services etc.
- Removal of existing structures and hard surfacing.
- Construction: access, working space, storage of materials/topsoil.

BS5837:2012 - CASCADE CHART FOR TREE QUALITY ASSESSMENT

Category and definition	Criteria			Identification on plan
Category U Those 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.	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other U category trees (e.g. 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, or very low quality trees suppressing adjacent trees of better quality • NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve.			RED
Category and definition	**Criteria - Subcategories**			
	1 Mainly Arboricultural values	2 Mainly landscape values	3 Mainly cultural values	Identification on plan
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual, or those that are 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 of particular visual importance and/or landscape features.	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	GREEN
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.	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 storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the Category A designation	Trees present in numbers usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality.	Trees with material conservation or other cultural benefits	BLUE
Category C Those of low quality and value with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in 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 no material conservation or other cultural benefits	GREY

Tree Survey - Key

HGT:	Height in Metres.
ST Ø:	Stem Diameter in millimetres.
Cr RAD:	Estimated average canopy radius to compass points.
CH:	Estimated height of crown clearance.
BD:	Estimated height and direction of lowest branch.
Est Cont:	Estimated remaining contribution in years.
Rad RPA:	Radial Root Protection Area in metres from stem centre.

Age Class:

NP:	New Planting
Y:	Young (1/5th of life expectancy)
SM:	Semi mature (2/5th of life expectancy)
EM:	Early mature (3/5th of life expectancy)
M:	Mature (4/5th beyond life expectancy and declining naturally)
OM:	Over Mature (5/5th of life expectancy)
V:	Veteran (of great age for its species or possibly of conservation value)

Condition:

P = Physiological

Good	No significant health problems
Fair	Symptoms of ill health that can be remediated
Poor	Symptoms of ill health that cannot be remediated

S = Structural

Good	No significant structural issues
Fair	Structural issues that can be remediated
Poor	Structural issues that cannot be remediated

Label/Tag Number:

H:	Hedge
T:	Off-site tree
TG:	Tree group
W:	Woodland

Individual on-site tree = no prefix BS5837 Category (colour coded)

BS Cat – *Category of retention* **U:** *Removal* **A:** *High quality/value* **B:** Moderate quality/value **C:** *Low quality/value* **e:** *Estimated*

Notes: *Tree measurements up to 10m have been rounded to the nearest half meter. Measurements over 10m are rounded to nearest metre.* **Key Tree** *Key tree influencing design process*

Tree Ref	Species	HGT	St Ø	Cr Rad				Cr Hgt		Age class	Physiological & Structural con'd Observations –ve/+ve Preliminary Management Recommendations	Est Cont	RPA	BS Cat
				N	E	S	W	B_D	C_H					
01	**Cherry** *Prunus spp.*	4.5	490	6.0	5.0	4.0	4.0		2.0	EM	P: Good S: Fair • Compression fork north at 1.5m with included structually weak union. • Crossing rubbing and fused secondary branches.	10-20	6.0	C1
02	**Norway Maple** *Acer platanoides*	16.5	470	5.5e	5.0	6.0	6.0	2.0 West	3.5	SM	P: Good S: Fair • Included acute angled primary stem unions north at 2.0m.	20+	5.7	B1
TG1	**Norway Maple** *Acer platanoides*	14	See TCP						4.5	SM	P: Good S: Good • Mechanical damage to bark west at ground level.	20+	See TCP	B2
TG2	**Norway Maple** *Acer platanoides*	16.5	See TCP					2.0 North	4.5	SM	P: Good S: Good • Dense congested crowns. • Crossing rubbing and fused secondary branches.	20+	See TCP	B2