

ARBORICULTURAL REPORT

BS5837: 2012 'Trees in relation to design, demolition and construction - recommendations'

SITE OF SURVEY BS 5837 SURVEY land at Drake Walk, Brigantine Place Cardiff CF10 4AN

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DATE SURVEYED

5th October

Report valid for 60 months*

*Comments on health of trees valid 12months

SUMMARY

- The Tree Survey, and constraints plan have been completed.
- An Arboricultural Impact Assessment and Method Statement and Tree Protection Plan may be required depending on the nature of the proposed development
- To ensure the successful retention of trees within a development site and to meet the requirements of the planning authority it is important to maintain the services of an Arboricultural Consultant to ; advise on tree protection, method statements for areas of construction or ingress within root protection zones of retained trees and to; act as a watching brief informing the developer and the planning authority before during and after construction phase.

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Appendices and Attachments	<u>Attachments sent separately by email</u> Tree Survey (excel doc) Tree constraints plan (Pdf and Dwg. File) Drake Walk TCP October 2014

1. INTRODUCTION

1.1 ASSIGNMENT

We have been instructed by Robert Chichester of C2J Architects & Town Planners to carry out a pre development site Arboricultural Assessment in accordance with BS5837:2012 'Trees in relation to design, demolition and construction - recommendations'. This report is being prepared in order to support a planning application for a development on land at Drake Walk, Cardiff.

1.2 THE DEVELOPMENT PROPOSALS

We have not been supplied with details of the development.

1.3 REPORT METHODOLOGY

The methodology for preparing this report is in accordance with BS5837:2012 'Trees in relation to design, demolition and construction - recommendations' is as follows:-

Tree Survey Plan

The purpose of the Tree Survey is to identify all trees on site that may be within influential distance of any proposed development. The plan will record the condition of the trees, their quality and benefits within the context of the development and their above and below ground constraints in relation to both the site and any proposed development.

Arboricultural Impact Assessment and Method Statement

The purpose of this part of the report is to identify, evaluate and possibly mitigate the extent of any direct and indirect impacts on the trees. It will also identify any potential impacts of the trees on the proposed development.

Tree Protection Plan

The Tree Protection Plan shows all necessary aspects of tree protection that are required during the development process.

1.4 DOCUMENTS AND INFORMATION PROVIDED

We were provided with a topographical survey plan of the site by Robert Chichester Town Planning Consultant showing the tree stem positions scaled at 1:250.

1.5 LIMITATIONS AND DISCLAIMER

Trees are living organisms whose health and condition can change rapidly. The conclusions and recommendations in this report are only valid for one year. Any changes carried out to the site as it stands at present, prior to planning approval, eg building of extensions, excavation works, importing of soils, extreme weather events etc will invalidate this report.

Visual tree assessment has been undertaken from ground level utilising aids such as binoculars, sounding hammer and probes where necessary.

We have no connection with any of the parties involved in this situation that could influence the opinions expressed in this report.

2. THE SITE

2.1 SITE VISIT

We carried out a site visit on 29th September 2014.

2.2 SITE DESCRIPTION

The plot of land is within a business park in Cardiff at Drake Walk off Brigantine Place Cardiff CF10 4AN. The trees are located within planting beds bordering car parking spaces and on the banks of a disused canal feeder. Many of the trees surveyed were planted as part of the landscape scheme and others have self seeded and grown into early mature semi mature and young specimens. Overall the area is maintained but has become very dense with tree growth.

2.3 PHOTOGRAPHS



2.4 LEGAL CONSTRAINTS

It is unknown whether the trees are protected by Tree Preservation Orders or if they are in a conservation area..

Conservation Area

In Conservation Areas, trees of a diameter greater than 75mm, measured at 1.5m from ground level are automatically protected (except in certain circumstances) under the Town and Country Planning Act 1990. Notice of intent is required to be given to the Local Planning Authority (LPA) before work is carried out. An application form can be downloaded from the LPA website. The LPA has six weeks to decide whether the tree should be made subject to a Tree Preservation Order. If the LPA do not respond within the six week period, then the tree work that has been applied for may proceed.

If an application for work is refused and a Tree Preservation Order is designated to the trees, the applicant has a right of appeal to the Secretary of State under the provisions of section 78 of the Town and Country Planning Act 1990 (as amended).

Tree Preservation Order (TPO)

A Tree Preservation Order is made by the Local Planning Authority which in general makes it an offence under the Town & Country Planning Act 1990, to cut down, top, lop, uproot, willfully damage or willfully destroy a tree without the planning authority's permission.

It will be necessary to apply to the Local Planning Authority (LPA) for permission to carry out any work on these trees. The LPA has eight weeks to respond to the application to either refuse or permit the work applied for. The LPA can also make alternative work recommendations.

If an application for work is refused, or allowed subject to conditions, or if the council fails to decide the application within 8 weeks, the applicant has a right of appeal to the Secretary of State under the provisions of section 78 of the Town and Country Planning Act 1990 (as amended)

Carrying out work on protected trees without permission from the LPA can result in fines of up to £20,000 per tree, if convicted in a magistrate's court and you have destroyed the tree or up to £2,500 for other offences.

3. TREE SCHEDULE

TREE SURVEY : Land at Drake Walk, Cardiff

Tree Number	Tag number	Type	Age	Tree Name (Common name)	Tree name (Botanical)	Condition	Crown height	Height	Trunk Dia. (mm)	Single stem (1) or multi-stem (m) *	North (m)	South (m)	East (m)	West (m)	BS Cat.	RPA Radius (m)	RPA Area (m2)	Comments	Action
1	826	T	EM	London Plane	<i>Platanus x hispanica</i>	Good	3.5S	15	570	1	7	8	8	6	B2	5.28	87.6	Open grown tree with single stem and natural taper, supporting a full and naturally formed canopy. Growing in area adjacent to building and car park.	No action
2	827	T	EM	Italian Alder	<i>Alnus cordata</i>	Good	2.5E	15	400	1	4	4	5	3	B2	4.80	72.4	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and car park.	No action
3	828	T	EM	Italian Alder	<i>Alnus cordata</i>	Good	2.5W	14	300	1	4	3	2	4	B2	3.60	40.7	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath	No action

4	829	T	EM	Italian Alder	<i>Alnus cordata</i>	Good	2.5E	10	295	1	3.5	4	4	3	B2	3.54	39.4	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and car park.	No action
5	830	Group	SM	Alder	<i>Alnus glutinosa</i>	Good	2.5N	8.5	110	1	3	3	2	2	C2	1.32	5.5	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and street light.	Prune to clear street light.
6	831	T	EM	Goat Willow	<i>Salix caprea</i>	Good	3W	8.5	300	1	3.5	1	3.5	4.5	C2	3.60	40.7	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Some significant deadwood in crown over shrub area. Growing in area adjacent to footpath and street light.	Prune to clear street light.

7	832	T	SM	Ash	<i>Fraxinus excelsior</i>	Good	2E	9	150	1	1.5	1.5	1.5	1.5	C2	1.80	10.2	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent car park.	No action
8	833	T	EM	Alder	<i>Alnus glutinosa</i>	Dead		8	220	1					U	2.64	21.9	Dead stem within group area.	Fell
9	834	Group	SM	Alder	<i>Alnus glutinosa</i>	Good	3W	9	110	1	1.5	1.5	1.5	1.5	C2	1.32	5.5	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent to footpath	No action
10	835	T	EM	London Plane	<i>Platanus x hispanica</i>	Good	2.5E	15	400	1	4.5	4.5	5.5	4	B2	4.80	72.4	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Low branches over parking area and access road.Growing in area adjacent to access road and car park.	Crown lift to 5.5m over parking area and road

11	836	Group	EM	Aspen	<i>Populus tremula</i>	Good	2W	10	250	1	5.5	5.5	4	4	C2	3.00	28.3	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light. 2 stems growing on canal edge. Growing in area adjacent to footpath and canal.	Remove 2 stems on canal edge.
12	837	Group	EM	Aspen	<i>Populus tremula</i>	Good	2E	13	340	1	7	4	5	6.5	C2	4.08	52.3	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Some Ivy growth on main stem. Some significant deadwood over footpath. Growing in area adjacent to footpath and canal	Remove significant deadwood.
13	838	T	EM	Aspen	<i>Populus tremula</i>	Good	3.5E	13	560	1	3.5	8	9	6	B2	6.72	141.9	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Some significant deadwood. Heavily end loaded limbs developing over footpath and car park. Growing in area adjacent to footpath and car park.	Remove significant deadwood. Reduce end loading of vulnerable limbs.

14	839	Group	EM	Aspen	<i>Populus tremula</i>	Good	1.5W	9	170	1	7	7	1	4	C2	2.04	13.1	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and canal.	No action
15	840	T	EM	Aspen	<i>Populus tremula</i>	Good	2W	9	180	1	2	3	2	2	C2	2.16	14.7	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and canal	No action
16	841	Group	SM	Aspen, Alder	<i>Populus tremula</i> , <i>Alnus glutinosa</i>	Good	2E	7	100	1	4	4	2	2	C2	1.20	4.5	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light. Dead tree within group. Growing in area adjacent to footpath .	Fell dead tree indicated on plan.
17	842	T	EM	Alder	<i>Alnus glutinosa</i>	Good	2.5E	12	210	1	4	4	4	2	C2	2.52	20.0	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and canal	No action

18	843	Group	SM	Alder	<i>Alnus glutinosa</i>	Good	3W	12	150	1	3	3	4	2	C2	1.80	10.2	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and car park.	No action
19	844	T	SM	Alder	<i>Alnus glutinosa</i>	Good	3E	13	170	1	2	2	3	2	B2	2.04	13.1	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and car park.	No action
20	845	T	EM	Alder	<i>Alnus glutinosa</i>	Good	3E	13	220	1	2	2	4	4	B2	2.64	21.9	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and car park.	No action

21	846	T	EM	Alder	<i>Alnus glutinosa</i>	Good	3E	12	240	1	3	2	4.5	3	B2	2.88	26.1	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent to footpath and car park.	No action
22	847	T	EM	Alder	<i>Alnus glutinosa</i>	Good	4.5E	11	195	1	2	2	3.5	3	B2	2.34	17.2	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent to footpath and car park.	No action
23	848	T	EM	Alder	<i>Alnus glutinosa</i>	Good	3E	11	300	1	3	4	4.5	5	B2	3.60	40.7	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent to footpath and car park.	No action
24	849	Group	EM	Alder	<i>Alnus glutinosa</i>	Good	3E	10	170	1	3	3	2	3	B2	2.04	13.1	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light.Growing in area adjacent to footpath and car park.	No action

25	850	T	EM	Alder	<i>Alnus glutinosa</i>	Good	3W	14	170	1	2	3.5	4	2	B2	2.04	13.1	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Leaning stem within group. Growing in area adjacent to footpath and building.	Prune to clear building. Monitor leaning stem.
26	851	Group	SM	Aspen	<i>Populus tremula</i>	Good	3E	7	110	1	3	3	2	2	C2	1.32	5.5	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to canal.	No action
27	852	Group	SM	Alder	<i>Alnus glutinosa</i>	Good	5E	12	230	1	7	7	4	4	C2	2.76	23.9	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and building.	No action
28	853	T	EM	Alder	<i>Alnus glutinosa</i>	Good	1.5W	12	420	m	3	3.5	1.5	4	B2	4.20	55.4	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and canal	No action

29	854	T	EM	Willow	<i>Salix x chrysocoma</i>	Good	1S	14	605	1	7	8	5	6	B2	7.26	165.6	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Some significant deadwood. Heavily end loaded limbs over canal. Growing in area adjacent to footpath and canal	Remove significant deadwood. Reduce end loading of vulnerable limbs.
30	855	T	EM	Willow	<i>Salix x chrysocoma</i>	Poor	0S	14	605	1	1.5	9	5	1.5	U	7.26	165.6	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Large crossing limb in lower crown. Limb with large split and collapsed into canal. Growing in area adjacent to footpath and car park.	Coppice and allow re growth.
31	856	T	EM	Norway Maple	<i>Acer platanoides</i>	Good	3.5N	13	280	1	4.5	6	5	2	B2	3.36	35.5	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and canal	No action
32	857	T	EM	Norway Maple	<i>Acer platanoides</i>	Good	2.5N	12	340	1	4	6	2	4	B2	4.08	52.3	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to footpath and canal	No action

33	858	T	EM	Norway Maple	<i>Acer platanoides</i>	Good	3N	12	380	1	6	6.5	4	3	B2	4.56	65.3	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent to footpath and canal	No action
34	859	T	EM	Norway Maple	<i>Acer platanoides</i>	Good	3N	12	400	1	4	6	3	5	B2	4.80	72.4	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent to footpath and canal	No action
35	860	T	EM	Alder	<i>Alnus glutinosa</i>	Good	3W	9	235	1	3	3	4	3	B2	2.82	25.0	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent to footpath and canal	No action
36	861	Group	EM	Buddleia, Hawthorn	<i>Buddleia spp.</i> , <i>Crataegus mongyna</i>	Good	2N	5	240	1	4	4	3	2	C2	2.88	26.1	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent to canal	No action

37	862	T	EM	Alder	<i>Alnus glutinosa</i>	Dead		9	360	1					U			Dead tree adjacent to canal.	Fell
38	863	Group	EM	Alder	<i>Alnus glutinosa</i>	Good	3N	8	320	1	4	4	4	4	B2	3.84	46.3	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to canal	No action
39	864	T	EM	Willow	<i>Salix x chrysocoma</i>	Good	0N	13	780	1	8	8	6	9	B2	9.36	275.2	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Growing in area adjacent to canal	No action

40	865	T	EM	Buddleia	<i>Buddleia spp</i>	Good	2N	6	240	1	3	4	4	4	C2	2.88	26.1	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent to canal	No action
41	866	T	EM	White Willow	<i>Salix alba</i>	Good	4E	16	720	1	6	10	10	10	B2	8.64	234.5	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light. Several forks between main stems.Growing in area adjacent to canal and park.	Monitor development of main forks.
42	867	Group	EM	Hazel	<i>Corylus avellana</i>	Good	0	8	250	m	13	13	6	6	C2	2.50	19.6	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent to canal and park	No action
43	868	T	EM	Alder	<i>Alnus glutinosa</i>	Good	3N	9	280	1	4	3	4	4	B2	3.36	35.5	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent canal and park	No action

44	869	T	EM	Alder	<i>Alnus glutinosa</i>	Good	0N	11	240	1	3	3	3.5	3.5	B2	2.88	26.1	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent canal and park	No action
45	870	Group	EM	Alder	<i>Alnus glutinosa</i>	Good	0N	10	280	1	4	4.5	3	3	B2	3.36	35.5	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..Growing in area adjacent canal and park	No action
43	871	T	EM	Alder	<i>Alnus glutinosa</i>	Good	0N	9	320	1	4.5	4.5	4	4	B2	3.84	46.3	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light..by growth on main stem.Growing in area adjacent canal and park	No action
44	872	T	EM	Alder	<i>Alnus glutinosa</i>	Good	3S	10	280	1	4.5	4.5	5.5	4	B2	3.36	35.5	Group tree with suppressed canopy towards neighbouring trees and full crown towards the light.Growing in area adjacent canal and park.	No action
45	872	Group	EM	Buddleia	<i>Buddleia spp</i>	Good	0S	5	280	1	See plan				C2	3.36	35.5	Group trees with suppressed canopy towards neighbouring trees and full crown towards the light.Growing in area adjacent canal	No action

4. TREE SCHEDULE KEY

The trees and groups of trees at the site have been assessed as per the recommendations set out in BS 5837 2012.

Type	Represents the type of vegetation being assessed. These are Tree (T), Group (G), Stump (S), Woodland (W)
Tag No	Each tree has been marked by a numbered tag for on site identification. Where possible this number is related to, or similar to the given tree number. There may be occasions when the tag number bears no relationship to the tree number, but is still useful for on site identification
Common Name Botanical Name	The tree species have been identified and both common and botanical names are given.
Age	<p>Young – (Shown as Y in the schedule) juvenile tree with dominant leading shoot growth and short side branches. Vigorous growth and often of conical form.</p> <p>Semi-mature – (Shown as SM in the schedule) young adult tree, leading shoot growth may not always be dominant but side branches are usually ascending. Vigorous growth, flower and seed production. Minimal deadwood.</p> <p>Early maturity – (Shown as EM in the schedule) adult tree with the main framework of the crown formed. Not yet at full dimensions. Vigorous growth and some shedding of inner branches and deadwood. Horizontal side branches.</p> <p>Mature – (Shown as M in the schedule) adult tree at full crown volume and dimensions. Maximum flower and seed production. Dead wood likely within the crown and reiteration growth in the lower canopy.</p> <p>Over mature – (Shown as OM in the schedule) loss of overall vigor and reduction of full dimensions due to limb loss and branch tip die back. Major dead wood within the crown and possible hollowing and cavities. Retrenchment of the crown through increased reiteration growth on the lower branches.</p> <p>Veteran / Ancient – (Shown as V in the schedule) a tree that has passed beyond maturity and is old in comparison with other trees of the same species. They often have decayed or hollow stems and branches and abundant deadwood. They are important for heritage, landscape and ecological value.</p>

Height (m)	Where site lines allow, tree height has been calculated by means of a laser clinometer and recorded in metres. If the use of a laser clinometer is restricted due to confined space or obscuring vegetation, the height of the tree may be estimated based on the surveyor's experience. Adjacent trees or buildings with a clear view may be measured and used as a height scale. Where several trees are located in close proximity, one tree may be measured and the other trees estimated using the measured tree as a reference.
Ultimate Height	This is an estimation of the potential height the tree is expected to reach at full maturity, taking into consideration the present surrounding environment and condition of the tree.
Diameter (mm)	The stem diameter is measured in millimetres in accordance with Annex C of BS5837 2012.
Stems	The number of stems are recorded, eg 1, 2, 3 etc.
Crown Height (m)	Is the distance from the lowest point of the crown from ground level.
FSB Height (m) /Direction	The height of the First Significant Branch (FSB) is recorded in metres and the direction of growth is in relation to the cardinal points of the compass.
ERC in years	Estimated Remaining Contribution in years: < 10 years 10 + years 20 + years 40 + years
North (m) South (m) East (m) West (m) (Crown Spread)	As it is rare that a tree's crown is asymmetric, the crown spread is measured at the four cardinal points of the compass to give an estimated representation of the crown spread which is then recorded on the tree survey plan.

<p>Condition</p>	<p><u>Physiological Condition</u></p> <p>Each tree has undergone a brief preliminary visual inspection from ground level. This information is only relevant at the time of inspection because circumstances influencing a tree's condition can change rapidly. This section is divided into two separate sections:</p> <p>G = Good – fully foliated/twigged canopy for the tree's situation with an indication of natural vigor from shoot extension growth and signs of good vitality throughout the tree's system.</p> <p>F = Fair – signs of adequate vigour and vitality up to 70% canopy coverage. May show signs of slight stress such as branch tip die back, slightly sparse foliage, yellow or small foliage. Stress may be alleviated by prescribed maintenance.</p> <p>P = Poor – obvious signs of advance stress including less than 70% canopy coverage, crown die back, significant deadwood. Sparse and discoloured foliage.</p> <p>D = Dead – moribund or dead trees</p>
<p>Comments</p>	<p><u>Structural Condition</u></p> <p>Any structural defects are noted such as splits, cracks, tight forks, rubbing branches, cavities, decay and the presence of pests or diseases. These may compromise the mechanical integrity of the tree's structure.</p> <p>(Veteran trees may pose many physiological and structural faults yet still be considered in good condition for their age.)</p>
<p>Recommendations</p>	<p>Following visual inspection preliminary recommended action, further detailed inspection, or maintenance may be prescribed.</p>
<p>RPR (m) Root Protection Radius</p>	<p>This is calculated from Annex D of BS 5837 2012 'Trees in relation to construction - Recommendations'.</p>
<p>RPA (m) Root Protection Area</p>	<p>This measurement is the total area of root protection. This can be modified if necessary by the Arboriculturalist.</p>

Category	<p>The tree's overall value is categorised in accordance to the cascade chart (table 1) of BS 5837 2005, see Appendix 2 of this report.</p> <p>In brief, the purpose of the tree categorisation is to identify and quantify the value of the existing tree stock. This will allow informed decisions to be made concerning which trees should be removed or retained should the development occur.</p>
<u>Category A</u>	Trees of high quality and value that make a substantial contribution. Marked in light green on the tree survey plan.
<u>Category B</u>	Trees of moderate quality and value that make a significant contribution. Marked in mid blue on the tree survey plan.
<u>Category C</u>	Trees of low quality and value that provide only an adequate contribution. Marked in grey on the tree survey plan.
<u>Category U</u>	Trees in such a condition that any existing value would be lost within ten years. This includes trees that should be removed for good arboricultural reasons. Marked in dark red on the tree survey plan.

5. GENERAL IMPLICATION OF DEVELOPMENT ON TREES

5.1 INTRODUCTION

The successful retention, protection and preservation of trees on construction sites is a continuous problem. It requires commitment from all parties:- arboriculturalists, planners, developers and contractors. The conflict between the need to maximise scarce building land and the social and environmental pressure to retain as many trees as possible often sets the construction industry at odds with planners.

5.2 THE REASONS FOR RETAINING TREES ON DEVELOPMENT SITES

- a) Trees increase property value by adding character, maturity and prestige to a new development.
- b) Trees add visual amenity by softening and naturalising hard landscapes.
- c) The general public respect trees and demand their protection.
- d) Local Planning Authorities have a duty to preserve trees under the Town and County Planning Act 1990
- e) Trees provide a microclimate reducing extremes of wind, temperature and dissipate ground water.
- f) Trees provide wildlife habitats
- g) Trees reduce pollution by removing particles from the air.
- h) Trees provide a screen from external sights and sounds

5.3 RISKS TO TREES

Trees that are growing satisfactorily are growing in equilibrium with their surroundings above and below ground. Anything that even slightly alters this balance will effect the trees' health, future growth and safety. Trees on development sites are particularly vulnerable to disruption during the construction process.

Damage can be caused by

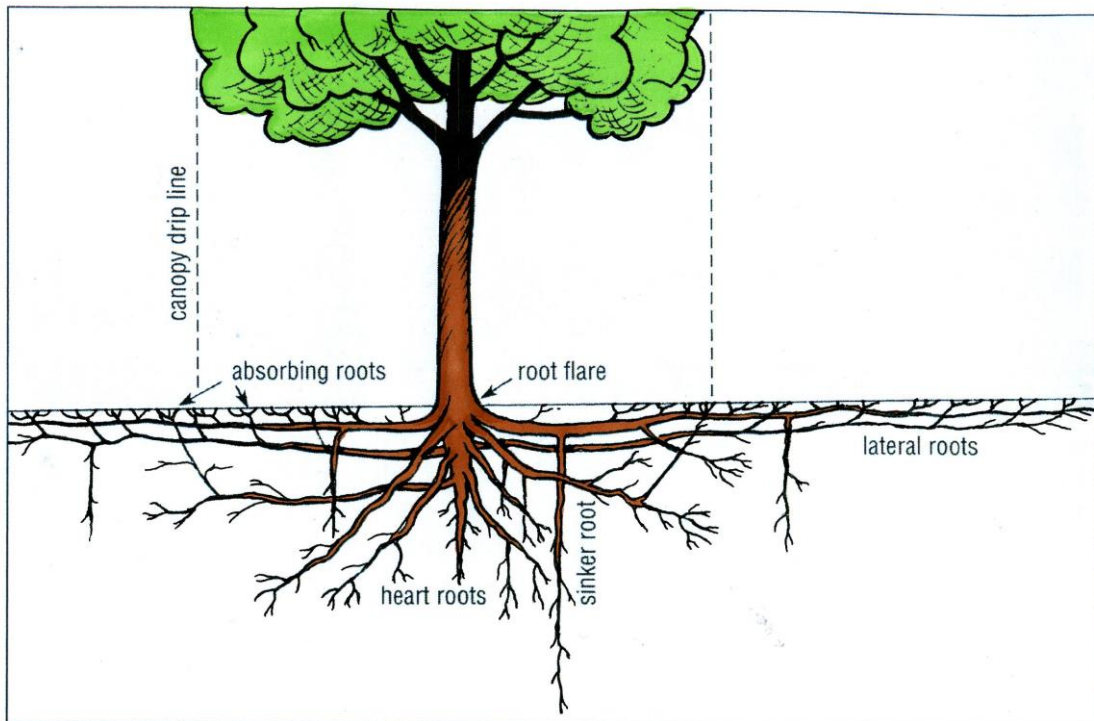
- a) Excavation within the root zone
- b) Raising or lowering of the soil levels
- c) Compaction of the soil by construction vehicles, machinery and by storing materials and debris
- d) Spillage of toxic materials
- e) Root asphyxiation by flooding
- f) The laying of impermeable surfaces

- g) Damage to trunk, branches and crown by direct physical impact
- h) Fire or heat damage
- i) Environmental changes - exposure to sunlight, cold, wind or shade

5.4 IMPACT ON TREE ROOTS

a) Important Facts About Tree Roots

- Tree roots are particularly susceptible to damage because they are not visible and frequently ignored. Damage or death of tree roots will effect the overall health and vigor of the tree, reduce potential life expectancy, and increase the risk of structural failure.
- The roots attached to a tree's main stem rapidly taper and subdivide resulting in a mass of fibrous roots, normally extending well beyond the edge of the outer most branches.
- Most tree roots are within the top 600mm of soil where optimum moisture, oxygen and nutrients are to be found
- Fine and fibrous roots are important for the trees structural stability. It is the mass of soil bound together by fibrous roots that counter balances the above ground portion of the tree.
- Tree roots often have an inter-relationship with beneficial fungi called mycorrhiza, relying on them for extra moisture, oxygen and nutrients and paying them back with converted energy.
- Soil compaction can drastically reduce the moisture, oxygen and nutrients available to tree roots and beneficial fungi; resulting in tree stress, decline and possibly death and structural failure.
- Tree root systems mechanically support the above ground portion of the tree on a structured root plate close to the stem of the tree. This is anchored in the soil by lateral tension roots which are in cohesion with the soil. The removal of just one main root particularly on the windward side can lead to failure unless the tree is reduced.



b) Root Severance

Trees can tolerate some minor root severance but it is important this work is undertaken by qualified arborists with specialised equipment (see section below).

Linear root severance can be detrimental in that:

- It reduces a tree's moisture and nutrient uptake leading to reduced vitality and stress
- Direct wounding of the root system makes an entrance point for pathogens which can lead to significant fungal decay.
- The stability of a tree may be affected in that roots that mechanically support the tree will be compromised. Root severance will reduce the cohesion surface area with the soil and affect the tension and compression properties of the root's system. This may lead to shearing of the root plate and structural failure.

Surface soils are often compacted on construction sites as a consequence of heavy equipment moving over the surface. Soil structure can be affected to some depth. Compaction reduces air and moisture content and increases the likelihood of erosion.

5.5 CHANGES IN GROUND LEVEL

The raising of the soil level over a tree's root system and around the stem base can be very damaging to some species. The fill soil can hold moisture around the trunk and over the roots and alter normal gas exchange. Some trees develop adventitious roots in the fill soil and keep the tree alive. Over time decay and disease may develop in the lower original root system and root buttresses. The tree can then become structurally unsound and prone to failure. These impacts may not take effect until many years after the construction has been completed.

5.6 IMPLEMENTATION OF WORK

We advise that any tree work be carried out by Qualified Arboricultural Contractors. The contractor should carry out all tree works to BS 3998 *Recommendations for Tree Work (2010)* and as modified by research that is more recent.

6. CONCLUSION

The tree survey and constraints plan has been completed and indicates the root protection area. It is recommended in BS 5837:2012 'Trees in relation to construction – Recommendations' that this information is used as a tool for design of the proposed building.

7. COMMENTS

7.1 NEXT STAGE

The above document is intended to be used as an aid for the site design and layout by the Planning Team.

Following the finalising of the planning stage and any further arboricultural consultation that this may require, the next stage is the drawing up of an Arboricultural Implications Assessment followed by an Arboricultural Method Statement

7.2 ARBORICULTURAL IMPLICATIONS ASSESSMENT

This is a study undertaken by an arboricultural consultant to identify, evaluate and possibly mitigate the extent of direct and indirect impacts on existing trees that may arise as a result of the implementation of any site layout proposal.

The arboricultural consultant needs to consult with the design team and have impact on the design with regards to preparing an Arboricultural Implications Assessment (AIA).

The Arboricultural Implications Assessment considers the information provided in the topographical land survey, tree survey and tree constraints plan and assesses how the proposed development and its associated trees and landscape will co-exist both at present and in the future.

The Arboricultural Implications Assessment should take into consideration

- a) The proximity of trees to structures in relation to obstruction of light, shade etc, future growth requirements, damage and nuisance.
- b) Protection of trees above and below ground.
- c) Legal constraints that may effect the trees, ie Tree Preservations Orders and Conservation Area.
- d) Other implications that are relevant to a specific site with regards to protection and suitable retention of trees.

7.3 ARBORICULTURAL METHOD STATEMENT

Once the Arboricultural Implications Assessment has been completed and final layout proposals agreed, the Arboricultural Method Statement and a Tree Protection Plan should be prepared.

The function of an Arboricultural Method Statement and Tree Protection Plan is to translate all necessary aspects of arboricultural work of the entire development into a document which is readily understood and appreciated by construction workers. This will comprise of:

- a) Statement of any planning conditions relevant to the trees.
- b) Table showing a concise chronology of events.
- c) List of relevant contacts.
- d) Tree Protection Plan. This is a scale drawing showing the finalised layout proposals, tree protection and tree and landscape protection measures detailed within the Arboricultural Method Statement, which can be shown graphically.
- e) Schedule of works for any tree removal and any preliminary tree works required.
- f) Specifications for any site specific engineering required or soil amelioration in relation to the retained trees.
- g) Design for re-planting and specifications (if required).
- h) Schedule for site monitoring by an Arboricultural Consultant during the construction period.