Pre-development tree survey, (BS5837:2012), Westfield Garden Centre, Skegby

A report to :

[redacted]

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1.0. Introduction and site description

Mr and Mrs Brouwer, commissioned Dr. Stefan Bodnar to undertake an arboricultural survey (BS5837: 2012) on trees within a development site at Westfield Garden Centre, Skegby . The trees included within the survey and their relationship to the Development Footprint are identified on the drawing in Appendix 2. Photographs of trees involved are included in Appendix 1, together with examples of the trees concerned. BS 5837:2012 includes an assessment of all trees within the development footprint in addition to those near to the site boundary.
The site is located atWestfield Garden Centre, Skegby, Nottinghamshire. An Aerial photograph and location plan , below, shows the area concerned. See Photographs (Appendix 1).
The site consists of a cleared site, formerly greenhouses and landscaped planted area in front of a workshop.

The site is located on the fringe of Skegby. Skegby is a small village in the Ashfield district of Nottinghamshire, England, located two miles west of Mansfield and one mile north of Sutton-in-Ashfield, close to Stanton Hill lying on the B6014 road. Skegby sits on both sides of a deep valley near the source of the River Meden.

A hatched plan and Aerial photograph, below, shows the area concerned. See Photographs (Appendix 1). The red line relates to the entire area surveyed.

1.2. Site Description

Originally the area under consideration was part of a wholesale nursery, started in the 1930s, with the area covered in greenhouses, which persisted until the 1960's, and includes a single storey bungalow and former packing shed.. Much of the site consists of an oblong piece of scrub and hardstanding, with two substantive buildings. The main site consists of a relatively flat area, including self-set and planted trees to the boundaries and east.
In addition there is a two storey 1930s former packing shed, used currently as partial residential and partially offices/storage and a single storey bungalow dating from the early 1970's with a mown amenity grass area.
Some of the site has recently undergone some vegetation management, which has removed much of the scrub vegetation from the site. This was undertaken to remove the remnant derelict greenhouses and to facilitate the topographical surveys. At the time of survey, most of the site was former hardstanding and bare ground, though the tree line to the East and planted trees to the south remain on site.

2.0. Arboricultural Survey Methodology

2.1. Condition Status

To determine the status of the trees within the site a full arboricultural survey has been undertaken, assessing species and status of all trees present within the footprint of development. The survey has been carried out in accordance with BS 5837 (2012).

The surveyor has extensive experience of arboriculture, through undertaking BS5837 surveys on many sites between 2005 and 2014. Previous to this, he has undertaken Lantra approved courses for arborists, and is competent to the level of a tree officer operating within a Local Authority, being familiar and having used the systems undertaken by tree officers for undertaking safety and condition surveys for Birmingham City Council. Dr. Bodnar possesses numerous ecological qualifications including a full member of CIEEM and a PhD (Community Forestry, 1998).

Individual trees above 75mm (diameter at 1.5m above ground level) have had their position confirmed on the survey drawing. The trees were visually assessed and a schedule prepared listing tree number, species, trunk diameter at 1.m above ground level, tree height, crown spread (radius), age, class and estimated remaining years. Any specific observation or recommendations with regard to management also.
A plan drawing indicating the location of each tree assessed is included in Appendix 2
The condition of each tree was assessed according to the following categories:

Category A
Those trees of high quality and value. Significant trees that are structurally sound and can be retained in the long term (i.e., >40 years) or trees that can be retained in the long term following remedial tree surgery. Colour code on the plan- pale green.

Category B
Those trees of moderate quality and value. Trees that may live 15-40 years. Trees that may live for more than 40 years, but whose removal may be required in that time frame to allow development of retained trees. Trees that are defective but could be retained in the medium term by remedial tree surgery.
Colour code on the plan- mid blue.

Category C
Those trees of low quality and value. Trees that can only be retained in the short term (.e, 5-15 years) and that have little landscape impact due to poor form or condition. Trees having a stem diameter of <150mm at 1.5m above ground level that could be replaced.
Colour code on the plan- grey.

Category U
Trees that are dead, dying or diseased that will become dangerous in the near future (within years). Colour code on the plan- red.

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

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

2.2 Root Protection Area (RPA)

In order to avoid damage to the roots or rooting environment of retained trees, the RPA has been calculated for each of the category A, B and C trees. This is a minimum area of m^2, which should be left undisturbed around each retained tree.

These figures are calculated utilising the formula blow taken from BS 5837 (2012):

Single stem tree

$$\text{RPA } m^2 = \left\{ \frac{\text{Stem diameter (mm) @ 1.5 x 12}}{1000} \right\}^2 \times 3.142$$

Trees with more than one stem below 1.5m above ground level

$$\text{RPA } m^2 = \left\{ \frac{\text{Basal diameter (mm) @ 10}}{100} \right\}^2 \times 3.142$$

2.2 Root Protection Area

During construction works the root protection areas – 'Construction Exclusion Zones' are to be protected by barriers and ground protection in accordance with Section 9.0 of BS 5837:2012 and as specified and indicated on an approved Tree Protection Plan.

Where construction operations (demolition / hard surfacing) are proposed/ permitted within the Root Protection Area precautions should be taken to maintain the condition and health of the root system in accordance with BS5837:2012.

Construction of hard surfacing within the root protection area should be designed to avoid root loss during excavation. The structure of the hard surface should be designed to avoid localised compaction, including the use of three dimensional cellular confinement system as an integral component of the sub-base.

The hard surfacing in these areas should be a permeable and gas-porous nature such as washed gravel or paving slabs and block pavers (with infiltration spaces). Edge supports such as kerbs and edgings on foundations and haunchings are not to be used within the RPA. Consideration should be given to the use of pegged timber edging or propriety or steelpaver or edge restraints.

3.0 Results: A map detailing the location of trees and their Category determined is located in Appendix 2, all other trees are noted as being below 150mm DBH and outside the requirements of BS5837. Trees below 150mm DBH but above 75 mm DBH are included in the topographical survey of the site. Appendix 1e show images of most trees and all significant specimens.

Tree no.	Species	DBH	Radius (m)	RPA (sq.m)	Crown N	Crown S	Crown E	Crown W	Height	Age Class	Estimated remaining contribution (years)	Physiological and Structural Condition	Category	Preliminary Management Recommendation
1	Leyland Cypress	620	7.5	177	2	2	2	2	12	Mature	10-20 years		C1	
2	Ash	280	3.3	34	4	4	4	4	8	Young tree	40 years+	Unsuitable to retain due to likely root damage to neighboring structure	U	Remove
3	Rowan	270	3.3	34	2	2	2	2	6	Over-mature	0-5 years	Dead and dying. Severe stem damage from 0.3m	U	Remove
3a	Crab apple	220	2.7	23	3	3	3	3	6	Over-mature	0-5 years	Dead and dying. Severe lean to E.	U	Remove
4	Scottish whitebeam	710	8.4	222	7	7	7	7	10	Mature	20-30 years	Lean to NE. fastigiate form. Stem and root damage. Some pruning	C1	Reduce weight by crown thin, formative pruning
5	Acer Crimson King	660	7.8	191	5	5	5	5	10	Mature	20-30 years	Good form. Some damage to surface roots	B1	Formative pruning
6	Altas Cedar	790	9.6	290	6	9	6	8	10	Semi-mature	10-20 years	Severe storm damage with loss of apical shoot and damaged limbs. Uneven, poor form. Previous pruning	C1	Formative pruning
7	Cherry	650	7.8	191	6	6	3	2	10	Over-mature	0-10 years	Uneven, poor form. Dead and dying	U	Remove
7a	Acer Leopoldii	620	7.5	177	6	5	7	4	10	Mature	10-20 years	Root and stem damage on driveway side. Lean to NE. Poor form	C1	Formative pruning
8	Leyland Cypress	Multistem	N/A	N/A	2	2	2	2	10	Semi-mature	20-30 years	Max. stem 300 DBH	C1	
9	Cypress	Multistem	N/A	N/A	2	2	2	2	10	Semi-mature	20-30 years	Max. stem 300 DBH	C1	
10	Hawthorn	Multistem	N/A	N/A	2	3	5	2	8	Previous hedge shrub	10-20 years	3 stems from 1.2m, 200, 300, 350	C1	
11	Weeping birch	450	5.4	92	3	2	6	0	10	Over-mature	0-10 years	Stem damage at 2m, deadwood, razor strop fungus, , decayed and dying	U	Remove
12	Red oak	600	7.2	163	7	7	7	7	10	Semi mature	20-30 years	Mature tree, reasonable form	B1	
13	Hawthorn	Multi-stem	N/A	N/A	6	6	6	6	7	Previous hedge shrub	10-20 years	2 stems from 1.3m, 300, 350	C1	
14	Weeping cypress	300	3.6	41	3	3	3	3	9	Semi-mature	20-30years	Good form, no obvious defects. Swamp cypress beside this are below BS5837 level.	B1	

15	Red horsechestnut	410	4.8	72	4	3	6	3	8	Semi-mature	20-30 years	Some deadwood at fork (1.8m), stem damage. Pruned with reactive growth from pruning. Lean to NE. Poor form	C1	Formative pruning
16	Leyland cypress	300	3.6	41	2	2	2	2	8	Former hedgerow tree. Young	20-30 years		C1	
17	Leyland cypress	300	3.6	41	2	2	2	2	8	Former hedgerow tree. Young	20-30 years		C1	
18	Weeping willow	600, 700	15	707	7	3	6	2	8.5	Mature	10-20years	Two stems from 0.5m. poor form. damaged on southern side. Stems, 600 and 700 DBH. poor form	C1	Formative pruning. Reduce.
19-24	Silver birch group	350 - 400	4.5	64	3	3	3	3	10	Semi-mature	10-20 years	Self set. mainly twin stems from base. Some with stem and root damage on S. side	C1	
25	Cherry (off-site)	Coppice	7.8	191	3	3	3	3	7	Coppice	10-20 years	3 stems at 220 each	C1	
26	Ash	300	3.6	41	N/A	N/A	N/A	N/A	2.5	Semi-mature	0-5 years	Dead and dying. Snapped at 2.5m, severe stem and root damage.	U	

Latin names for species identified:

Common name	Scientific name
Ash	*Fraxinus excelsior*
Elder	*Sambucus nigra*
Crab apple	*Malus sylvestris*
rowan	*Sorbus aucuparia*
Hawthorn	*Crataegus monogyna*
Holly	*Ilex aquilfolium*
Horse chestnut	*Aeschalus hippocastaneum*
Lawson's cypress	*Chaemaecyparis lawsonii*
Leyland cypress	*Cyparocupressus leylandii*
Red oak	*quercus rubra*
Silver birch	*Betula pendula*
Sycamore	*Acer pseudoplatanus*
Weeping willow	*Salix babylonica*
Weeping cypress	*Chaemaecyparis nootkatensis*
Wild Cherry	*Prunus avium*
Atlas cedar	*Cedrus atlantica glauca* Acer
Crimson King	*Acer platanoides 'Crimson king'*
Scottish Whitebeam	*Sorbus arranensis*
Weeping birch	*Betula pendula* 'Yongii'
Korean fir	*Abies koreana*
Cypress	*Cupresseus lawsonii allumii*
Acer Leopoldii	*Acer pseudoplatanus* 'Leopoldii'

4.0 Discussion

4.1 Tree Protection:

It is understood from the client, that none of the trees on the site are covered by a Tree Preservation Order.

4.1.1 Existing trees of good quality, carefully incorporated so that they form an appropriate relationship with the new surroundings, will greatly enhance any new development proposal providing an immediate appearance of maturity. If however, existing trees are poorly sited and suffer from juxtaposition to newly developed structures, then they may cause new occupants anxiety and unacceptable nuisance to the extent that even legal protection will often not ensure their long-term retention. To avoid such problems and to ensure equilibrium between existing trees and new development, the physiological requirements of trees must be carefully considered within the planting layout. Once the right balance is found, this will ensure that they are a true asset to the site and go on to provide a wide range of material considerations for their perceived life expectancy. In particular, the development should aim to primarily retain trees in the 'A' and 'B' Categories and as many of Group 'C' as can be retained depending on the design plan.

4.1.2 Trees may be negatively affected by the construction period by both direct and indirect actions, which are often borne out of ignorance as to their physiological requirements. Careful site planning and management along with the implementation of robust physical protection measures is necessary to ensure the retention of important trees.

The trees in question consist of a number of trees planted as landscape trees in the late 1960s and early 1970s beside the garden centre, and the remains of a self-set tree line, to the north of the plot. The landscape trees beside the garden centre have suffered some storm damage (in particular tree 6), and a number lean away from the prevailing westerly winds. In addition, accidental damage mainly caused by delivery lorries, root damage and compression along the drive and mowing damage to surface roots are all significant factors in reducing the quality of many of the trees present. Some pruning work has also taken place at varying times. The self set trees along the northern boundary have been partially damaged during previous clearance operations related to the derelict greenhouses that were on the site, a number having stem and root damage.

Trees 3, 3a, 7, 11 and 26 are dead or dying and as such are recommended for removal. Tree 2, although healthy, is recommended for removal sue to it's location beside a residential building and likely foundation damage as it becomes more developed.

Trees 5, 12 and 14 all attain a B category and should be retained, with tree and root protection zones established.

All other trees are of C category and whilst these should be retained if possible, they could be removed to facilitate the development, providing adequate replacement planting is undertaken.

Note should be made that trees may need some facilitation pruning, should Planning Permission be granted.

4.1.3 It is essential to safeguard a pre-determined volume of soil around the base of the retained trees to ensure that then ongoing biological functioning of the root system along with the interaction with the soil is not impaired. This requires, that prior to the commencement of development activity on site (including the demolition works) that a robust protective barrier is erected.

4.1.4 The specifications for this barrier should be as per the British Standard 5837 of 2012 (Trees in Relation to Construction – recommendations). In brief, this consists of 2.3m high panels attached to an adequately braced scaffold structure to deter un-authorized dismantling and robust enough to rebut physical impacts from site plant and machinery. In practice Heras, weld-mesh type panels perform well when attached to the above mentioned scaffold structure.

4.1.5 Bird breeding season: All tree works should ideally take place outside of the bird breeding season. Bird breeding season is between mid March and mid July, although certain species can breed outside these months and if breeding birds are found then work should cease and the advice of an ecologist sought. If clearance is undertaken within the bird breeding season then all site features should preferably be checked immediately prior to clearance by a suitably qualified ecologist.

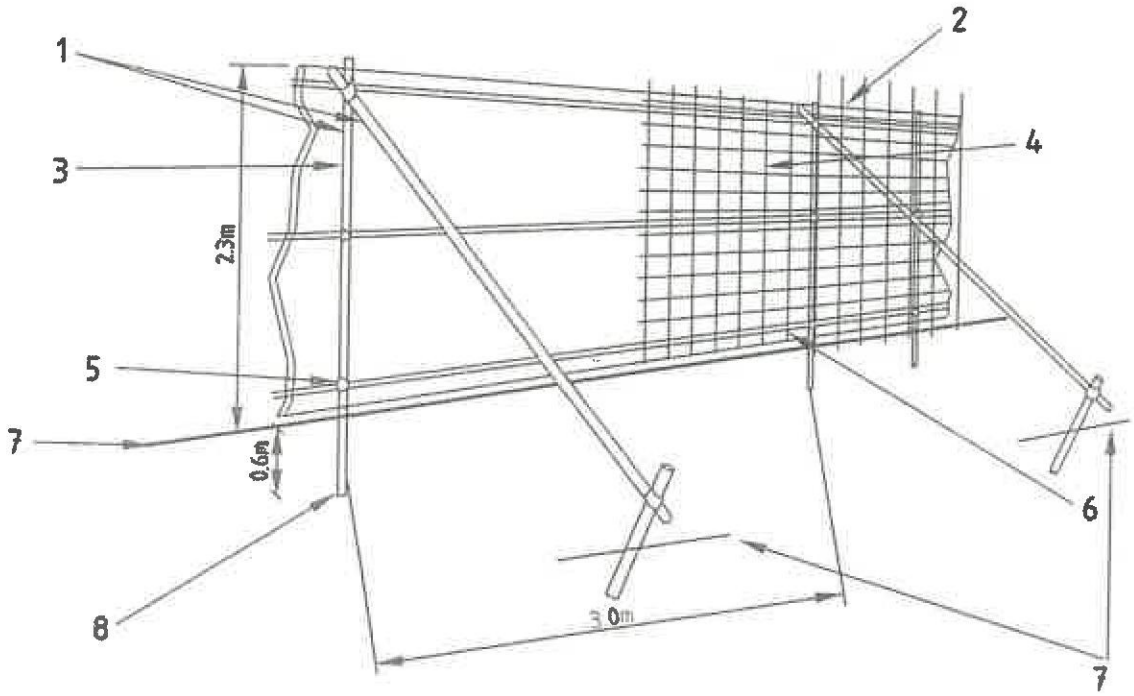
4.1.6 Bats: There are no trees of high or moderate bat roost potential identified

4.2 Tree Protection & Ground Protection

4.2.1 All trees that are being retained on site are to be protected by barriers and/or ground protection before any materials or machinery are brought onto the site, and before any demolition, development or stripping of soil commences. Where all activity can be excluded from the RPA, vertical barriers are to be erected to create a construction exclusion zone. The default barrier specification is to be in accordance with Figure 2. of BS 5837:2012 'Trees in Relation to Design, Demolition and Construction - Recommendations' as illustrated below.

4.2.2 The protected area is to be regarded as sacrosanct, and, once installed, barriers and ground protection is not to be removed or altered without prior recommendation by the project arboriculturist and, where necessary, approval from the local planning authority.

4.2.3 All weather tree protection posters (an example is detailed below) are to be securely fixed to the tree protection fencing in plain view.



1 Standard scaffold poles
2 Uprights to be driven into the ground
3 Panels secured to uprights with wire ties and, where necessary, standard scaffold clamps
4 Weldmesh wired to the uprights and horizontals
5 Standard clamps
6 Wire twisted and secured on inside face of fencing to avoid easy dismantling
7 Ground level
8 Approx. 0.6m driven into the ground

Figure 2. – Protective fencing for RPA

4.2.4 The tree protection fencing to the retained trees is to be erected as detailed above.

Care is to be exercised when locating the vertical poles to avoid underground services and, in the case of the bracing poles, also to avoid contact with structural roots. If the presence of underground services precludes the use of driven poles, an alternative specification that provides an equal level of protection is to be prepared in conjunction with the project arboriculturist as illustrated within Figure 2 above.

4.2.5 Where the set-back of the tree protection barrier exposes unmade ground to construction damage, temporary ground protection is to be installed as part of the implementation of physical tree protection measures prior to work starting on site.

4.2.6 Temporary ground protection is to be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil. Detail is shown in Figure 3 below: Scaffolding and root protection within the RPA.

a) for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;
b) for pedestrian-operated plant up to a gross weight of 2t, proprietary, inter-linked ground protection boards placed on top of a compression resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;
c) for wheeled or tracked construction traffic exceeding 2t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

4.3 Landscape considerations:

Consideration should be given to landscape impacts and reinforcing site boundaries. Further consideration should be given to the appearance of frontages and screening. The appropriate landscape mitigation and compensation will need to be discussed at the pre-application stage with the appropriate Local Authority Planning Landscape Officer. Compensation planting will be undertaken and located to enable the landscape value of this area to be reinforced.

4.4 Mitigation and compensation:

The type, number and location of any replacement trees will been determined in the detailed landscape design plan including location and species.

REPORT ENDS

Appendix 1: Images of trees

Trees 5, 1 and 2

Trees 3, detail of 3 and tree 6

Tree 6 detail, trees 8, 9

Root damage and stem damage to landscaping trees

Trees under BS5837 on northern edge, and trees **16, 17**

Trees 14and 15 (first image), trees 4 and 5 (second image)

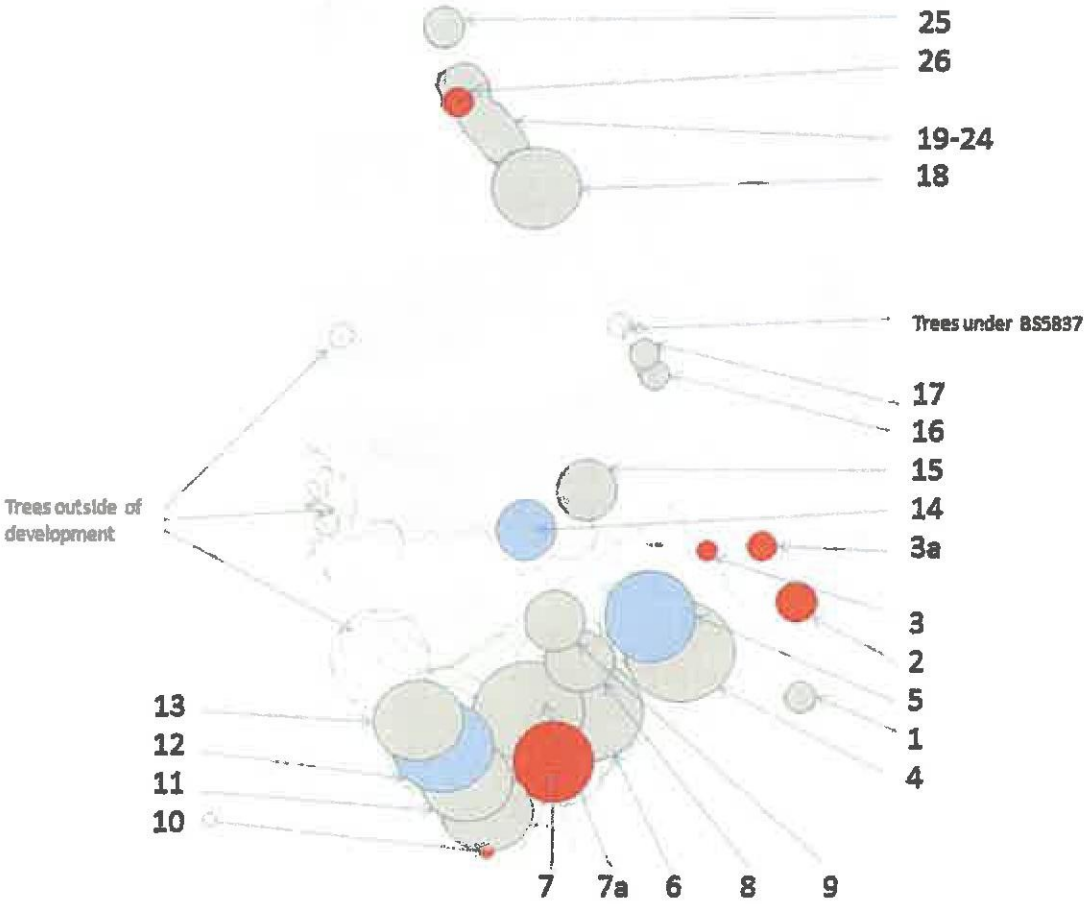
Tree 10 and 11, detail of 11, and tree 12

Trees 15, 3a and 18 (also **tree** group 19-24)

Detail tree 18 (first 2 images), one of tree group 19-24

Trees 26 and 25

Appendix 2: Tree location maps



Category A
Those trees of high quality and value. Significant trees that are structurally sound and can be retained in the long term (i.e., >40 years) or trees that can be retained in the long term following remedial tree surgery. Colour code on the plan- pale green.

Category B
Those trees of moderate quality and value. Trees that may live 15-40 years. Trees that may live for more than 40 years, but whose removal may be required in that time frame to allow development of retained trees. Trees that are defective but could be retained in the medium term by remedial tree surgery.
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Category C
Those trees of low quality and value. Trees that can only be retained in the short term (.e, 5-15 years) and that have little landscape impact due to poor form or condition. Trees having a stem diameter of <150mm at 1.5m above ground level that could be replaced.
Colour code on the plan- grey.

Category U
Trees that are dead, dying or diseased that will become dangerous in the near future (within years). Colour code on the plan- red.