



Tree Canopy Cover Assessment

Land off Kelvedon Road
Tiptree
Essex
CO5 0LX

UTC-0357-03-AIA
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1 INTRODUCTION

INSTRUCTION & TERMS OF REFERENCE

- 1.1 In February 2022, Underhill Tree Consultancy was instructed by Marden Homes, to provide a tree canopy cover assessment to accompany a planning application for a proposed development. The request was in response to a request from Colchester Borough Council for the following:
- *A Canopy Cover Assessment will be required for all major applications. Development proposals should seek where appropriate to increase the level of canopy cover on site by a minimum of 10%. In circumstances, where this is not possible or desirable, compensatory provision should be identified and secured through a legal obligation.*
- 1.2 A published study, *The Canopy Cover of England's Towns and Cities: baselining and setting targets to improve human health and well-being*, Doick, K.J, et al, Forest Research, 2017, sets out baselines and targets for tree canopy cover.

PURPOSE & SCOPE OF THIS REPORT

- 1.3 This report's purpose is to allow the local planning authority (LPA) to assess the existing tree canopy cover (TCC) of the site, the loss of canopy cover as a result of the development, and the projected increase in canopy cover from planted trees.

BACKGROUND INFORMATION

- 1.4 An Arboricultural Impact Assessment (UTC-0357-03-AIA-Rev B) was produced to accompany the planning application. This report contains full information on trees on site, including crown dimensions of existing trees, and this information is not repeated here.

2 DISCUSSION

THE IMPACT OF THE DEVELOPMENT

- 2.1 The table below indicates the total number of trees on site and the number to be removed as part of the development.

BS 5837 Category	A High quality	B Moderate quality	C Low quality	U Unsuitable for retention
Individual trees	0	T26, 27,	T28, 35, 38, 39,	1, 17, 18, 19
Groups	0	0	G8, 9	0
Hedges	0	0	0	0
Woodlands	0	0	0	0
Removed/Total	0	2/23	6/21	4/4

METHODOLOGY FOR TREE CANOPY ASSESSMENT

- 2.2 Using CAD software, the total area of the site was calculated, along with the total area of tree canopy and tree canopy lost as part of the development. All calculations are in square metres (m²).
- 2.3 Hedgerows and areas of scrub are not included in the calculations, although most are to be retained.
- 2.4 In addition, using an indicative Landscape Masterplan (2268 001 by Liz Lake Associates), and approximate numbers of proposed trees to be planted, a calculation was made of canopy size at planting, along with likely canopy size 10 years, 20 years, 30 years and 40 years after planting. This follows unpublished work by Sharon Durdant-Hollamby. This assumes an increase in stem diameter of urban trees of between 0.94-1cm a year (*White, J., 1998. Estimating the Age of Large and Veteran Trees in Britain. Forestry Commission Information Note*). Work undertaken by Sharon Durdant-Hollamby and others indicates an average increase of 0.98cm a year for younger trees in an urban environment, and this has been used in calculations in this report.
- 2.5 From research by Forest Research (*Vaz Monteiro, M., Levanič, T., Doick, K.J., 2017. Growth rates of common urban trees in five cities in Great Britain: A dendrochronological evaluation with an emphasis on the impact of climate. Urban Forestry and Urban Greening 22 (2017)*), a calculation between stem diameter and canopy size can be made, and the tables below shows calculations used.

1.4 x stem diameter in cm to the power of .45
 Small (12cm girth) – growing at 0.98cm per year – 10 years = 9.8cm

	Stem Diameter (cm)	Canopy diameter (m)	Canopy radius (Squared)	Canopy area m ²
Year 1	3.8	2.6	1.3 (1.69)	5.3
10	13.6	4.53	2.26 (5.13)	11.3
20	23.4	5.8	2.9 (8.41)	26.4
30	33.2	6.7	3.4 (11.56)	36.3
40	33.2	7	3.5 (12.25)	38.5

Medium 14cm girth or m/s growing at 0.98cm per year – 10 years = 9.8cm

	Stem Diameter (cm)	Canopy diameter (m)	Canopy radius (Squared)	Canopy area m ²
Year 1	4.5	2.8	1.4 (2)	6.28
10	14.2	3.8	1.9 (3.6)	16.11
20	24	5.8	2.9 (8.4)	26.4
30	33.9	6.8	3.4 (11.6)	36.5
40	43.6	7.7	3.85 (14.8)	46.5

Large tree 25 girth or m/s growing at 0.98cm per year – 10 years = 9.8cm

	Stem Diameter (cm)	Canopy diameter (m)	Canopy radius (Squared)	Canopy area m ²
Year 1	8	3	1.5 (2.25)	7
10	17.8	5.2	2.6 (6.8)	21.3
20	27.6	6.2	3.1 (9.61)	30.2
30	37.4	7.1 (adjusted to 8)	4 (16)	50.2
40	47.2	8 (adjusted to 10)	5 (25)	78.5

ASSUMPTIONS MADE REGARDING NEW TREES TO BE PLANTED

- 2.6 The project landscape architect will have the responsibility for species selection, specification of nursery stock, planting location, planting pit design, and maintenance proposals, although some suggestions are made within this report. The following assumptions have been made:
- That the trees are healthy when planted
 - That they are planted by a competent person in a suitable planting pit
 - That they are sufficiently maintained until independent in the landscape (ref *BS 8545:2014 – Trees: from nursery to independence in the landscape - Recommendations*)
 - That they are the right tree in the right place
 - That they are not diseased, dying, or vandalised, or if they are, that they are replaced during the next available planting season
- 2.7 The Canopy Cover of England's Towns and Cities states that the aim should be that targets for tree canopy cover should be achievable within 10-20 years from planting.

2.8 The table below shows statistically the existing TCC, that removed by development, remaining TCC and projected TCC from new tree planting.

Total area of existing tree canopy: 4597 m ²			
Area of existing tree canopy removed: 939 m ²			
Area of existing tree canopy retained: 3658 m ² = 7% of total area of site			
Target for 10% increase in tree canopy cover = 460 m² gain. Total target = 5057 m²			
Proposed tree planting numbers c.166, as indicatively shown on Landscape Masterplan			
Number & size of tree	Canopy size @ Year 1	Canopy size @ Year 10	Canopy size @ Year 20
Small x 20	120 m ²	249 m ²	528 m ²
Medium x 22	165 m ²	322 m ²	581 m ²
Large x 124	1116 m ²	2641 m ²	3745 m ²
Total new planting	1401 m²	3212 m²	4854 m²
Total of retained	3658 m²	3658 m²	3658 m²
Grand total	5059 m²	6870 m²	8512 m²

2.9 The Canopy Cover of England’s Towns and Cities states that the aim should be that targets for tree canopy cover should be achievable within 10-20 years from planting.

2.10 As can be seen from the table above, in excess of a 10% TCC increase will be achieved in year 1.

TREE IMPACT OF SPECIES SELECTION ON TREE CANOPY COVER

- 2.11 The calculations for small, medium and large trees are based on the size of tree at the time of planting and the figures for TCC increase is based on an average and is not species specific.
- 2.12 Wherever possible, tree species planted should be those able to achieve a large canopy size at maturity, as many of the benefits accrued by trees are clearly greater in a larger tree, compared to a smaller one. The project landscape architect will have the responsibility of choosing species which fit in with available space, as well as design parameters, however, the chart below indicates species from different size at maturity categories. Not all are necessarily suitable for all sites and there may be restrictions on some species due to plant health concerns.
- 2.13 The more medium and large species which can be included means a faster, and greater TCC.

Small trees	Medium trees	Large trees
<i>Amelanchier</i> sp. - Serviceberry	<i>Acer campestre</i> – Field maple	<i>Acer pseudoplatanus</i> - Sycamore
<i>Arbutus unedo</i> – Strawberry tree	<i>Acer platanoides</i> – Norway maple	<i>Aesculus hippocastanum</i> – Horse chestnut
<i>Cercis siliquastrum</i> – Judas tree	<i>Acer davidii</i> – Pere David's maple	<i>Aesculus indica</i> – Indian horse chestnut
<i>Cornus kousa</i> – Chinese dogwood	<i>Betula nigra</i> – River birch	<i>Alnus glutinosa</i> – Common alder
<i>Corylus avellana</i> - Hazel	<i>Betula pendula</i> – Silver birch	<i>Carpinus betulus</i> - Hornbeam
<i>Crataegus</i> sp. (most)	<i>Betula utilis</i> subsp. <i>Jaquemontii</i> – White-barked Himalayan birch	<i>Castanea sativa</i> – Sweet chestnut
<i>Laburnum anagyroides</i> – Common laburnum	<i>Catalpa bignonioides</i> – Indian bean tree	<i>Corylus colurna</i> – Turkish hazel
<i>Magnolia</i> sp. (most)	<i>Ilex aquifolium</i> – Common holly	<i>Fagus sylvatica</i> – Common beech
<i>Ligustrum</i> sp. (most)		<i>Juglans nigra</i> – Black walnut
<i>Malus</i> sp. (most)		<i>Juglans regia</i> – Common walnut
<i>Prunus</i> sp (most)		<i>Liquidambar styraciflua</i> - Sweetgum
<i>Pyrus</i> sp. (most)		<i>Metasequoia glyptostroboides</i> – Dawn redwood
<i>Sorbus</i> sp. (most)		<i>Pinus nigra</i> – Black pine
		<i>Pinus sylvestris</i> – Scots pine
		<i>Platanus x acerifolia</i> – London plane
		<i>Quercus robur</i> – Pedunculate oak
		<i>Tilia cordata</i> – Small-leaved lime

3 CONCLUSIONS

- 3.1 The new planting will achieve 10% increase in canopy cover in year one and continue to increase since it will see a substantial net increase of 154 number new trees across the site, contributing to an enhanced canopy cover for the borough.
- 3.2 Careful selection of species will ensure maximum benefits for carbon capture, as well as ecology and visual amenity.
- 3.3 Ensuring sufficient rooting volume, and planting correctly, as well as maintenance and watering until established, will help to ensure tree canopy cover is achieved as soon as possible.

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The report covers arboricultural issues; however, non-arboricultural matters may be referred to such as soils, ecology, construction methods etc. This should be viewed as provisional and the appropriate expert should be consulted where required.

No assessment has been made of the potential influence of trees upon existing buildings or other structures because of shrinkable soils or from direct damage.

Trees are dynamic living organisms and their condition can change rapidly and therefore this report is valid for a period of 12 months. This period may be reduced if significant changes occur to the trees or the ground conditions close to them.



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