Leicestershire County Council

The Value of Trees

ADEPT
Association of Directors of Environment, Economy, Planning & Transport

Rees Jeffreys Road Fund

Written and produced by

Treeconomics

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Funded by:
This project was funded by the Rees Jeffreys Road Fund whose objectives are to foster improvements in the engineering, management, design and use of roads to deliver safer, more environmentally sensitive, aesthetically pleasing and enjoyable outcomes.

https://www.reesjeffreys.co.uk/

This project was commissioned by ADEPT

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January 2023

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Executive Summary

The report which follows is a result of work carried out by the Value of Trees steering group and Treeconomics. The Value of Trees Project (VoT) was set up in recognition of the increasing challenges being faced in ensuring the continued presence and resilience of trees along the highway network. These challenges include climate change, the threats from imported pest and disease, continued highway safety and the contentious issue of responsibility for future tree management and maintenance. With funding available through the Rees Jeffreys Road Fund, the Association of Directors of Environment, Economy, Planning and Transport (ADEPT) approached Leicestershire County Council (LCC) in 2021 to ask if they would deliver a project to develop an approach that would assist local authorities to re-establish trees as an important feature along the highway network. Specialist consultants Treeconomics were engaged to deliver, in consultation with the VoT steering group, a report outlining an approach which could be implemented by LCC and have the potential to be used by other local authorities across the UK. The aim of the project was to produce a 'toolkit' that would deliver high quality tree planting schemes on or near the highway that provide multiple and clearly identified benefits for communities and stakeholders. This report provides an evidence base to support the 'toolkit' and offers suggestions as to how the individual elements of the report can be harmonised and used together to achieve the objectives outlined above.

The 'toolkit' is composed of five elements:

- A Species Selection Guide- This guide contains over 300 species and cultivars with their genetic tolerances and inherent characteristics identified and outlined coupled with their aesthetic and amenity features. This will widen the palette of trees available to developers, designers and others selecting and planting trees and allow natural characteristics to be matched with individual site constraints.
- A Valuation Matrix- This matrix characterises the specific ecosystem services, carbon storage, carbon sequestration, air pollution and storm water runoff, delivered by individual tree species in both monetary and volumetric terms at varying stages in their lifecycle up to 300 years. The scope of the matrix was broadened during early stages of the project to include a range of hedgerow species.
- Life Cycle Costs- A full holistic costing for five planting scenarios of varying complexity and levels of investment necessary to achieve planting, establishment, and management success.
- Best Practice Guidance- A summary of current best practice guidance available including references, suggestions for further reading and the identification of key elements which can be included in specifications for tree planting management and maintenance.
- Policy Review- International, national and LCC policies were reviewed allowing for gaps to be identified in existing LCC policy documents and enable the widest policy endorsement to be developed with regard to trees.

The use of all of the above five elements in conjunction with each other allows the most appropriate species to be chosen for any given set of circumstances combined with the ability to link species choice to specific desired ecosystem service delivery as well as considering the appropriateness of different levels of investment in planting methodology, best practice and the likelihood of a return on investment being realised.

The contents of this report are specific to Leicestershire, but the framework can be applied to other geographical locations with adaptations made to take into consideration other local environmental and landscape characteristics.

It is additionally advised that the data included be used to develop a software system where species choice is filtered through a menu of design and site constraints coupled with desired outcomes both aesthetically and environmentally.

The report also suggests that the existing ‘Tree Charter’ produced by LCC and The National Forest Company be developed to encompass the findings and outcomes of the VoT project and provide a means where all stakeholders can sign up to a unified approach to tree planting and management. The ‘toolkit’ has the potential to become a decision-making framework for local authorities and others across the UK.

Foreword

Blake Pain
Lead member for Environment and the Green Agenda at Leicestershire County Council

The County Council has shown its commitment to maintaining and improving the tree population in Leicestershire through its work with the National Forest Company to develop a Tree Charter. I'm very pleased to announce that the momentum behind this work has continued through the production of a Value of Trees Report, supported by the Association of Directors of Environment, Economy, Planning and Transport (ADEPT) and Rees Jeffreys Road Fund. This incredibly valuable toolkit will provide guidance to those who wish to deliver high quality, resilient tree planting schemes near to highway land.

In addition to their beauty in the landscape, trees are known to deliver many other benefits including carbon storage, reduced flooding and provision of habitat for wildlife. Trees also provide health benefits by cooling urban areas, improving mental health and wellbeing and reducing air pollution. However, there are challenges in ensuring the continued presence and resilience of trees along our highway network, not least the prevalence of tree pests and diseases such as ash dieback, climate change and concerns over maintenance and highway safety.

To tackle these threats the County Council has already taken action through the production of its Ash Dieback Action Plan and Tree Management Strategy. We have also promoted our vision to help plant 700,000 trees across Leicestershire – a tree for every person in the county - which will contribute to the Council's ambition to become a Net Zero authority. Going forward, the Value of Trees toolkit will also help in delivery of Biodiversity Net Gain and in the development and delivery of our Local Nature Recovery Strategy. The Value of Trees toolkit will reinforce these commitments by helping those involved in planting schemes to make appropriate species and design choices, so that trees will survive and thrive and continue to benefit communities into the future.

The project is particularly timely because of changing national policy and guidance. The National Planning Policy Framework and National Design Code and Guide emphasise that development should create 'beautiful places 'where street trees should be a prominent feature. There is a lot to consider in meeting these requirements, but we're committed to working together with partners and landowners to continue to develop the Value of Trees approach and deliver on its commitments. This work is a bold step in the right direction towards a future with trees that deliver multiple benefits and ultimately provide a better quality of life for Leicestershire residents.

Introduction

The report which follows explores and provides a framework for the selection of tree species throughout Leicestershire. It provides a decision-making matrix with regard to the characteristics of individual tree species, their natural tolerances, aesthetic attributes and longevity in the landscape. This is coupled with an assessment of the ecosystem services, carbon storage, carbon sequestration, pollution absorption and avoided stormwater runoff, which can be expected to be delivered by those species during their lifetimes. These ecosystem services are expressed in both quantitative and monetary terms for all the species and cultivars considered. When coupled together these two strands of information and data allow for detailed and evidence- based tree species selection.

There are many other benefits provided by trees which are not included in this report and therefore the monetary benefits are an underestimation. There is a huge amount of research and evidence in the public domain which outlines the many benefits of trees with regard to health and well-being, both mental and physical, climate change mitigation and much more. These benefits at the time of writing cannot be quantified and valued at a species level and therefore cannot meaningfully be included in this report.

The report also provides estimations of the whole life costs of tree planting, management and maintenance. This provides the potential for a cost/benefit analysis to be carried out when deciding on appropriate planting techniques for different tree species, taking into account their characteristics, longevity and ecosystem service delivery. It facilitates assessment of where return on investment is likely to be greatest.

The report also carries out a comprehensive policy review assessing the international, national and local policy documents and outlines the existing framework supporting the planting management and maintenance of the urban forest.

Finally, the report considers the use of a Tree Charter and how this can be used to provide a framework for the delivery and use of the contents of this report.

The Existing Leicestershire Tree Population

When considering the management of a tree population the first and perhaps most critical question is: 'What have we got?' It provides the baseline for all decision making, the creation of a vision, the setting of goals and targets and the monitoring of progress towards a desired outcome.

Leicestershire County Council manages and maintains the highway trees throughout the county including those planted on new developments which the council are asked to adopt once a development is complete. One of the objectives of the Value of Trees project is to re-establish trees as an important feature on the Leicestershire County Council Highway network. It is hoped that the work will inform decision making about tree species selection and maintenance not only the highway network but throughout the county.

Currently there is not a comprehensive management plan for the tree population of Leicestershire and the only publicly available data which analyses the trees in Leicestershire is the i-Tree Eco Inventory report produced by Treeconomics on behalf of the County Council in 2018.

This report only considered the trees recorded on the County Council's tree management inventory and did not include trees managed by housing associations, other local authorities, or private trees. It is therefore unlikely to be representative of the whole of Leicestershire but provides a useful starting point when considering the ecosystem service benefits provided by trees, their asset value, the composition, and structure of the Leicestershire County Council managed tree estate and provides a starting point for discussions related to future tree species selection.

Details of 82,599 trees were used in the report. A total of 277 species were recorded within the tree population, yet also illustrated the high level of dominance and reliance on just four species, which accounted for over 31% of the population. These species were: Ash (*Fraxinus excelsior*) 12.5%, Oak (*Quercus robur*) 8.3%, Sycamore (*Acer psuedoplatanus*) 5.5% and Birch (*Betula pendula*) 5.3%. Such dependence on just four species potentially leaves a significant percentage of the whole population lacking resilience and vulnerable to the threat posed by imported pest and or disease and the as yet ill-defined impacts of climate change.

The presence of Ash Dieback (*Hymenoscyphus fraxineus*) is problematic and is likely to impact on at least 75% (a local estimation) of the Ash population, a total of 8019 trees from a total population of 10,692 Ash trees.

The 2018 i-Tree report provides the beginning of an evidence base as to which tree species might be successfully planted in greater numbers to increase the overall resilience of the population. Table 1 illustrates just fifteen species which are present in the population in small numbers (less than 0.5%) but have the potential to make significant roadside trees.

Species	Share of Population %	Share of Leaf Area %	Dominance Value
Acer saccharinum	0.5	0.9	1.4
Tilia euchlora	0.2	0.3	0.5
Juglans regia	0.2	0.3	0.4
Tilia platyphyllus	0.1	0.2	0.4
Alnus cordata	0.2	0.2	0.3
Corylus colurna	0.2	0.1	0.3
Acer cappadocicum	0.1	0.1	0.2
Sequoiadendron giganticum	0.1	0.1	0.2
Liriodendron tulipifera	0.1	0.1	0.1
Metasequoia glyptostroboides	0.1	0.1	0.1
Ostrya carpinifolia	0.1	0.1	0.1
Koelreutaria paniculata	0.1	0.1	0.1
Nothofagus	0.1	0.1	0.1
Hippophae rhamoides	0.1	0.1	0.1
Styphnolobium japonicum	0.1	0.1	0.1

Table 1. Species with less than 0.5% population share of Leicestershire C.C. trees
Source: Leicestershire i-Tree Eco Inventory Report (2018)

Note: The above tree species are sorted in the order they appear in the i-Tree report of 2018 and it is not suggested that each species will be suitable for all situations. It is intended to illustrate how the existing report can be used to inform future species choice with a view to increasing population diversity and resilience.

In addition to providing a guide to species selection with regard to diversity and resilience, an understanding of 'what you have got 'provides a basis for a more articulate analysis of the ecosystem services provide by the trees present in the population. The i-Tree report produced headline figures of the ecosystem services provided by the Leicestershire CC inventory population.

It reported that over 25,000 tonnes of carbon is stored, valued at over £6 million at the time of reporting (recent changes to the value of CO_2e put this at around £22 million in 2022). Annually over 9 tonnes of pollution were removed with a value of over £161,000, 625 tonnes of carbon is sequestered annually at a value of almost £150,000 (recent changes to the value of CO_2e put this at around £568,000 in 2022) and that 31,740m_3 of avoided stormwater run-off was achieved annually at a value of more than £48,000. The total annual benefits amounted to £359,000.

It is also obvious from the data contained in the report that not all trees deliver benefits equally with species, size, health, and condition being significant factors. Generally, the larger longer-lived species deliver the greatest benefits. Table 2 illustrates the top ten trees in the Leicestershire CC inventory in order of replacement cost and the variations in ecosystem services provided.

Species		No. Trees	Carbon storage (tonnes)	Carbon sequestered (tonnes/yr)	Avoided runoff (m^3/yr)	Pollution removal (tonnes/yr)	Replacement Cost (£)
Quercus robur	English oak	6,818	5,337	109	3,925	1.14	17,124,977
Fraxinus excelsior	Ash	10,301	3,389	79	5,236	1.53	16,530,489
Acer psuedoplatanus	Sycamore	4,523	2,011	46	2,947	0.86	7,947,358
Tilia	Lime	2,968	1,065	23	1,794	0.52	6,414,682
Acer platanoides	Norway maple	3,478	1,149	30	2,113	0.62	4,685,623
Tilia x europaea	Common lime	2,004	638	15	1,221	0.36	3,848,467
Betula pendula	Silver birch	4,385	896	32	848	0.25	3,012,539
Prunus	Cherry	3,756	892	27	913	0.27	2,606,868
Aesculus hippocastanum	Horse chestnut	1,531	996	19	1,069	0.31	2,380,627
Fagus sylvatica	Beech	958	711	13	792	0.23	2,143,171

Table 2. Top ten species within Leicestershire C.C. tree stock
Source: Leicestershire I-Tree Eco Inventory Report (2018)
Where only genus was available, data was collected at this level hence e.g. both ***Tilia*** and ***Tilia x europaea.***

It must be remembered that the values above represent a snapshot in time with the services provided accruing over time as trees grow and develop or lost as trees fail or are removed from the population. It also, has to be remembered that the services provided can be enhanced if trees are growing optimally, free from stress and fulfilling their genetic potential.

The i-Tree report of 2018 also produced a monetary valuation of the Leicestershire C.C. tree inventory. Two methods were used in the report. The first is a replacement cost based on the physical resource itself and the cost of replacing a tree with a similar tree. It uses the Council of Tree and Landscaper Appraisers (CTLA) method with guidance from the Royal Institute of Chartered Surveyors. The second was the Capital Asset Value for Amenity Trees (CAVAT). This method has a similar basis to CTLA but has been developed in the UK to express a trees contribution to public amenity and its prominence in the urban landscape.

The CTLA replacement cost was just under £100 million and the CAVAT valuation was just over £428 million.

The above focuses on the value of trees and the importance of understanding and answering the question ‘what have we got to’ identify and plan for the future management, and maintenance of the urban forest.

It is obvious that the above does not in itself provide a comprehensive guide to tree species selection but does perhaps indicate the importance of an evidence base to focus future planting and management decisions on.

Recommendations:

1. **Develop a vision statement for all trees in Leicestershire County.**
   - **To encompass those trees under the management of Leicestershire County Council and in a wider context the tree population of Leicestershire County as a whole.**
   - **Such a vision can be singular or multi- faceted.**
   - **Some of the elements which might be contained in such a vision statement include:**
     - **Increase canopy cover**
     - **Increase tree diversity within the population**
     - **Increase stormwater interception through strategic tree planting**
     - **Reduce the impact of the heat island effect by providing shade**
     - **Increase pollution interception by strategic tree planting**
     - **Improve the management and maintenance of the existing tree population to increase the benefits delivered.**
     - **Improve the health and wellbeing of the human population by enhancing tree cover.**
   - **It is important that the vision is based on evidence and that a clearly defined action plan is developed to achieving the vision.**

2. **Continue to develop and update the current evidence base.**
   - **A further i-Tree Eco Inventory report on the Leicestershire CC tree inventory would provide such information.**
   - **Widen the evidence base with regard to the tree population of Leicestershire as a county.**
   - **Leicestershire to use its position as an influencer to encourage the development and sharing of tree inventories by district councils and other landowners within Leicestershire where they do not exist and to encourage the use of i-Tree Eco where they do.**
   - **Create an on-line resource as a repository for information as it is gathered so that a comprehensive picture is developed of the tree population within Leicestershire which is available to the community.**

3. **Undertake an i-Tree Eco Sample plot study of the whole of Leicestershire.**
   - **This would include privately owned trees and therefore:**
     - **provide a picture of the tree population of Leicestershire as a whole;**
     - **create a greater understanding of the role of trees managed and maintained by Leicestershire CC within the whole;**
     - **inform how new development and planting can enhance the development of the urban forest.**

4. **Consider the development of a Leicestershire Urban Forest Master Plan.**

Species Selection

Species Selection Matrix: Trees

Species selection to achieve the aims and objectives of a vision is complex. Many elements and factors need to be considered in the process.

These can be divided approximately into the following:

- Design aims and objectives.
- Site characteristics and constraints. This includes an assessment of which constraints can be ameliorated and which will remain following intervention.
- Species selection which will include an assessment of a species' inherent characteristics and tolerances, the capability of a species to thrive in particular conditions, the ability of a species to deliver required ecosystem services, the maintenance and management necessary to facilitate the optimum development of the chosen species, the contribution the chosen species will make to the population as a whole and the aesthetic characteristics of the species.

It is simply not good enough to prescribe planting the 'Right Tree in the Right Place 'without clarifying what is the place and what is the right tree and for what reasons.

The development of the following species selection matrix enables decision making with regard to tree species selection for planting to be informed and educated but does not remove the need to first answer the question 'what have we got?'. As outlined in the previous section a comprehensive understanding of the existing tree population is critical if species selection for planting is to achieve identified aims and objectives.

The species selection matrix is divided into two sections. The first considers the tree species and its characteristics. The second considers the tree species and the ecosystem services provided across a clearly defined timescale related to age-defined stages of the life of a tree species up to 300 years of age.

Section One: Tree Characteristics and inherent tolerances:

This section provides information about tree species and is divided into a series of headings each of which is outlined and explained in the table below.

Taxonomy	Botanical Name	Botanical name of the tree genus and species
	Common Name	Common name of the species where available
	Family	Family of which the genus is part
Tolerances	Drought	tolerance of drought assessed as tolerant, mid tolerant, mid sensitive, sensitive
	Salt	tolerance of salt where available assessed as tolerant, mid tolerant, mid sensitive, sensitive
	Waterlogging	tolerance to waterlogging assessed as tolerant, mid tolerant, mid sensitive, sensitive.
	Shade	tolerance to shade assessed as tolerant, mid tolerant, mid sensitive, sensitive
	Hardiness Zone	Based on USDA Hardiness zone map; UK lies in zone 6b to zone 10b.
	Succession	Succession status where information is available. Indicates conditions necessary for successful establishment
	Natural Range	Area where species occurs naturally. Provides an indication as to the inherent tolerances and conditions in which it thrives naturally.
Ecosystem Services where information is available	Carbon sequestration	Assessed as high, medium or low
	Avoided stormwater runoff	Assessed as high, medium or low
	Pollution Removal	Assessed as high, medium or low
	Total benefits index	Assessed as high, medium or low.
Ecosystem Disservices	BVOC Emissions	Assessed as high, medium or low.
	Allergy potential	Assessed as high, medium or low.
Aesthetic and other characteristics	Mature height	Assessed as open grown tree with no local constraints to development
	Crown Spread	Assessed where information is available as an open grown tree with no local constraints to development
	Crown Shape	Assessed as the mature crown shape with no local constraints to development
	Foliage, Deciduous	Species indicated as deciduous
	Foliage, Evergreen	Species indicated as evergreen
	Foliage, Autumn colour	Indicates which species provide significant autumn colour
Flower	Monoecious	Where male and female flowers appear on the same plant
	Dioecious	Where male and female flowers appear on different plants. Important when considering allergy potential and aesthetics.
	Colour	The predominant colour of the flower
	Flowering period	The time of year when flowers are produced
Fruit		The type of fruit produced if at all.

Ornamental bark	Whether the species has significant ornamental bark

Table 3. Glossary of Terms for tree taxonomy, characteristics and ecosystem services

With the above it is possible to make an informed choice as to species selection based on the design requirements and the site constraints which cannot be ameliorated.

To illustrate how the information in Table 3 might be used, if the requirement is for a tree species which is of medium height with a globular head, is moderately tolerant of drought, waterlogging and shade, falls with the UK hardiness zone rage, is a pioneer species, has a high capacity to store carbon, has medium allergy potential, is deciduous, is monoecious and flowers in the late spring then the above will guide the reader to *Celtis occidentalis*, the Hackberry. The table allows for both detailed and cursory examination dependent on the design criteria and requirements of the site to be planted.

A full list is available separately in spreadsheet form as Appendix 1 - Species Selection Matrix.

Section Two: Ecosystem Service Delivery

The second part of the matrix extends species choice beyond that outlined in the table and considers the ecosystem service delivery of different species at different stages of their life up to 300 years and provides an estimate of the monetary value of those services as the tree develops towards maturity. It clearly makes the point that the value of benefits which trees deliver over time increases with age and size. It also enables a comparison to be made between individual species and their effectiveness in delivering one or more ecosystem services. The headings used are outlined in table 4.

Species Name	Botanical name of the species	
Replacement Cost	The CTLA replacement cost	£
Carbon storage	Value of carbon stored.	Tonnes or Kg
Gross carbon sequestration	Value of carbon sequestered annually.	Tonnes or kilograms per year
Avoided run-off	Volume of avoided runoff annually	Cubic metres per year
	Value of avoided runoff annually	£ per year
Pollution removal	Weight of pollution removed annually	Grams per year
	Value of pollution removed annually	£ per year

Table 4. List of headline metrics provided within the i-Tree Eco Inventory Report (2018)

Carbon storage, carbon sequestration, avoided runoff and pollution removal are then calculated for different stages of tree development as shown in table 5. In section one, given a certain set of criteria the species *Celtis occidentalis* was selected as appropriate for the design requirements. Using the above, it becomes possible to evaluate the likely performance of *Celtis occidentalis* with regard to carbon storage and ecosystem service delivery at clearly identified stages of the development of the tree.

Celtis Occidentalis	Replacement Cost (£)	Carbon Storage		Carbon Seq		Avoided Runoff		Pollute Remove	
		(kg)	(£)	(Kg/yr)	(£)	(m^3/yr)	(£)	(g/yr)	(£)
10 years	73	9	8	0.3	0.3	0.1	0.0	8	0.3
20 years	274	30	27	0.4	0.4	0.4	0.0	38	1.6
30 years	943	60	55	0.6	0.5	0.9	0.0	86	3.5
40 years	1,879	99	90	0.7	0.6	1.4	0.0	134	5.5
50 years	3,083	144	131	0.8	0.8	2.2	0.0	205	8.4
75 years	7,012	286	260	1.1	1.0	2.3	0.0	219	9.0
100 years	11,269	466	424	0.9	0.8	2.3	0.0	214	8.8
150 years	12,940	557	507	0.6	0.6	2.8	0.0	262	10.7
200 years	14,475	655	596	0.3	0.3	3.3	0.0	312.7	12.8

Table 5. Example of carbon storage, ecosystem service delivery and valuation data

Note the figures in the columns are not cumulative but express the total amount and value at each of the stages in the life cycle. The replacement cost indicated cannot be used in isolation from the ecosystem service values delivered by species at the various stage of their life cycle. The true replacement cost is a cumulative one and must include the value of the ecosystem services lost.

The CTLA method has been used throughout this report as opposed to or complimentary to CAVAT because allowing for the community index element within the CAVAT methodology across the age classes used in the report would be unrealistic. It is suggested that CAVAT values be applied when mitigation for the loss of individual or groups of trees is a consideration. A full list is available separately in spreadsheet form as Appendix 2, and further information on the methodology can be found in Appendix 4.

From the above it can be seen that it is possible to make appropriate species selection for a wide range of environmental variables. It also becomes possible to forecast with a degree accuracy what ecosystem services the newly planted tree will deliver throughout its lifetime and how its asset value will grow with the tree.

It also enables a detailed examination of the characteristics of trees not currently present in the Leicestershire C.C., the ecosystem services they will potentially provide and the contribution those species could make to the overall population diversity. It is also possible to compare species with regard to the rates at which ecosystem services are delivered across their anticipated lifespan. It is assumed that all trees are open grown and in optimum condition. Table 6 shows five species which are currently not present in the Leicestershire C.C. inventory. The table is only an illustration of potential analysis and does not pretend to cover all permutations possible.

Species (Common Name)	Description	Ecosystem services
Carrya illinoinensis (Pecan Nut)	A member of the Walnut family, mid tolerant of drought and waterlogging and intolerant of shade, hardiness zone 5-9, originating from the southern USA, has high allergy potential, can reach 30 metres in height, is deciduous and monoecious, produces catkins and a nut in the autumn.	Has the potential to store over 500 kg of carbon over 50 years reaching a maximum of 7500 kg. Has the potential to sequester over 21kg carbon annually reaching a maximum of over 90kg annually.
Cladastris kentuckia (Yellow wood)	A member of the Fabaceae family, which is mid sensitive to drought, mid tolerant of shade but sensitive to waterlogging, hardiness zone 4-8, originating from Eastern North America, has medium allergy potential, reaches a height of 10-15 metres, is deciduous and displays autumn colour.	Has the potential to live for over 100 years, will store almost 3000kg of carbon at maturity, will sequester 50 kg of carbon annually at maturity and absorb 574 g pollution annually at maturity.
Eucommia ulmoides (Rubber Tree)	A member of the Eucommiaceae family, mid tolerant to drought and shade, hardiness zone 5-7, originates in southern Europe and Western Asia, has medium allergy potential, and reaches a height of 15-20 metres in favourable conditions	At maturity will store almost 7000kg of carbon and at maturity has a replacement cost of above £16,000.
Pterocarya fraxinifolia (Wingnut)	A member of the walnut family, mid tolerant to waterlogging and shade but mid sensitive to drought, hardiness zone 8-9, originating in the Caucasus and Iran, a pioneer species which can reach 30 metres in height	At maturity will store over 7000 kg of carbon and will avoid 1.30m_3 of stormwater runoff annually.
Zelkova serrata (Japanese Elm)	A member of the Elm family, sensitive to water logging, but mid tolerant of drought and shade, hardiness zone 5-8, originates in Japan and China, has the potential to reach a height of 25-30 metres, is diocecious and has indistinct flowers produced in the spring.	Reaches a replacement cost of over £18,000 and stores over 7000kg of carbon at maturity. Also at maturity will sequester over 57kg of carbon annually.

Table 6. Five species not currently planted by Leicestershire C.C.

Recommendations:

5. **It is highly recommended that the data from sections one and two are combined and incorporated into an electronic dropdown system where the design requirements and constraints of any planting site are entered. The system then filtering out tree species which have the capacity to meet those requirements and producing a list of choices.**

6. **The data used to complete the tree species matrix is updated annually with new species introduced and additional species information added as required. Over time, as more information about the tree population of Leicestershire, as a whole ’is gained and recorded, the system will become increasingly Leicestershire focused.**

7. **The system is piloted with modifications added, if necessary, with an aim to make it as user friendly as possible.**

Species Selection Matrix: Hedges

Hedges provide valuable habitat and connectivity between the numerous land use types which constitute the landscape character of Leicestershire. For the purposes of this report no detail is available as to the size, scale, condition or presence of hedges, the different species, or any specific targets or ambitions for hedge planting other than to encourage it wherever practically possible.

The remit was to provide information on the ecosystem service provision of different species of hedge. Consequently, seven common hedging plants were reviewed for the purpose of this report. The ecosystem services provided by each of these species was evaluated at three different hedge sizes over a ten metre length of hedge. These were as follows:

- 10 metres x 2 metres height x 2 metres width
- 10 metres x 2 metres height x 1 metre width
- 10 metres x 1 metre high x 1 metre width.

The following species were selected for review:

- Beech (*Fagus sylvatica*)
- Blackthorn (*Prunus spinosa*)
- Field Maple (*Acer Campestre*)
- Hawthorn (*Crataegus monogyna*)
- Hazel (*Corylus avellana*)
- Hornbeam (*Carpinus betulus*)
- Holly (*Ilex aquifoliium*)

An example of the results is shown in Table 7

Hedge Size (m) L x H x W	Species	Replacement Cost	Carbon Storage		Carbon Seq		Avoided Runoff		Pollutant Remove	
			(kg)	(£)	(Kg/yr)	(£)	(m_3/yr)	(£)	(g/yr)	(£)
10 x 2 x 2	*Acer campestre*	£865	42	38	16	0.02	0.27	0.33	<0.01	1.87
	Carpinus betulus	£865	66	60	28	0.03	0.35	0.42	<0.01	2.42
10 x 1 x 1	*Acer campestre*	£216	10	9	7	0.01	0.13	0.15	<0.01	0.88
	Carpinus betulus	£216	16	14	13	0.01	0.17	0.20	<0.01	1.14

Table 7. Example of carbon storage, ecosystem service delivery and valuation data for selected hedges

A full list of the results can be found at Appendix 3, and further information on the methodology can be found in Appendix 4.

From the table at Appendix 3 it can be seen that there is relatively little difference in the ecosystem services provided by individual species and it is unlikely that species selection will be influenced by this factor alone; it is more likely to be influenced by the biodiversity value of different species and their appropriateness for any given situation.

With regard to the provision of ecosystem services, a metre gain is height is possibly more important than the equivalent gain in width, given it generates additional leaf area on both sides.

Over a ten-metre length of hedge the ecosystem services gained seem relatively small but when extrapolated upwards by increasing the length of the hedge then significant gains can be seen.
For example, a ten-metre hedge of Hornbeam with a height of two metres and a width of one metre will store 0.033 metric tonnes of carbon but a hedge of 1000 metres will store over 3 metric tonnes of carbon. From the table at Appendix 3 it is possible to calculate the ecosystem service gains to made of hedges of different lengths and dimension.

Recommendations:

8. **Existing important hedges are mapped and assessed for condition and species present.**

9. **Areas of priority for hedge planting are identified and mapped with a focus on connectivity between disconnected parcels of land, particularly woodland.**

10. **Private landowners are engaged with a view to encouraging hedge planting.**

Species Selection: Biodiversity

Leicestershire CC's trees are a vital aspect of habitat provision, constituting a significant and highly visible element of the county's biodiversity in their own right as well as for the species that depend upon them - as recognised within the county's Action for Nature report, covering its biodiversity strategy. They include ancient semi-natural and secondary native woodland, wood pasture, parkland, scrub, and individual veteran trees.

The functioning of our whole food supply system as well as all as the ecosystem services we derive form trees relies on the biodiversity of pollinators, soil organisms, natural predators of crop pests and many more. It is vital that we maintain their vitality, especially in the face of climate change threats.

Pollinating insects provide ecosystem services by pollinating flowers and producing food. Trees offer an important source of pollen at particular times of year when other sources are unavailable.

Many insect herbivores are supported by trees and shrubs. Some specialise on just a few tree species, whilst others are generalists that benefit from multiple tree and shrub species. Of the species found in Leicestershire, native willows, oaks and birches support the most varied insect herbivore species (Table 8), although every species has role to play, for example by supplying structural habitat dead wood.

A broad guideline is that non-native trees associate with fewer species than native trees as they have had less time to form associations with native organisms[1]. However, some non-native trees such as sycamore support a large quantity of biomass with benefits such as food source for birds, whilst some native species form few insect herbivore associations due to their high level of defence mechanisms, yew being a good example[2].

Amongst all species, the greatest levels of biodiversity are enabled through veteran and ancient trees, with where the decay phases of wood are allowed to go through their natural cycle.

It is obvious when considering the contents of Table 8 (below) that the data with regard to associations between tree species, insects, mites and lichens is limited to relatively few tree species. Data for most of the species considered as part of the tree species selection matrix, which is subject of this report, is unavailable yet it is now generally agreed that diversity in urban tree populations is desirable to achieve resilience in the face of challenges such as climate change.

[1] Kennedy & Southwood 1984
[2] Daniewski et al.1998

Common Name	Scientific Name	Associated Insect Species	Associated Lichen Species
Oak (pedunculate & sessile)	*Quercus robur & Quercus petraea*	284 (423)	324
Willow species	*Salix*	266 (450)	160
Birch (silver & downy)	*Betula pendula & Betula pubescens*	229 (334)	126
Hawthorn	*Crataegus*	149	no data
Blackthorn	*Prunus spinosa*	109	no data
Poplar species (inc aspen)	*Populus*	97	no data
Crab Apple	*Malus Sylvestris*	93	no data
Scots Pine	*Pinus sylvestris*	91	132
Alder	*Alnus*	90	105
Elm	*Ulmus*	82	187
Hazel	*Corylus*	73	160
Beech	*Fagus*	64 (98)	206
Ash	*Fraxninus*	41	255
Spruce*	*Picea*	37	no data
Lime	*Tilia*	31	83
Hornbeam	*Carpinus*	28	44
Rowan	*Sorbus*	28	125
Field Maple	*Acer campestre*	26 (51)	93
Juniper	*Juniperus*	20	no data
Larch*	*Larix*	17	no data
Fir*	*Abies*	16	no data
Sycamore*	*Acer pseudoplatanus*	15	183
Holly	*Ilex*	7 (10)	96
Sweet Chestnut*	*Castanae sativa*	5	no data
Horse Chestnut*	*Aesculus hippocastanum*	4	no data
Yew	*Taxus*	4	no data
Walnut*	*Juglans*	4	no data
Holm Oak*	*Quercus Ilex*	2	no data
Plane*	*Platanus*	1	no data
Rhododendron*	*Rhododendron*	0	no data

Table 8. Number of insects and lichens which have been recorded in association with common trees and shrubs in Britain. Dark grey shading indicates >1% share of Leicestershire CC tree inventory. Light grey indicates <1% share. Figures in brackets include mite species. * Introduced tree species. Figures in brackets include mite species.

Below is a summary of theoretical models for diversity in the urban forest:

Santamour, 1990:

No urban tree population should comprise more than 10% of any given species, no more than 20% of any genus and no more than 30% of any given family.

Millier and Miller, 1991:

Proven species should not exceed more than 10% of the population.

Moll, 1989:

No species should exceed 5% of a city's tree population and no genus should exceed 10%

Grey and Denke, 1986:

One species should not amount to more than 10-15% of the total population.

Berker, 1975:

Communities should establish maximum population densities for each species as a percentage of the entire street tree and no more than 5% of any one species is used.

Konijnendijk, 2021

3-30-300 Rule for every neighbourhood.

- Three trees from your window.
- Thirty percent tree cover.
- Three hundred metres to the nearest park or greenspace

Research indicates that the urban forest is at this moment in time lacking in diversity and therefore resilience, with populations relatively dependent on a relatively few species. Examples of research illustrating a lack of diversity in urban tree populations are summarised below:

- Trees in Towns II the last comprehensive review of trees in urban areas in England reported that six species accounted for 37% of all trees and shrubs planted in England's cities[3].
- Recent work carried out by Forest Research examining 12 i-Tree studies in the UK confirmed this perception reporting that in total 110 different genus were identified across all locations, of which 218 species were identified; the conclusion was that locations were typically dominated by a small number of species[4].
- It has been reported that although there are a wide range of tree species used in central and north western European countries, approximately two hundred and fifty woody species are used across central European parks and gardens[5].
- Usually only three to six genera account for 50-70% of all street trees planted with lime, maple, plane, horse chestnut, oak and ash being the most popular[6].
- A measurement of 108 cities around the world for species diversity found that on average 20% of trees in the urban forest were of the same species, 26% were of the same genus and 32% were of the same family[7].

[3] Britt and Johnson, 2008
[4] Monteiro, 2019
[5] Roloff et al., 2009
[6] Pauleit, 2013
[7] Morgenroth et al., 2016

Inevitably, when discussing diversity in the urban forest the native verses exotic discussion emerges. The discussion normally involves the appropriateness of planting exotics and the impact this will have on biodiversity in the environment but also raises the question as to whether true diversity within the urban forest is possible using native species alone.

Genus	Species	
Acer	*Acer campestre*	
Alnus	*Alnus glutinosa*	
Betula	*Betula pendula*	*Betula pubescens*
Carpinus	*Carpinus betulus*	
Fagus	*Fagus sylvatica*	
Fraxinus	*Fraxinus excelsior*	
Ilex	*Ilex aquifolium*	
Malus	*Malus sylvestris*	
Pinus	*Pinus sylvestris*	
Populus	*Populus nigra subsp Betulifolia*	
Prunus	*Prunus avium* *Prunus padus*	*Prunus spinosa*
Pyrus	*Pyrus cordata*	
Quercus	*Quercus petrea*	*Quercus robur*
Taxus	*Taxus baccata*	
Tilia	*Tilia cordata*	*Tilia platyphyllus*
Ulmus	*Ulmus glabra*	*Ulmus minor*
Salix	*Salix alba* *Salix caprea* *Salix cinerea* *Salix fragilis*	*Salix petandra* *Salix triandra Salix* *Salix viminalis*
Sorbus	*Sorbus arranensis* *Sorbus aucuparia* *Sorbus bristoliensis* *Sorbus devoniensis* *Sorbus domestica* *Sorbus eminens* *Sorbus hibernica* *Sorbus lancastriensis*	*Sorbus porrigentiformis* *Sorbus psuedofennica* *Sorbus rupicola* *Sorbus subcuneata* *Sorbus torminalis* *Sorbus vexens* *Sorbus wilmottiana*

Table 9: Examination of native species available for urban planting

*Dark Grey - Genera which are currently affected adversely by a known pest or disease where planting is restricted or banned

Light grey - Genera where native species would not be suitable for extensive use as trees, particularly street trees in the urban environment either because of size, form, or availability. It is to be noted that ***Sorbus aucuparia*, ***S. domestica*** and ***S. torminalis*** are used but normally they are represented by cultivars.

According to the Royal Horticultural Society, 18 genera are native to the UK (Table 9). Native genera which are currently affected adversely by a known pest or disease where planting is restricted or banned include *Fraxinus, Ulmus* and *Quercus*.

Genera where native species would not be suitable for extensive use as trees, particularly street trees in the urban environment either because of size, form, or availability include *Ilex, Malus, Pinus, Populus, Prunus, Pyrus, Salix* and *Sorbus*. It is to be noted that *Sorbus aucuparia, S. domestica* and *S. torminalis* are used but normally they are represented by cultivars, and though native species of these genera may be inappropriate as street trees, some non-native species may be more appropriate.

The detail in Table 9 would indicate that true diversity according to the theoretical models is not possible if only native tree species are used. There are therefore obvious implications for informed species selection. The use of the information contained in this report allows an informed balance to be struck between the use of exotic species and of native species.

Recommendations:

11. **Additional information is gathered to inform tree planting strategies and species selection where diversity within the tree population is low. These will usually be the more urbanised areas within LCC, and areas where new development enables a diverse population to be created at design stage.**

12. **A gradient is created, identified and mapped between urban, peri-urban and rural where the use of native species can be prioritised. The vulnerability of native species to changes caused by climate change and the threats from imported pest and/or disease should be a consideration in this analysis.**

Tree Species: Whole Life Costs

The whole life cost of a tree is not an easy figure to extrapolate as there are innumerable variables to consider. These include some which are site specific and others which relate to the management and maintenance regimes implemented locally. For, this report five scenarios have been considered, but it is accepted that these scenarios do not cover all potentialities.

Location	Skeleton/Structural Soil in a street	Crate system in street or on a podium	Soft verge in a street	Parkland and green space
Average cost of a 12-14 cm girth containerized tree.	£120	£120	£120	£120
Costs of Planting the Tree	£8,893	£12,061	£149	£149
Cost of establishment	£378	£412	£357	£357
Total	£9,391	£12,593	£626	£626

Table 10. Comparative costs for tree planting in new developments.
Adapted from 'Trees Planning and Development: A Guide for Delivery' (2021) by Trees and Design Action Group with 10% adjustment for inflation since publication date.

Table 10 gives indicative cost only and does not include economies of scale, changes in material or labour costs. The cost of establishment includes watering, mulching where appropriate, formative pruning and structural pruning during the formative years after planting until the tree can be considered truly independent in the landscape, growing healthily without the need for arboricultural intervention other than annual inspection.

The Trees and Design Action Group document allowed a £10 annual cost associated with regular inspection and other minor maintenance. The removal costs of the tree at end of life have not been included as these are difficult to predict and will be enormously variable given local constraints and differences in size, age and species. The question of retrofitting trees into existing hard surfaces has also been excluded as once again the variables are so great as it is impossible to provide definitive figures with any degree of accuracy.

For a discussion of planting methodologies see Best Practice Guidance below:
What follows is an extrapolation from the above figures based on personal experience of the authors of this report rather than any specific data base and is likely to be critiqued and challenged with specific local information which was not available at the time of writing.

Certain assumptions have been made:

- The TDAG data is underestimated by 20%
- The end-of-life removal cost is £1000
- The cost of retrofitting in hard surfaces where there is not an existing tree pit is approximately 20% of the cost of planting and managing a tree planted using skeletal soil.

Using these assumptions, it is possible to produce the table set out below.

Location	Skeleton/ structural soil in a street	Crate system in a street or a podium	Retrofitting into existing hard street surface. (20% of cost of skeletal soil)	Soft verge in a street	Parkland or open space
Cost of an average 12-14 cm girth containerized tree allowing for a 20% underestimation	£145	£145	£145	£145	£145
Cost of planting trees allowing for a 20% underestimation	£10,671	£14,473	£2,134	£178	£178
Cost of Establishment allowing for a 20% underestimation	£453	£494	£453	£428	£428
Cost of routine management and maintenance throughout life	£2,000	£2,000	£2,000	£2,000	£2,000
Cost of removal at end of life estimated at an average 75 years (too low for many species)	£1,000	£1,000	£1,000	£1,000	£1,000
Total	**£12,269**	**£16,112**	**£3,732**	**£1,751**	**£1,751**

Table 11. Example costs for planting trees into hard landscapes.
Adapted from Trees & Design Action Group

It can be assumed that the cost of the trees will increase by approximately 30% with every size increment - the larger the tree the more it will cost. It has been assumed that containerised trees are used. The costs of trees produced by other nursery production methods (see Best Practice) will vary and are likely to be cheaper.

The above can only be viewed as indicative but provides a basis to begin to consider tree planting not as a cost but as an investment. Trees are an asset which accrues in value as they grow and provide additional carbon storage and other ecosystem service benefits the larger they become.

Using the Species Selection Matrix (Appendix 1), it is possible to consider in which planting scenarios and in which species high level early level investment is likely to be repaid in terms of asset accrual and ecosystem services delivered. At 75 years, the average period considered in the above table for removal *Celtis occidentalis* will deliver the following:

Celtis occdentalis	Replacement Cost	Carbon storage		Carbon seq		Avoided runoff		Pollution removal	
		(kg)	(£)	(kg)	(£)	m^3/yr	(£)	(g/yr)	(£)
75 years	£7,010	286	260	1.1	0.99	2.3	<0.01	219	8.95
200 years	£14,475	655	596	0.3	0.26	3.3	<0.01	313	12.8

Table 12. Example comparison of key carbon and valuation metrics at 75 and 200 years (***Celtis occidentalis***)

It can be seen from table 12 that high investment in a *Celtis occidentalis* where site and other constraints may limit life expectancy to 75 years might be considered only a reasonable investment but at 200 years the asset value alone will exceed the whole life cost of the tree.

A *Celtis occidentalis* planted as a retrofit tree in a hard surface where the initial investment is far less will have reached an approximate breakeven point in terms of asset value after 50 years without considering any of the ecosystem service benefits it has delivered during that period.

A true cost benefit analysis is not possible for all species considered in this report, but it is possible to enhance decision making by equating the initial and whole life investment made to the longevity of the species selected, the asset value of the tree and the services delivered. The above becomes another tool in making educated species selection and justifying investments made.

Recommendations:

13. **That the decision-making process regarding species selection incorporates a calculation as to the return on investment over a defined number of years using the methodology outlined above.**

14. **That an agreed planting methodology and subsequent maintenance schedule is adopted (See Policy Review: Recommendations: Tree Charter) for the five scenarios considered above and accurate costs are created which apply directly to Leicestershire. It has been highlighted that the costs used above are indicative only.**

Note: The above species matrix is intended to be used in its entirety when considering the appropriateness of any tree species selection for any specific environment.

The matrix is composed of several elements each of which is important but all are interrelated and should be considered in the relation to the environmental and other constrains present on a specific planting site.

The tree characteristics and inherent tolerances section enables site constraints to be matched with tree species which have the inherent characteristics to thrive despite those constraints. The ecosystem services section allows for selection of a species which will deliver particular ecosystem services over a known timescale and the prioritisation of ecosystem service delivery in response to particular environmental, social and other specific needs.

The whole life costs element of the matrix allows species choice to be related to the costs of specific planting methods and an assessment as to whether a particular investment is likely to deliver a return over time.

It is intended that the species selection matrix can be incorporated into policy and used as an engagement tool with all stakeholders with an investment in the urban forest including local interest groups, NGO s, planners, developers and others.

Best Practice

Already in the public domain there are numerous documents, reports and research papers which contribute to and provide guidelines for establishing trees in the urban and peri-urban landscapes. It is beyond the scope of this report to analyse these in detail or to create significant new best practice guidance if indeed this was possible.

The two most contemporary, significant and comprehensive documents published are:

- BS 8545:2014 Trees: From Nursery to Independence in the Landscape (2014)
- Trees in the Hard Landscape: A Guide for Delivery by Trees & Design Action Group (TDAG) (2014)

Subsequent work and research enhance and re-examine the material contained in these two documents but does not significantly add to or contradict the original texts. They therefore remain the principal sources of best practice guidance and foundation references for the writing of planting specifications and subsequent post planting maintenance.

Experience suggests that it is not the absence of best practice guidance which limits tree planting and success but the implementation of that best practice at various stages in the delivery chain. This view was consolidated during a site visit to Leicestershire carried out with members of the Value of Trees Project on Tuesday 1st March 2022.

British Standard BS 8545:2014

BS 8545 suggests that the process of successfully planting and nurturing trees until they become independent in the landscape can be divided into a series of stages which are interlinked and dependent on each other if success is to be achieved. These are:

- Policy and Strategy
- Site Evaluation and constraints assessment
- Species Selection
- Nursery Production and Procurement
- Handling and Storage trees from the nursery and prior to planting
- Planting
- Post planting management and maintenance

It is recognised that several different actors will be involved in the delivery of the above stages and the potential for failure or poor practice to inhibit success is greatest when the implementation of any stage is passed to another. This also makes it difficult to isolate and apportion responsibility if failure occurs.

The standard also makes the point that every planting site is different, each with its own constraints and limitations and that overcoming and accommodating these to achieve planting success and longevity of the newly planted tree is an ‘intellectual exercise ’and cannot be achieved using formulaic recipes ‘cut and pasted ’from elsewhere.

In the British Standard flowcharts are created for each of the stages. These are reproduced below for the purpose of this report.

Policy and Strategy

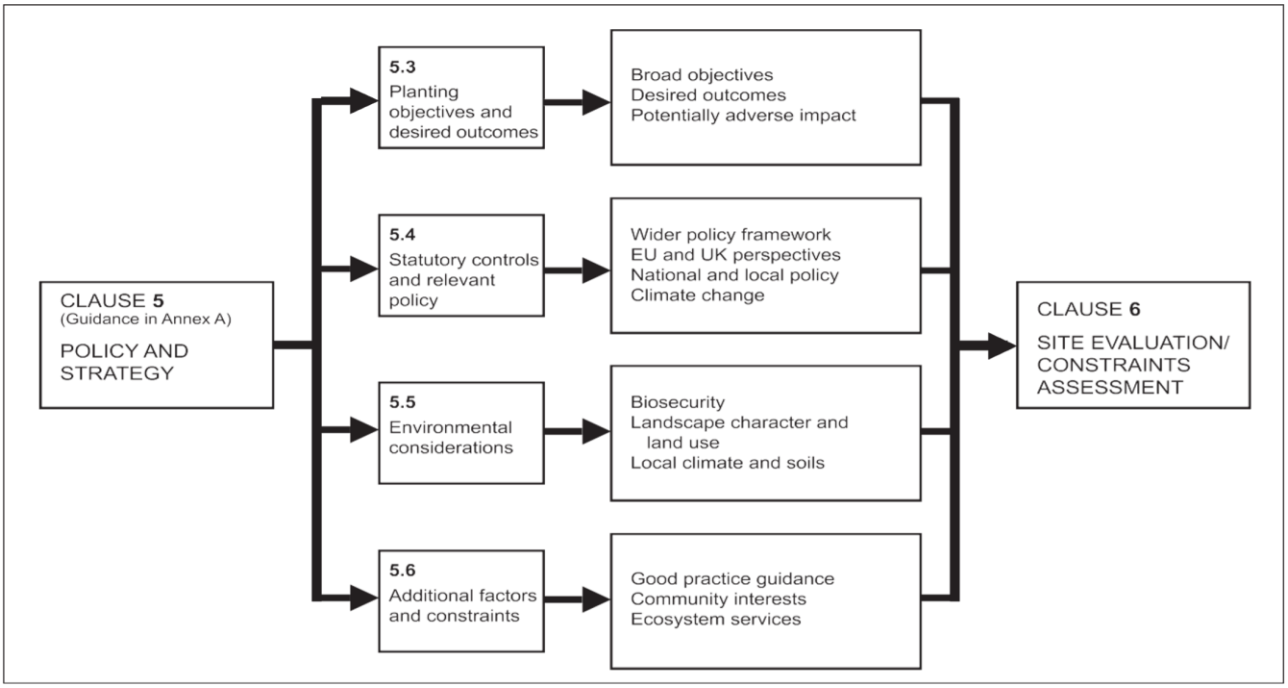


Figure 1. Policy & Strategy flowchart. Source: BS8545:2014

Site evaluation and constraints assessment

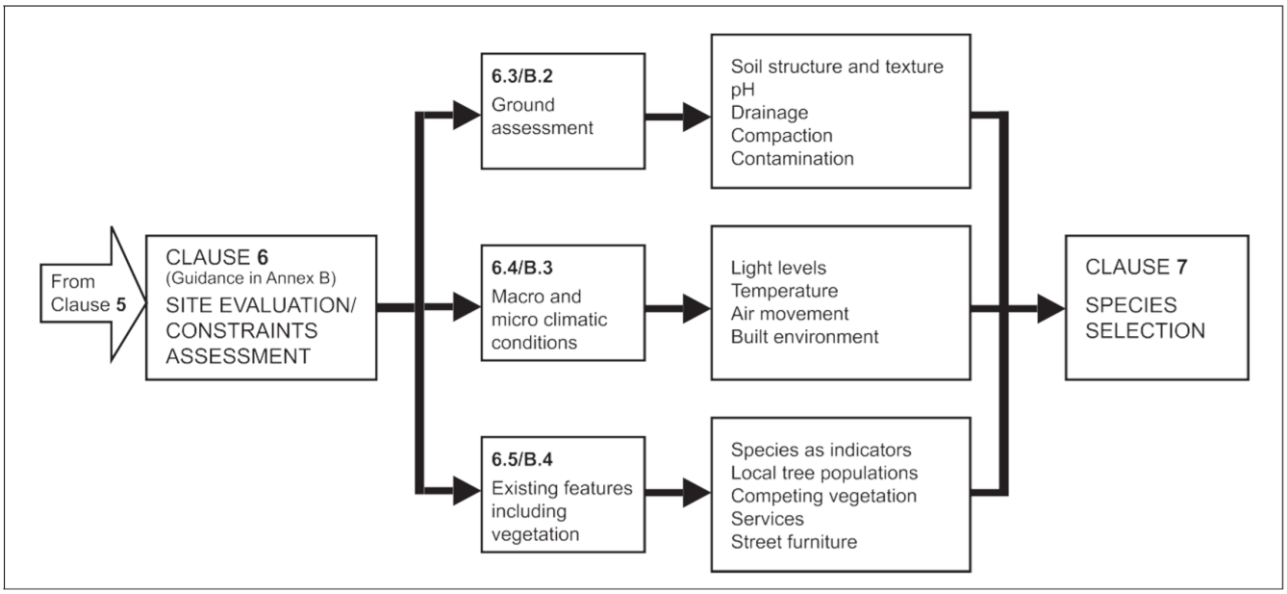


Figure 2. Site evaluation & constraints assessment flowchart. Source: BS8545:2014

Species Selection

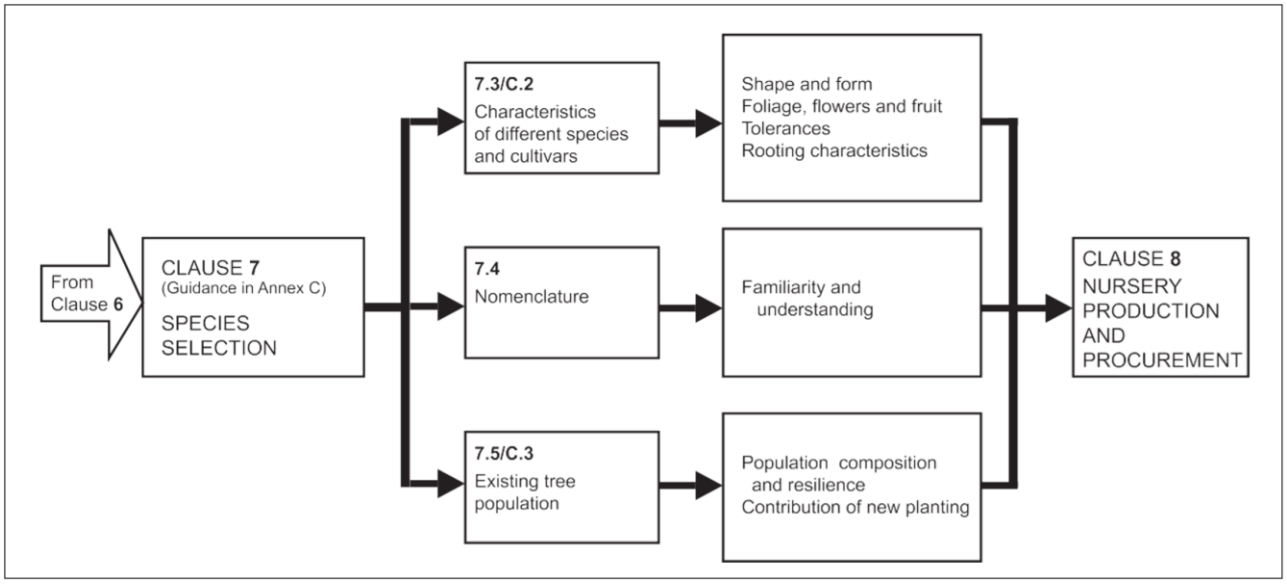


Figure 3. Species selection. Source: BS8545:2014

Nursery Production and Procurement

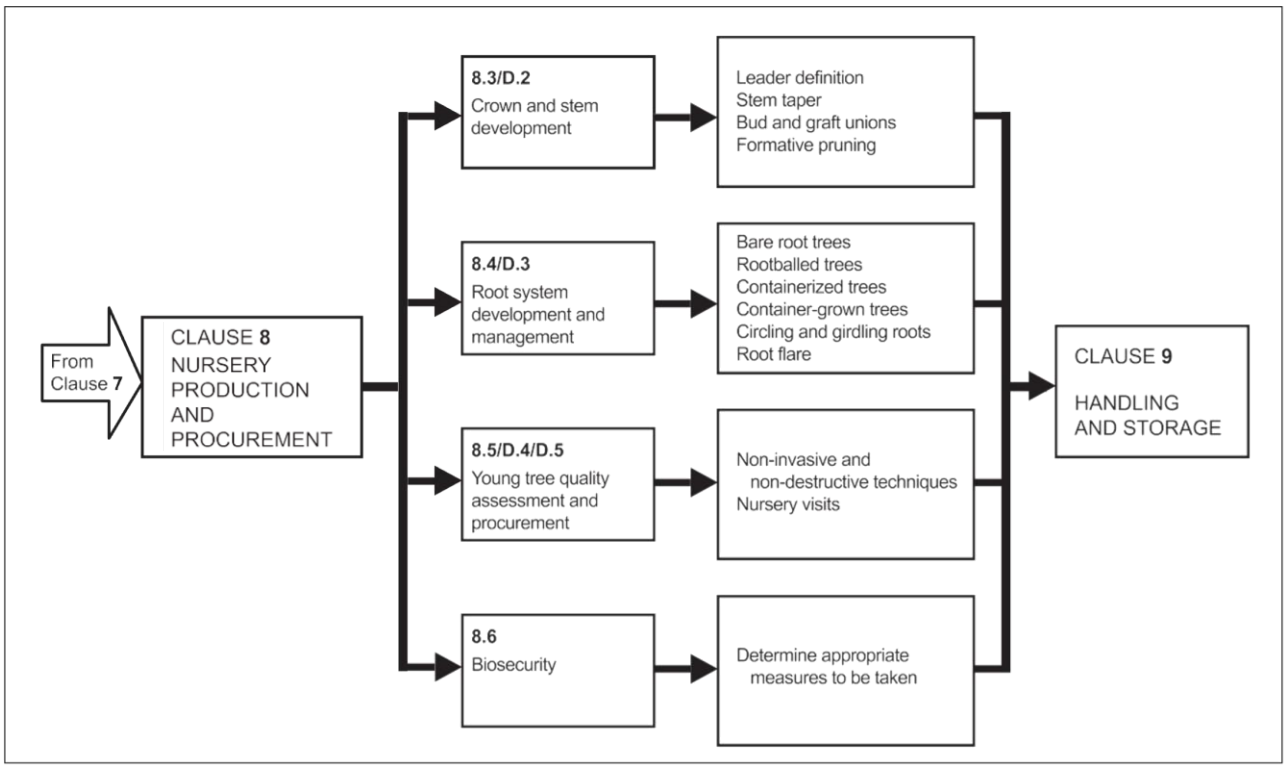


Figure 4. Nursery Production & Procurement flowchart. Source: BS8545:2014

Handling and Storage

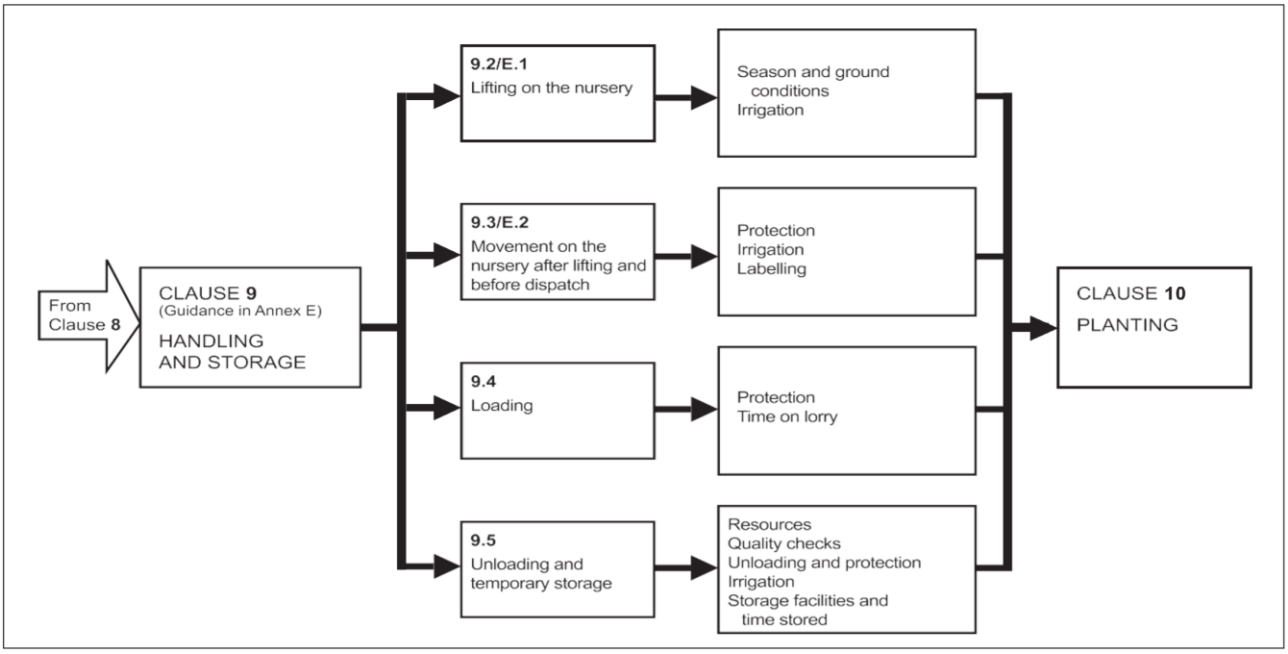


Figure 5. Handling & Storage flowchart. Source: BS8545:2014

Planting

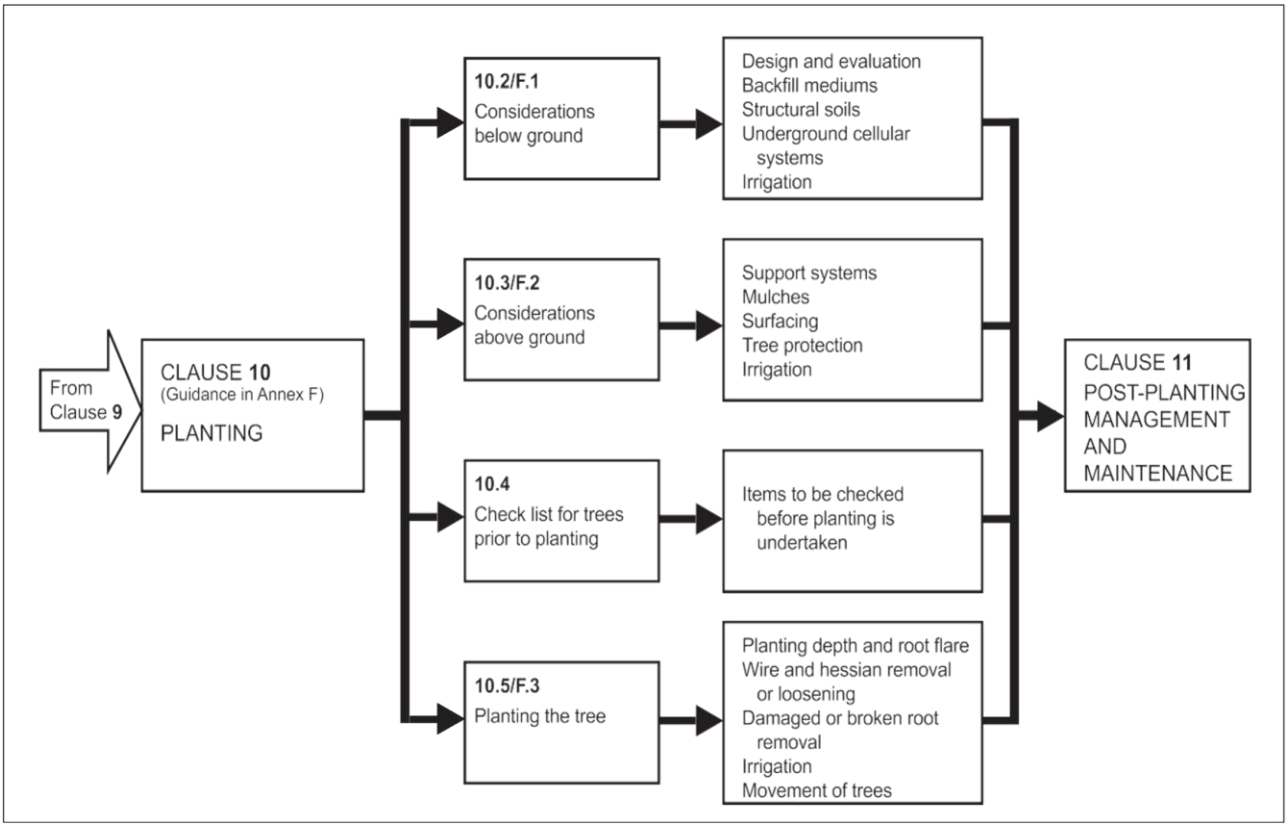


Figure 6. Planting flowchart. Source: BS8545:2014

Post Planting Management and Maintenance

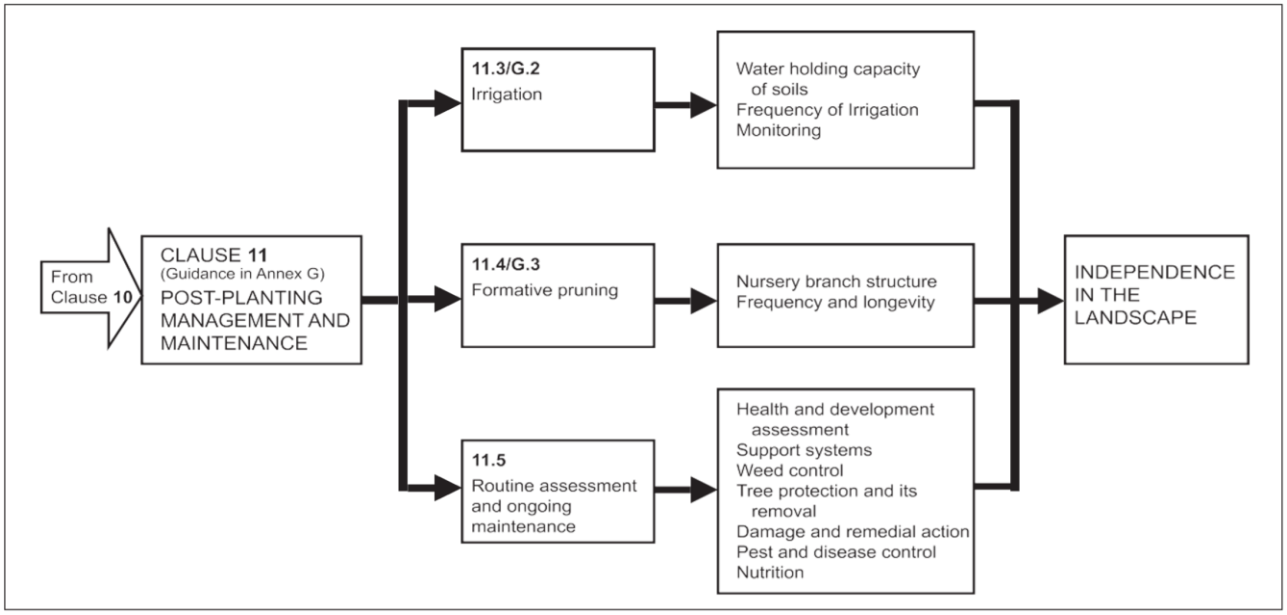


Figure 7. Post planting flowchart. Source: BS8545:2014

The standard makes recommendations for every element identified in the flow charts above and then provides supplementary information on each of the topics plus references to the original research papers where applicable.

As stated above in the opening paragraphs it is beyond the scope of this report to examine every element in detail and would indeed offer nothing new as all the information is outlined clearly and concisely in the standard itself.

It is perhaps the planting of the tree and the variability of planting sites coupled with inadequate management and maintenance which are the principal causes of concern in Leicestershire although conversations with the steering group have indicated that there is some dissatisfaction with procurement and the varying quality of trees being planted across the county.

The subjects of policy and species selection have been covered in detail elsewhere in this report so the remainder of this section will be devoted to nursery procurement, planting and post planting management and maintenance.

Nursery procurement

Variability in the quality of young trees procured from the nursery invariably follows poor specification and a general lack of understanding of the advantages and disadvantages of the three principal nursery systems used in the UK. Nursery visits are also generally infrequent and often considered a luxury rather than a necessity.

There are three principal nursery production systems. These are:

- Open Grown (bare root)
- Rootballed (Ball and burlap)
- Containerised Trees

Each of them has advantages and disadvantages and each will be appropriate at different planting sites dependent on the conditions and constraints to be found there. A full list of the advantages and disadvantages of each system can be found in table D2 on page 43 of the standard coupled with a full description of that production system.

It is worth outlining here items which can be included in a specification to a supplying tree nursery.

Tree Health

Items which can be specified:

- All foliage should be free of significant leaf lesions or abnormal discolouration.
- The crown structure should be free from any dieback.
- Foliar density and size should be typical of the species and or cultivar.
- Extension growth should be compared with and comparable to the growth of the previous year where this is apparent.
- The main trunk/stem of the tree should be free of abnormal excessive adventitious bud development.
- The main trunk/stem should be free from any significant untypical flattening.
- There should be no epicormic growth emerging from the rootstock of the tree.
- Trees should be sourced from a nursery which has achieved accreditation under the Plant Healthy Certification Scheme (relevant to biosecurity).

Figure 8. Items that can be specified to a supplying nursery to ensure good tree health

Branch, Stem and Crown Development

Items which can be specified:

- Growth between stock and scion wood should be equitable with no disproportionate growth apparent between the two.
- The supplying nursery should be able to indicate the understock used to produce any particular cultivar. This should be asked for.
- At no time during the production process should the bud union have been below soil level.
- No growth, usually more vigorous, should be apparent emerging from the understock used for budding or grafting.
- All young trees should have a clearly defined and strong leader. It is the central leader / trunk which will provide the structural support for the final structural branching system of the tree (exceptions to this would be specialist trained trees such as multi-stems)
- All young trees should have a clearly defined strong leader.
- All lateral branches should be subordinated to the leader and should never be more than 25% of the diameter of the main stem at the branch union.
- All formative pruning wounds should exhibit healthy and continuous bark occlusion with all pruning cuts made leaving the branch collar clearly visible and intact on the main stem.
- All branches which are poorly attached, are inward growing or cross and rub other branches should be removed or subordinated to the central stem.
- All young trees should exhibit a clearly defined stem taper appropriate to the species and evident from crown tip through to root flare.
- All young trees should have a proportionate and balanced height/stem girth ratio appropriate to the species.
- At the point of despatch all trees should being wholly self-supporting and free from any extraneous canes or ties in the crown.

Figure 9. Items that can be specified to a supplying nursery for branch, stem and crown development

Root System Development and Management

The three types of production system outlined above all primarily are concerned with root development and the method by which the root system is developed and transported to the planting site.

Bare Root Trees

These are trees lifted directly from the nursery field and supplied free from soil or container usually wrapped prior to dispatch.

All root systems exhibit certain characteristics which a peculiar to the species under consideration. Even within the species there is variation so providing generalised guidance is difficult, but it is fair to suggest all bare root systems should display a good lateral root spread with at least four obvious and well- developed lateral roots evenly spread around the stem circumference.

Items which can be specified:

- All root systems should be typical for the species and should display a well-balanced radial root system comprising of at least four obvious and substantial lateral roots
- Root systems should not be predominantly one directional
- All bare root systems should meet the height size parameters as outlined in table 12 below.
- All bare root systems should have a significant amount of fibrous root commensurate with the species
- Bare root trees on the nursery trees should have several lateral roots near the soil surface.
- A simple iodine test should be carried out to assess the amount of stored carbohydrate present.

Figure 10. Items that can be specified to a supplying nursery for bare root trees

Items which can be specified:

- The root flare should be clearly visible at the surface of the rootball
- The final root pruning cut should be at least 200-300 mm from the exterior of the rootball
- The soil ball should not move independently of the central stem
- The supplying nursery should be advised that a sample number of rootballs will be broken open with the root system inspected to ensure that the production process has been carried out correctly and that any deviance will result in the whole load being returned to the nursery

Rootball Table		
Girth of tree measured at one metre in centimetres	Minimum diameter of rootball in millimetres	Minimum number of times transplanted /undercut on the nursery
8-10	300	-
10-12	300	-
12-14	400	3
14-16	450	3
16-18	500	3
18-20	550	3
20-25	600	4
25-30	700	4
30-35	800	4
35-40	900	5
40-45	1000	5
45-50	1200	5
50-60	1300	6

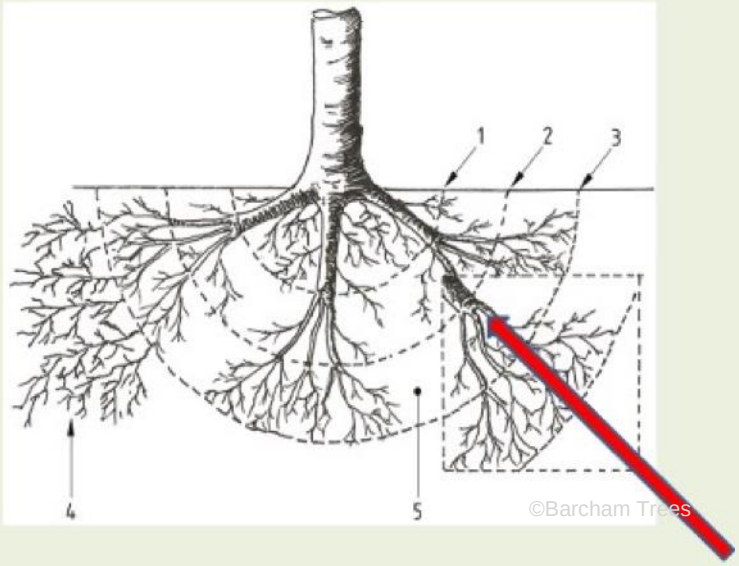
Figure 11. Items that can be specified to a supplying nursery for rootballed trees

Young Tree Height in metres	Diameter of root spread in millimetres
2.5 - 3.0.	450
3.0 - 3.5.	550
3.5 upwards	700

Table 12. Guide to size relationships between tree height and root spread for bare root standard tree stock

Rootballed Trees

Rootballed trees are those which have been produced through a vigorous nursery production process which involves periodic undercutting or transplanting of the trees. Rootwrapped trees are entirely different and the two should not be confused although their appearance at the point of delivery is almost identical.



The principle of undercutting

1. First cut
2. Second cut
3. Lifting cut

Proliferation of root from cut root end

Items which can be specified:

- A strong dominant leader with no external support necessary
- Potential co-dominant lateral branches should be subordinated to the main dominant trunk
- Lateral branches with poor or included branch unions should be removed
- No lateral branch should be more than 50% diameter of the main trunk at the point of union
- All pruning wounds should be in the process of occluding (healing over) completely

	Size & Height	
Type	Size (girth) circumference at 1metre (cm)	Height (metres)
Standard	8 - 10	2.5
Selected Standard	10 - 12	3.5
Heavy Standard	12 - 14	4
Extra Heavy Standard	14 - 16	4

Figure 12. Items that can be specified to a supplying nursery for all nursery production methods for crown development for standard trees and above.

Containerised Trees

Containerised Trees are trees which have been grown conventionally in the nursery field and lifted to be grown on in containers for at least one full growing season. Prior to containerisation the root system will have been pruned.

The success of this system is related to the length of time the tree is held in a container prior to dispatch and planting in the environment. This timing is critical as, irrespective of the container type used, tree roots will circle as they make contact with the container wall. This circling can result in root girdling which can lead to failure often many years after planting.

Extreme examples of root girdling (Figure 13) result in very little lateral root development leading to instability at the planting site and potentially failure.

Items which can be specified:

- All containerised trees should be free of root circling or root girdling
- All nurseries supplying containerised trees should be able to specify the ‘shelf life ’date of individual or batches or trees.
- The beginnings of the root flare of all containerised trees should be clearly visible on the surface of the container.
- Where trees are transferred from smaller to larger containers evidence should be provided to demonstrate that any root defects/circling roots have been shaved from the container ball prior to re-containerisation.

Figure 13. Items that can be specified to a supplying nursery for containerized trees

Figure 14. Examples of extreme root girdling

Crown Development

The purpose of nursery pruning is to select and define a central leader which becomes the main trunk of the tree which, as it develops, is mechanically able to support the eventual permanent structural branching system of the tree. Nursery pruning also should control and subordinate lateral branches to the main trunk while retaining photosynthetic integrity as the tree grows.

Much of the lower crown on a nursery tree is formed of temporary branches which are removed as the tree as the tree develops.

It must be remembered that the nursery tree irrespective of its size at planting is not the finished article and formative and structural pruning should be continued post planting and should be built into any maintenance regimes post planting.

Stages in Crown Development at the nursery.

Figure 15. Removal of the stem of the understock following budding.

Figure 16. Young trees in the nursery field

Figure 17. Developing young trees in the nursery field.

Figure 18. Young trees prior to lifting from nursery field.

Figure 19. Well-pruned young nursery trees.
Note dominant leader

Planting

For the purposes of this report five planting scenarios have been considered and were outlined in the section entitled ‘Tree Species: Whole Life Costs.’ These scenarios are as follows:

- Skeleton/structural soil in a street
- Crate system in a street or a podium
- Retrofitting a tree into an existing hard surface in a street
- Soft verge in a street
- Parkland or open space

As already demonstrated, there is a large variation in the cost of each of the above scenarios. Both skeleton/structural soils scenarios are associated with the need to provide a load bearing surface with a recommended soil volume beneath the surface to support tree growth and development. It is essential to remember that in each of the scenarios the basic requirements of the tree remain the same.

Whatever the scenario the above fundamentals are critical with those indicated in red being the most essential. Failure to achieve any of these three elements is likely to result in failure. There is no formulaic solution to achieving these goals as each planting site will be different with different constraints present and different potential for removing those constraints.

Skeleton/Structural Soil in a Street

The TDAG publication Trees in the Hard Landscapes: A Guide for Delivery has extensive and well-presented guidance for the use and installation of both skeleton/structural soil solutions and the use of crate systems. This can be found on page 84 onwards in the chapter entitled Technical Design Solutions and there is little to be gained by replicating it here. There is useful information about sustainable urban drainage and tree pit surfaces with numerous case studies illustrating successful uses of the systems.
It is stressed throughout that supervision and strict adherence to specification is critical when using both solutions.

Soft Verge in a Street and Parkland or Open Space

These two scenarios can be considered together as the planting requirements are identical. BS 8545: Trees from Nursery to Independence in the Landscape has extensive information and guidance in Chapter 10, pages 18-22 and again there is little to be gained by replicating the information in this.

Retrofitting a Tree into an Existing Hard Surface in a Street

The existing best practice guidance currently in the public domain concerning retrofitting into an existing hard surface in a street is limited and is an area where research is lacking. Solutions tend to be local with limited evidence to support their success or otherwise. It is agreed that the fundamentals to tree planting as outlined above must be met but are constrained by local resources. The cost of opening a new tree pit in an existing hard surface in a street vary enormously from local authority to local authority restricting the options available. It is agreed that the larger the dimensions of the tree pit the better particularly the surface area available for gaseous exchange to take place. It is also generally agreed that a surface mulch applied after planting is beneficial, but this is not always practical to achieve with any great success.

See recommendation for suggestions as to how approaching this scenario may be addressed.

Management and Maintenance Post Planting

BS 8545 outlines three main actions in terms of post planting management and maintenance. These are:

- Irrigation
- Formative Pruning
- Routine assessment on on-going maintenance

It is agreed that post planting management and maintenance is critical to achieving post planting success and longevity in the landscape. Sadly, post planting management and maintenance is only undertaken for a limited period post planting, and it is rare to find any long-term management and maintenance programmes for young trees post planting.

While the three headings used in the British Standard may be considered inadequate, it is useful to replicate here the full transcript contained in the Standard for post planting management and maintenance. There is a sound basis supported by research for the creation of a meaningful post planting management and maintenance programme for Leicestershire. The text has been reproduced in italics and modified to include additional relevant information. These modifications will be in bold type The original text is available in section 11 0f the standard on pages 23 – 25. Significant recommendations have been highlighted in yellow.

Post planting management and maintenance is important if longevity in the landscape is to be achieved. A full young tree management programme with budgetary provision should be in place for all planting schemes. This management programme should be in place for at least five years.

Irrigation:
The timing and frequency of irrigation should consider the prevailing weather conditions, soil moisture content, soil moisture release characteristics, and the response of tree species to water deficits or periods of prolonged soil saturation. (See Species selection matrix: tolerances of different species).

Note: Nursery trees produced in ideal conditions can take time to adapt to localised planting conditions. (Genetic tolerances may not be immediately apparent).

Any given volume of soil has the capacity to hold a given volume of water. The water -holding capacity of the soil should be assessed and considered when determining irrigation needs. (See G2 on pages 70-72 of the standard for a fuller discussion).

The frequency of irrigation is more important than the volume of water given at any one time. Increased water cannot compensate for a lack of frequency. (Water applied, more than, field capacity will be lost as drainage water or even worse collects as an anaerobic water sump at the base of the tree pit). This should be accounted for in irrigation plans. Irrigation plans should also consider the finding of the original site assessment and the subsequent species choice made.

It might not be sufficient to apply a given amount of water arbitrarily at a certain frequency after transplanting. Monitoring is recommended if there are 10 consecutive days during the growing season at above 25 degrees centigrade. Water should only be added if soil moisture probe/tensiometer values indicate that it would be appropriate to do so. (Simple soil moisture probes are readily available but rarely used).

Where there is hard surfacing near to newly planted trees, careful design can be used to supplement irrigation needs. This can be achieved using permeable surfacing, directional drainage channels or other methods where natural rainfall is directed into the rooting environment. (Not all permeable surfacing work and other problems can be encountered because of its use. See Trees in the Hard Landscape A Guide for Delivery page 67 for a full discussion of the merits of different types of surfacing)

If the use of irrigation tubes is proposed, it should be fully assessed in relation to site constraints. (The success of irrigation tubes is debatable with no clear evidence to suggest that they improve water delivery). The use of watering tubes does not necessarily preclude the need for top up watering. (Slow-release watering bags are widely used and considered a more effective way of delivering irrigation water)

Formative Pruning:
Formative pruning should be carried out in accordance with BS 3998 as required throughout the early years of a tree s life in the landscape. Some of the nursery prepared branching structure is temporary and formative pruning should continue until a permanent structurally sound scaffold of permanent branches typical of the species and appropriate for the site circumstances is produced. (It is often assumed that the nursery tree is the finished article. It must be realized that the nursery phase is just one of the phases of a continuous growing culture which continues when the tree is planted in the landscape).

Routine assessment and ongoing maintenance:
A formal assessment of young tree health and development should be carried out annually. The assessment should include foliar appearance (i.e. lack of leaf chlorosis and or necrosis), leaf size and leaf canopy density, extension growth and incremental girth development. Continual assessment on an ad hoc basis to be carried out throughout the year, to inform maintenance requirements.
It is possible to assess young tree performance in the field using both leaf fluorescence and leaf chlorophyll content. These tests should be carried out wherever practicable.

It might not be practical to individually assess large numbers of young trees planted in the same season, but sampling is a recognised method of assessment.

As necessary being carried out:
All stakes and ties should be checked at least annually to ensure that the root system remains stable and firm in the ground, and that ties are still effective and not causing damage to the tree. Any stakes and ties that are found to be not fit for purpose should be adjusted, replaced or removed.

All stakes and ties should be removed as soon as the developing root system is strong enough to support the tree. Two growing seasons are usually long enough for this to occur (If not self- supporting after this period it is unlikely that self-sufficiency will occur and that there are cultural problems which need to be addressed).
Wires and straps used in underground guying systems that could cause damage to the growing stem or structural roots should be cut as soon as the tree is self-supporting.

The area around the base of the tree should be free from competing vegetation. (The presence of grass around the base of the tree encourages strimming which is responsible for incalculable damage to young trees and often to their death. Herbaceous perennials and judicious sympathetic complementary planting can often be advantages).

Selection of an appropriate herbicide, when used to control competing vegetation, is essential to avoid environmental contamination and damage to the tree. (Herbicide use is best avoided).

All mulches should be replenished to their original depth, 50mm to 100mm, and hand weeded as necessary, if practicable, at least once annually. The mulched area should be enlarged, if practicable, as

the tree develops to the drip line, taking care to avoid a build up of mulch around the root flare and the base of the stem.

All grilles, grids, guards, and other protective furniture should be checked at least annually. Such furniture should be removed as soon as it is no longer necessary to protect the tree, or where there is the risk of physical damage to the tree.

The soil around newly planted trees should be regularly inspected for soil capping and compaction. Remedial action should be taken as necessary. (It is critical that compaction and capping is avoided as this inhibits gaseous exchange and prevents one of the fundamentals outlined above from being realised).

Inspections can be visual, but where conditions are extreme, on-site testing and amelioration may be necessary. This can include manually loosening the pit surface with hand tools or more extensive action using an air spade or equivalent. Mulching can prevent further compaction.

All trees should be checked on a regular basis for mammal, human and other external damage. Remedial action should be implemented as soon as practicable on discovery, where necessary.

All trees should be checked on a regular basis for pests and diseases. Remedial action should be taken promptly on discovery.

Unless specific nutritional deficiencies are identified, no fertiliser should be applied to newly planted trees. If visual inspection reveals symptoms of nutritional deficiency such as leaf scorching, pale foliage or necrotic spots, then further investigation will be necessary with remedial action taken. Remedial action may, in addition to fertiliser application, include pH testing, assessment of organic content and levels of compaction.

Recommendations:

15. **Review current specifications for young tree procurement using guidelines as set out above.**

16. **Produce a set of procurement specifications which can be used to inform the proposed Tree Charter development and be adopted by potential signatories to that charter.**

17. **Build relationships with nurseries who fulfil the criteria set out in the revised procurement specifications. This will include regular nursery visits and selection of young tree stock on site.**

18. **Consider the preparation and development of contract grow contracts with selected nurseries to ensure that not only the quality of tree stock required is available but also the diversity of tree stock required to produce a resilient tree population for Leicestershire.**

19. **To further develop a knowledge of nursery production systems and the implications of each for planting success.**

20. **To develop a series of specifications for planting in each of the scenarios used in this report. Use the information referred to as a basis for producing a practical and workable series of specifications which can be agreed and used to inform the proposed Tree Charter development and adopted by potential signatories to that charter.**

21. **To ensure that the detail of the specification is realised on site.**

22. **Develop and implement a young tree management and maintenance programme which covers at least a five-year period following planting and ensure this programme is adhered to.**

23. **Include this management and maintenance programme as an integral part of the proposed Tree Charter.**

24. **Consider the development of an independent audit system with agreed criteria to measure and report on the development of newly planted young trees.**

Leicestershire Policy Review

The policy review below sets out the current International, European, National and LCC policy framework with regards to trees. It will become obvious that there is an extraordinarily strong policy framework to support the value of trees and the many benefits they provide for society. However, it also becomes obvious that while there is a general direction of travel in favour of trees the various policies have been written for different audiences, have been produced at separate times and vary with regard to the emphasis placed on the value of trees.

This review does not consider the policy documents of the district councils within Leicestershire or Leicester City Council, does not consider any neighbourhood plans which may or may not be in place, and does not consider any town or parish council plans.

The likely complex matrix of policy documents, in addition to those considered below, has implications for the Value of Trees project if the expressed aim of extending the work beyond Leicestershire County Council to encompass the whole of the county and its numerous stakeholders is to be achieved.

International Policy

The Paris Agreement 2015

The Paris Agreement of 2015 is a legally binding international agreement on tackling climate change. Its goal is to limit the rise of global temperatures to below 2 degrees Celsius. To achieve this, nations are directed to cut greenhouse gas emissions and aim to achieve carbon neutrality by 2050. Each country has communicated a Nationally Determined Contribution (NDC) under the Paris Agreement to the United Nations Framework Convention on Climate Change (UNFCCC).

Agenda for Sustainable Development 2030

The 2030 Agenda for Sustainable Development is a multifaceted action plan adopted by the United Nations (UN) with the aim of achieving global sustainability and encouraging member states to further progress the three aspects of sustainable development - economic, social and environmental. Outlined within this document are 17 Sustainable Development Goals and associated targets. These create a broad and universal policy agenda which influence many other international, European, national, and local policies, strategies and frameworks. Of these, urban forests can contribute directly to meeting at least 9. These goals are being implemented at all levels of policy. The Environmental and Social Sustainability Framework (ESSF) of the UN Environment Program (UNEP) aims to strengthen the sustainability and accountability of UNEP projects and programmes and bring them in line with the 2030 Agenda.

FAO Guidelines on Urban and Peri-urban Forestry

Providing the most relevant global framework and guidance for the urban forest, this document explains what the urban forest and urban forestry are, what they do for us, and how the urban forest can be managed, improved, and grown to maximise the range of benefits it provides. Following these voluntary guidelines will assist the global audience - and relevant decision makers in particular - to develop urban and peri-urban forests as a way of meeting the present and future needs of cities for forest products and ecosystem services. The document offers guidance for policy makers and encourages focus on urban

and peri urban policy within other urban policy frameworks and as part of overall ‘green city ’policies. Emphasis is put on peri-urban areas as a link across the urban and rural divide. It is recommended that any policy maker in urban planning departments refers to this document to ensure that they are addressing key issues such as health, climate change, biodiversity, economy, land degradation, water, food security, and sociocultural values, and fully support urban forests through communication, community engagement, partnerships, and research.

FAO Green Cities Initiative 2020

The Green Cities Action Programme (2020) has the objective to “increase people’s wellbeing through increased availability of and access to products and services provided by green spaces including urban and peri-urban forestry, agriculture and by sustainable food systems”.
As a metropolitan City, Birmingham faces challenges such as increasing consumption of food, water, and energy, and decreasing green space, agricultural lands and water catchment.
For metropolitan cities key actions include FAO’s support on:

- increasing the adoption of innovations and green technologies for food systems and green infrastructure (e.g. green walls, rooftop and vertical farming, pocket parks, retrofitting of public spaces, etc.);
- improving food distribution systems, particularly last mile logistics;
- improving the food environment to increase access to nutritious food;
- improving the food and water waste management;
- improving governance mechanisms.

Post-2020 Global Biodiversity Framework

After the UN Convention on Biological Diversity, the Post-2020 Global Biodiversity Framework is being developed on the vision that by 2050 biodiversity is “valued, conserved, restored and wisely used, maintains ecosystem services, sustains a healthy planet and delivers benefits essential for all quantitative biodiversity targets for 2050 and 2030 milestones. The Leaders ’Pledge for Nature, which has been signed by the UK, is a commitment to reversing biodiversity loss by 2030 for sustainable development. The development and implementation of the post-2020 framework is central to the pledge.

UN Decade on Ecosystem Restoration (2021-2030)

The UN is aware that ecosystem restoration and the prevention of ecosystem degradation is imperative to meeting the SDGs. This new initiative is driven by the FAO and UNEP. Prior to this it was clear that the political support and technical capacity in both public and private sectors was insufficient to support the immense scale of the necessary works. This UN initiative aims to inspire governments, agencies, private companies, and local peoples to collaborate and implement restoration initiatives worldwide. Urban forests will support ecosystem restoration and contribute to this global cause dramatically especially as urban ecosystems are one of seven types of ecosystems in focus.

UN Habitat -The New Urban Agenda

The New Urban Agenda was first adopted at the UN Conference on Housing and Sustainable Urban '. development and prioritisation of 'safe, inclusive, accessible, green and quality public spaces. There is a commitment to the sustainable management of resources including forest, and to the reduction of greenhouse gases and air pollution emissions.

Point 14C outlines the commitments of the agenda to 'ensure environmental sustainability by promoting clean energy and sustainable use of land and resources in urban development, by protecting ecosystems and biodiversity, including adopting healthy lifestyles in harmony with nature, by promoting sustainable consumption and production patterns, by building urban resilience, by reducing disaster risks and by mitigating and adapting to climate change'. A focus is on investment in stormwater management and promoting the sustainable management of water resources within the urban, peri urban and rural areas by reducing and treating wastewater, minimising water losses, and increasing water storage, retention and recharge.

Urban Forests play a vital part in supporting cities to achieve these goals and increasing tree canopy cover in urban areas would have a profound effect. Habitat III also called for national Urban Policies (NUPs) to drive public space led development.

The UN Strategic Plan for Forests (2017-2030) (UNSPF)

The UNSPF aims to 'promote sustainable forest management and the contribution of forests and trees outside forests to the 2030 Agenda'. There are six Global Forest Goals of which urban forest can influence at least the following three:

1. Reverse the loss of forest cover worldwide through strategic forest management, including protection, restoration, afforestation and reforestation, and increase the efforts to prevent forest degradation and contribute to the global effort of addressing climate change.
2. Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest dependent people.
3. Significantly increase the area of protected forests worldwide and other areas of sustainably managed forests, as well as the proportion of forest products from sustainably managed forests.

The UN Forest Instrument is a tool for the implementation of the six goals by strengthening the commitment of member states to the UNSPF and the 2030 Agenda.

Other International Programmes

Biophilic Cities Network

Biophilic Cities is a global network of cities, launched by a group of experts and organisations including the University of Virginia, USA. This initiative aims to promote urban design and planning which integrates and brings back nature to the city and to the everyday life of citizens. Through this, cities and urban planners are encouraged to advance biophilic design, i.e., to bring (more) nature into the city, making it greener and richer in nature.

Tree Cities of the World

The Tree Cities of the World programme is an international effort to recognise cities and towns committed to ensuring that their urban forests and trees are properly maintained, sustainably managed forests and duly celebrated. FAO and the Arbor Day Foundation developed the programme to celebrate green cities. To be recognised as a Tree City, a community must meet five core standards (Table 13) that illustrate a commitment to caring for its trees and forest. Only six UK cities have reached this standard so far. The core standards help to provide a framework for action at a local level. Other local policies contribute to achieving and maintaining these standards.

Standard One: Establish Responsibility	The city has a written statement by city leaders delegating responsibility for the care of trees within the municipal boundary to a staff member, a city department, or a group of citizens called a Tree Board
Standard Two: Set the Rules	The city has in place a law or official policy that governs the management of forests and trees. These rules describe how work must be performed- often citing best practices or industry standards for tree care and worker safety- where and when they apply, and penalties for noncompliance.
Standard Three: Know what you have	The city has an updated inventory or assessment of the local tree care resource so that the effective long- term plan for planting, care and removal of the city trees can be established.
Standard Four: Allocate the resources	The city has a dedicated annual budget for the routine implementation of the tree management plan.
Standard Five: Celebrate achievements	The city holds an annual celebration of tree to raise awareness among residents and to acknowledge citizens and staff members who carry out the city tree programme.

Table 13. The five core standards required to become a Tree City of the World

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European Policy

The UK is no longer a part of the European Union but in the past EU policy has been used as a framework for UK policy. It is anticipated that the UK will continue to work closely with the EU and therefore EU policy will partially shape UK policy. The relevant EU policies are summarised here.

The European Green Deal

In response to the climate emergency the European Union has developed a new growth policy, the European Green Deal, which amongst other things, sets out explicitly the aim to achieve no net emissions of greenhouse gases in 2050. It also aims to 'protect, conserve and enhance the EU's natural capital, and protect the health and wellbeing of citizens from environment-related risks and impacts. 'While this document mostly concerns emissions and climate, it also clearly expresses the importance of biodiversity and forest resources and makes clear the benefits and importance of afforestation and forest restoration in the sequestration and storage of carbon, and the resilience of both forests and agriculture. It states that the new EU Forest strategy will have key objectives in these areas.

The European Climate Law has been designed to underpin the Green Deal. It is still in its proposal stage at present and only applies to member states. It aims to set in legislation Europe's goal of climate neutrality by 2050.

Common Agricultural Policy (CAP)

The CAP is a vital tool for policy makers and strategists, though the new reformed CAP is not yet in place. It aims to provide clear guidelines which facilitate the goals of the European Green Deal. CAPs should be implemented at a national level in line with the recommendations made by the EU. The UK, having now left the EU, will be implementing its own management scheme to replace this, the Environmental Land Management Strategy.

Forestry Strategy

The EU Forestry Strategy from 2013 has provided a framework for cohesive and consistent policies and objectives. Within the new framework significant focus is placed on afforestation and forest restoration, and it includes a roadmap to planting at least 3 billion trees in the EU by 2030.

EU Biodiversity Strategy for 2030.

This strategy builds on key aspects of the UN Post-2020 Global Biodiversity Strategy and Sustainable Development Goals. Tree planting is a major part of the Biodiversity Strategy. It states that through the CAP Strategic Plans, tree planting will be promoted to support biodiversity and ecosystem restoration. There is reference to the benefits of planting in urban areas and cites the upcoming Forest Strategy's 'Urgent need 'to bring back at least 10% of agricultural area under high diversity landscape features, much of which can be done in urban settings. Green infrastructure is identified as a key component, and it commits to the development of a GI Strategy. Section 2.2.8 on urban and peri urban areas states the benefits of green space for people and reiterates how green spaces have been vital to people's health and wellbeing during the lockdowns imposed throughout the current pandemic. This strategy aims to reverse the trend of green urban spaces being lost in competition with other urban land uses, encouraging the incorporation of nature-based solutions in urban planning.

It also includes a call on European cities of at least 20,000 inhabitants to develop ambitious Urban Greening Plans, ‘These should include measures to create biodiverse and accessible urban forest, parks and gardens, urban farms, green roofs and wall, tree lined streets, urban meadows and urban hedges. They should also help improve the connections between green spaces, eliminate the use of pesticides, limit excessive mowing of urban green spaces and other biodiversity harmful practices. Such plans could mobilise policy, regulatory and financial tools. ’In support of these efforts, an EU Urban Greening Platform will be set up under a new ‘Green City Accord ’with cities and mayors.

EU Strategy on Green Infrastructure:

This strategy adopted in 2013 is closely linked to the former Biodiversity Strategy, calling for healthy green infrastructure to be developed, preserved and enhanced ‘to help stop the loss of biodiversity and enable ecosystems to deliver their many services to people and nature. ’The Commission believes that the green infrastructure strategy can be implemented in the form of an enabling framework with key elements promoting GI in the main policy areas, improving information, strengthening the knowledge base, promoting innovation, and improving access to finance.

National Policy

The UK's Nationally Determined Contribution (NDC)

Under the Paris Agreement, the UK has submitted its new DNC to the UNFCCC. It commits the UK to reducing greenhouse emissions by at least 68% by 2030 (compared to1990 levels). The UK has been advised by the Climate Change Committee (CCC) that this would align with the Intergovernmental Panel on Climate Change (IPCC) for achieving the 1.5 degrees Celsius goal. Supplementary documents, the Adaptation Communication and Biennial Finance Communication, have also been published to outline the mitigation, adaptation and finance aspects of the UK NDC.

Within the Adaptation Communication, emphasis is put on the role of the UK Climate Change Act and the National Adaptation Programme as tools for achieving the NDC.

The UK Climate Change Act 2008

This is a legally binding framework for the UK to reduce greenhouse gas emissions and strengthen resilience to climate change risks. Originally adopted in 2008, this was commitment to reduce greenhouse gas emissions by 80% by 2050, however a 2019 amendment now sets the goal as net zero emissions by 2050. It also introduced carbon budgets over successive five-year periods.
The Act facilitated the introduction of a Climate Change Risk Assessment (CCRA) which is to be completed every five years, followed by a National Adaptation Programme (NAP). The Act also established the CCC which advises the UK government and administrations. Since climate policy is devolved in the UK, Scotland and Wales have unique emissions reduction targets set by the devolved authorities.

The second NAP was published in 2018 and sets out how highlighted risks are to be addressed over the following years. With regards to forestry, the NAP refers to the UK's 25 Year Environmental Plan and commits to increased woodland management, increased tree planting and incentivising planting on private land. Chapter 2.7 states 'We will promote urban tree planting through actions supporting community forests, both as part of the Northern Forest and in wider partnerships to bring trees and green infrastructure to towns and cities across England. 'This reflects the importance of the urban forest and green infrastructure in improving cities and adapting to the climate emergency. Forest resilience is to be improved by increased diversity. Green infrastructure is recognised to be vital to building resilience to climate change within urban areas, as well as improving health and wellbeing.

The CCC have produced the Sixth Carbon Budget as required under the Climate Change Act. The committee advised that the UK sets its budget to require a reduction of emissions by 78% by 2035. The builds on the NDC which is 68% by 2030. They recommend policy strengthening across the economy; however, the report was only released in December 2020.

National Planning Policy Framework 2021

The NPPF sets out the planning policies for England and how they should be applied. With reference to sustainable development, the NPPF states, ‘Planning policies and decisions should contribute to enhance the natural and local environment by… recognising the intrinsic character and beauty of the countryside and the wider benefits from natural capital and ecosystem services- including the economic and other benefits of the best and most versatile agricultural land and of trees and woodland. ’Also, ‘development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient and veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists ’ and ‘strategic policies should set out an overall strategy for the pattern, scale and quality of development and make sufficient provision for the conservation and enhancement of the natural, built and historic environment, including landscapes and green infrastructure and planning measures to address climate change mitigation and adaptation. ’Promoting healthy and safe communities is a large part of urban planning and climate change mitigation is a key component. Urban Forests and the incorporation of green space into planning is vital to achieving these goals.

Environment Act November 2021

This act sets out for the first time clear statutory targets for the recovery of the natural world in four priority areas: air quality, biodiversity, water and waste and includes an important new target to reverse the decline in species abundance by the end of 2030.

It means that the 25-Year Environment Plan published in January 2018 can move from ambition to reality becoming the first statutory Environmental Improvement Plan. The Act also brings into being a new Office for Environmental Protection.

25 Year Environmental Plan, January 2018.

An aspirational document until the Environment Act received Royal Assent in November 2021. It now has a statutory base and becomes the first environmental plan prepared by the secretary of state.
There are ten goals outlined in the plan. These are as follows:

- Clean Air
- Clean and Plentiful water
- Thriving plants and wildlife
- Reducing risk of harm from environmental hazards such as flooding and drought.
- Using resources from nature more sustainably and efficiently
- Enhanced beauty, heritage, and engagement
- Mitigating and adapting to climate change
- Minimising waste
- Managing exposure to chemicals
- Enhancing biosecurity.

The plan identifies six key policies to aid in achieving these goals, five of which relate to urban forests:

1. **Using and managing land sustainably**. Embedding an ‘environmental net gain ’principle for development, including housing and infrastructure; improving the management of land and incentivising land management, improving soil health and restoring and protecting peatlands, focusing on woodland to maximise its many benefits and reducing the risks from flooding and coastal erosion.

2. **Recovering nature and enhancing the beauty of landscapes**. Protecting and recovering nature; conserving and enhancing natural beauty; respecting nature in how water is used.
3. **Connecting people with the environment to improve health and wellbeing**: Helping people improve their health and wellbeing by using green spaces; encouraging children to be close to nature, in and out of school; greening towns and cities.
4. **Increasing resource efficiency, and reducing pollution and waste**: Maximising resource efficiency and minimising impacts at the end of life; reducing pollution.
5. **Protecting and improving the global environment**: Providing international leadership and leading by example; helping developing nations protect and improve the environment; leaving a lighter footprint on the global environment.

Environmental Land Management Scheme (ELMs)

Having left the European Union, the Common Agricultural Policy is no longer applicable in the UK. The Environmental Land Management Scheme is a new policy currently being developed to replace CAP. The ELMs scheme is considered vital to implementing the 25, Year Environmental Plan.

The ELMs will be the new form of support for landowners and farmers who have previously been the beneficiaries of CAP. To qualify for grants under the ELMs, applicants will have to demonstrate the delivery of one or more of six 'public goods. 'These are water, air, biodiversity, environmental protection, adaption and mitigation of climate change, beauty, heritage, and engagement with the environment.

The Forestry Commission has been carrying out an urban focused test and trial for ELMs with a view that the grant system might be extended to include urban areas. Urban ELMs could be of interest to local authorities, landowners and developers going beyond planning applications and others who influence land use within the urban environment.

Evidence of the delivery of public goods is likely to be necessary at both the grant application stage and throughout the project as progress is made.

Clean Air Strategy: 2019

This strategy sets out the comprehensive action that is required from across all parts of government and society to meet these goals. New legislation will create a stronger and more coherent framework for action to tackle air pollution. This will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to act, in areas with an air pollution problem. These will support the creation of Clean Air Zones to lower emissions from all sources of air pollution, backed up with clear enforcement mechanisms.

An aim of this strategy is to cut public exposure to particulate matter pollution as suggested by the World Health Organisation. It will set a new, ambitious, long-term target to reduce people's exposure to PM2.5 and will publish evidence early in 2019 to examine what action would be needed to meet the WHO annual mean guideline limit of 10 $\mu g/m^3$.

There is a commitment to reduce PM2.5 concentrations across the UK, so that the number of people living in locations above the WHO guideline level of 10 $\mu g/m^3$ is reduced by 50% by 2025.

Clean Growth Strategy (Updated 2018)

Reaffirms the commitments made in the Climate Change Act outlines strategies for growing the economy whilst cutting greenhouse gas emissions. The strategy repeats the aim of establishing a network of forests in England including new woodland on farmland, and fund larger-scale woodland and forest creation, in support of the commitment to plant 11 million trees and increase the amount of UK timber used in construction and outlines.

England Trees Action Plan 2021-24.

1.1. Support a wider range of woodland types and establishment methods with grant funding, as well as mixed woodlands that serve a variety of environmental, productive and amenity purposes.

1.2. Review the base payment rate for all kinds of woodlands. The more benefits a woodland provides, for example for biodiversity, flood prevention and amenity value, the greater payment rates will be.

1.3. Create a single application process for planting and maintenance payments, and an online grant portal to support land managers to make informed choices between the available grant options.

1.4. Include support for tree planting, woodland creation and management and agroforestry across new sustainable Farming Incentive, Local Nature Recovery and Landscape Recovery Schemes.

1.5. Guarantee that if you create woodlands now you will not be unfairly disadvantaged by the launch of the governments new Sustainable Farming Incentive, Local Nature Recovery and Landscape Recovery Schemes.

1.6. Allow land managers entering into any woodland creation agreement from 2021 to:

- 1.6.1 Break those agreements at agreed points without penalty (through annual break clauses) once they have secured a place in the new Sustainable Farming Incentive, Local Nature Recovery Fund and Landscape Recovery Schemes.
- 1.6.2 Remain on the same terms and conditions for the duration of the agreement.

1.7. Continue to support England's Community Forests, the National Forest Company and the Northern Forest to plant thousands of hectares of new woodland by 2005.

1.8. Support the establishment of Forests 4 Cornwall and the Northumberland Forestry Partnership and develop three new woodland creation partnerships.

1.9. Expand the nation's forests, managed by Forestry England, by entering into leasehold agreements with owners of land suitable for afforestation.

1.10. Plan to require government departments and partner organisations with greatest potential to improve biodiversity, to increase tree planting and woodland cover where appropriate. Full detail will be available in the forthcoming 2021-25 Greening Government Commitments Framework.

1.11. Widen the eligibility of our tree planting and tree health grant schemes so more public bodies can access the.

1.12. Publish guidance for local authorities to develop their own local tree and woodland strategies.

1.13. Support and encourage public sector bodies to buy bio secure trees.

1.14. Provide grant finance and guidance to support natural colonisation through the England Woodland Creation Offer.

1.15. Initiate 10 Landscape Recovery projects between 2022-2024. These projects will support the delivery of landscape and ecosystem recovery through long-term, land use change, including projects to restore wilder landscapes. Where appropriate this will include large-scale tree planting and natural colonisation.

1.16. Research the potential to remediate and restore different types of vacant and derelict land to woodland, with a view to supporting such projects at scale in the future.

1.17. Provide dedicated financial support and guidance for riparian planting through the new England Woodland Creation Offer, using over 100 existing catchment partnerships to target delivery.

1.18. Pilot new approaches to deliver coordinated woodland creation within targeted catchments, harness private investment and maximise benefits.

1.19. Collaborate with water companies to meet and exceed their target planting of 11 million tree as an industry by 2030, whilst maximising the benefits of each tree for water quality, flood resilience and biodiversity.

1.20. review the regularity requirements for woodland creation to streamline the process while strengthening environmental protections.

1.21. Improve the Forestry Commission's woodland creation map to better show low risk areas for woodland creation incorporating additional sensitivities as new information becomes available.

1.22. Develop new mapping products and spatial data sets so land managers have more clarity on site sensitivities and opportunities for woodland establishment and management.

1.23. Develop new guidance for England that will help determine when afforested peat should be restored to bog, and to minimise impacts on peaty soils from tree planting.

1.24. Develop metrics that allow decision makers to assess the realistic costs of forest bog restoration.

1.25. Improve land use decision making through the new peatland map data once it is complete in 2024.

1.26. Extend the Urban Tree Challenge Fund to support the planting and establishment of trees in urban and peri-urban areas.

1.27. Propose new guidance through the National Model Design Code on how trees can be included in the built environment, including design parameters for the placement of street trees.

1.28. Propose changes to the National Planning Policy Framework, to make clear the expectation that trees, such as community orchards, should be incorporated in new developments and that streets should be tree lined.

1.29. Provide funding to support UK public and private sector nurseries and seed suppliers to enhance the quality, quantity, diversity and biosecurity of domestic tree production. This will include capital grants, support to augment investment, and stimulate innovation.

1.30. Provide a Nursery Notification Scheme that will help better plan for supply and demand for the sector. This will support nurseries and seed suppliers to produce the right stock at the right time.

2.1. Provide financial support to develop innovative timber products through the Forestry Innovation Fund.

2.2. Work with key construction stakeholders including the Green Construction Board, Construction Leadership Council and the Federation of Master Builders to develop a policy roadmap on the use of timber.

2.3. Drive an increase in the use of certain modern methods of construction, some forms of which can encourage use of sustainable materials such as timber.

2.4. Work with Homes England and delivery partners to explore ways to increase timber use in the delivery of housing programmes.

2.5. Increase public demand for sustainably sourced timber through procurement policies.

2.6. Encourage research into barriers to uptake of timber, including looking at timber strength grades and the fire resistance of engineered timber structures.

2.7. Launch an impact fund in 2021 to leverage private finance into new natural capital markets for carbon, water quality, biodiversity, natural flood alleviation and other ecosystem services.

2.8. Adopt a principle in the design and ongoing review of all our grant offers that it is the landowner's best interests to participate in natural capital markets or secure other sources of private funding.

2.9. Support the development of the Woodland Water Code, a crediting mechanism to encourage private investment in trees for the improvement of the freshwater environment.

2.10. Explore expanding the UK Emissions Trading Scheme to the two-thirds of uncovered emissions and set out the government's approach to incentivising deployment of greenhouse gas removals, including nature-based solutions.

2.11. Review guidance on the tac treatment of trees and woodlands, to provide greater clarity to landowners on how new and existing trees on their land affect tax liabilities.

2.12. Support apprenticeships, T levels and other technical training routes into the forestry sector and develop higher technical and professional education routes. We will also improve links with allied sectors such as arboriculture, agriculture and horticulture needed to deliver our ambitions.

2.13. Support the Forestry Skills Forum to create a new Forestry Skills Action Plan for England.

2.14. Support Forestry England to deliver apprenticeships and work with further education institutions to strengthen the training and skills development offer to foresters and those working in the wider forestry supply chain.

Leicestershire County Council Policies

Leicestershire Tree Management Strategy 2020-2025.

The purpose of the Tree Management Strategy is to recognise the importance of the tree resource under the stewardship of the county council and identify standards for its management. This will ensure its long-term conservation and development for the people of Leicestershire and future generations.

The Tree Management Strategy for Leicestershire County Council:

- provides a framework to establish a healthy, balanced and sustainable tree population capable of withstanding predicted climatic changes and the impact of diseases such as ash dieback
- reduces the risk to the public from potentially hazardous trees
- specifies the authority's policy on levels and standards of tree management
- ensures the most efficient use of resources
- increases public awareness of the value of trees in the environment

Recommendations

This document that can/should be used to bring the independently working parts of the council together to both recognise the value of trees and work towards a unified set of objectives/have a road Map to increasing the awareness of urban forest benefits and therefore action to increase canopy cover. The document uses national and region policy examples with numerous clear links to the benefits of the Urban Forest. In addition to the visual beauty trees bring to our parks, gardens, road corridors, towns and villages they provide huge, but often unnoticed environmental benefits. They improve air quality and reduce air pollution, giving off oxygen as part of their natural growing process. They absorb carbon dioxide and contribute significantly to mitigating climate change. They retain water and stabilise soils, thereby reducing flood risk. Trees are very important for wildlife, hosting and providing food for a wide range of flora and fauna. They are the major components of forest eco-systems both locally and worldwide. Scientific research has now proven that trees provide huge benefits to physical, mental, and social human health, providing calming and peaceful environments.

https://www.leicestershire.gov.uk/sites/default/files/field/pdf/2021/2/16/Tree-Management-Strategy-2020-2025.pdf

Leicestershire Environment Strategy 2018 – 2030

The Strategy sets out the vision, aims, objectives and targets which will be used to drive improved environmental performance.

The strategy is based on the 2030 Agenda for Sustainable Development, the UK's Clean growth strategy, and the UK's 25-year environmental plan, and highlights all the ecosystem services that trees, and the urban forest contribute positively to now. They are clean air; reducing the risks of harm from environmental hazards; clean and plentiful water; using resources from nature more sustainably and efficiently; thriving plants and wildlife; and enhanced beauty, heritage and engagement with the natural environment. The strategy is linked closely with the Leicestershire & Rutland Biodiversity Action Plan which influences a lot of ward level policy/plans.

Table 2 - PG 26 - titled ‘Key contributions of the Environment Strategy to the Strategic Plan 2018-22 outcomes. This table has strategic plan outcomes against contributions from the environment strategy. Trees, are not currently mentioned, however could be included in every element. There is an opportunity to truly value the services provided by trees. This policy could be used alongside the infographic on tree/urban forest benefits as a fantastic argument for trees and planting. Looking at Table 2 in isolation, trees could be a solution to meeting many goals and aspirations. A quantified canopy cover target could be used here as increases in canopy cover would positively impact on the environment

Leicestershire Action For Nature 2021

A Strategic Approach to Biodiversity, Habitat and the Local Environment

This is an overview of the state of nature in Leicestershire based on existing and recently collected data and mapping. It creates an understanding of the policy and legislative context within which achievement of the following aims and objectives are set;

- an understanding of the current state of nature in Leicestershire;
- the guiding principles and rationale of our approach to taking action for nature;
- identification of the key opportunities for action;
- a supporting Delivery Plan that provides more detail of the actions to be taken;
- a foundation on which further action for nature can be taken as greater understanding of future legislative and other changes arise, such as the Environment Bill.

It has links to the Leicestershire tree management strategy. References the urban forests positive contribution to schools and air quality via other policies such as the Leicestershire Healthy Schools Programme and the Air Quality and Health Action Plan.
Trees and woodland creation are considered KPI’s regarding measured progress towards biodiversity.

https://www.leicestershire.gov.uk/sites/default/files/field/pdf/2021/8/16/action-for-nature-strategic-approach-to-biodiversity.pdf

Leicestershire Flood Risk Management Strategy 2015

The Local Strategy is a statutory requirement of the Flood and Water Management Act (2010) understand and manage flood risk within the county.
The key objectives of the action plan are:

- Work Collaboratively
- Improve understanding and awareness of local flood risk
  Enhance the Natural and Historic Environment
- improve Resilience
- Encourage Sustainable Development
- Use resources effectively
- Promote Riparian Responsibilities

Increasing tree coverage in appropriate locations is in part of the action plan to meet Objective 3 “Enhancing the Natural and Historic Environment”. There is a whole section on increased tree coverage recognising it as an extremely important land management technique.

It lists the benefits of trees in regard to water quality and quantity as follows:

- Trees intercept rainfall with their leaves, branches and trunks and take up water through their roots.
- Trees stabilise soil with their roots, increase the amount soaking into the soil ('infiltration') by increasing soil organic matter and improving soil structure.
- Trees provide shade for fish.
- Trees reduce the amount of water running off the surface. This helps reduce soil erosion, washing of sediment and other contaminants into water, and ameliorates the effects of flooding.
- Trees take up nutrients and some pollutants from the soil acting as a buffer.

Trees not included in Objective 4 which is "improve resilience" Trees are not included in Objective 5 which is to "encourage sustainable development

https://www.leicestershire.gov.uk/sites/default/files/field/pdf/2015/12/8/flooding_strategy_plan.pdf

Ash Dieback Action Plan: 2018

Action plan to outline how LCC plan to manage the anticipated risks and issues associated with the spread of ash dieback across the county.

Recognition that ash die back presents both a threat and an opportunity to the Councils Environment Strategy. The impending loss of a large number of the council's trees brings forward the need for urgent assessment of tree stocks, vulnerabilities, future planting strategies and management plans.
It estimated that there are over 500,000 Ash trees in Leicestershire - The significance of ash dieback in relation to the value of the urban forest in Leicestershire is therefore very high.

https://www.leicestershire.gov.uk/sites/default/files/field/pdf/2019/6/4/Ash-Dieback-Action-Plan.pdf

The Effects of Climate Change on 3CAP's Highway Network Policies and Standards: 2011

Collaborative study to investigate the impact of climate change on highway policies and standards across Derbyshire, Leicestershire, and Nottinghamshire and to identify appropriate adaptation responses. No reference to urban forest benefits.

Trees are not included anywhere in the measures to adapt pavements to the effects of climate change when they would help mitigate the climate change impacts noted. Trees not included in the assumed adaptation recommendations carried out for improving the road/pavements resilience levels to extreme rainfall.

https://www.leicestershire.gov.uk/sites/default/files/field/pdf/2017/1/5/effects_of_climate_change_highway_network_policies.pdf

Leicestershire County Council's Strategic Plan 2022 to 2026: 2022

Sets out the long-term vision and priorities for the next four years. Five strategic outcomes describe the council's vision for people in the county:

1. Clean and Green
   - People act now to tackle climate change
   - Nature and the local environment are valued, protected and enhanced
   - Resources are used in an environmentally sustainable way
   - The economy and infrastructure are low carbon and environmentally- friendly

2. Great Communities
   - Diversity is celebrated, and people feel welcome and included
   - People participate in service design and delivery
   - Cultural and historical heritage are enjoyed and conserved
   - Communities are prepared for and resilient to emergencies
   - People support each other through volunteering

3. Safe and Well
   - People are safe in their daily lives
   - People enjoy long lives in good health
   - People at the most risk are protected from harm
   - Carers and people with care needs are supported to live active, independent, and fulfilling lives

4. Strong Economy, Transport and Infrastructure
   - There is close alignment between skill supply and demand
   - Leicestershire has the infrastructure for sustainable economic and housing growth
   - Leicestershire is an attractive place where businesses invest and flourish
   - Economic growth delivers increased prosperity for all

5. Improved Opportunities
   - Every child gets the best start in life
   - Every child has access to good quality education
   - Families are self-sufficient and enabled to be resilient
   - Young people and adults are able to aim high and reach their full potential

Recognition of the need to protect and enhance the environment and that biodiversity and eco-system services clean our water, purify our air, regulate the climate and provide us with food and resources for medicines. Loss or damage of natural environments is among the biggest threats to wildlife. Has an overall aim to increase the percentage of county land which promotes diversity of habitat and species. Planting of trees recognised as being part of this solution.

Opportunity to highlight the positive contributions of trees on air quality, carbon sequestration and storage, flood alleviation, and general health and wellbeing.

https://www.leicestershire.gov.uk/sites/default/files/field/pdf/faq/2022/4/12/Appendix-B-LCC-Strategic-Plan-2022-26.pdf

Leicester City Council Local Plan: 1996

https://www.leicester.gov.uk/your-council/policies-plans-and-strategies/planning-and-development/adopted-planning-policy/

Leicester City Council - Draft Local Plan: 2020

Sets out the vision for future development in the borough/district. Every area in England and Wales should have an up-to-date Local Plan and review it at least every five years. Consultation closed Dec 2020.

Recognition of urban forest value in regards to biodiversity and what are denoted as "wider environmental benefits, including managing flood risk" - there is an opportunity here to elaborate on the services that the urban forest provides.

Trees are noted to be helpful in the production of a healthy and active city in Policy HW01: A Healthy and Active City. The use of trees and recognition of their benefit is included in the landscape design policy. Trees included as part of green infrastructure developments and noted for their "significant contribution to the character of a place and how it feels". Comprehensive recognition of green infrastructure/urban forestry in Chapter 15: The Natural Environment. Trees could be highlighted within the Biodiversity Net Gain section. Trees could be considered as a listed asset as part of Policy CT02: Assets of Community Value. Trees could be included as part of/a way of "Supporting Sustainable Town Centres" Policy TCR02.
Trees could be included in Policy TCR03: City Centre, which states "The council will promote the growth of the city centre as a sub-regional shopping, leisure, historic, tourist and cultural destination as the most accessible and sustainable location for main town centre uses and in recognition of its central role in the City's economy and wider regeneration by adopting the following strategy." Trees could be more explicitly highlighted within the policy discussion Chapter 14: Open Spaces, Sports and Recreation. When referring to Green Wedges and their benefits e.g., air quality, flood alleviation and transport corridors.

Trees could be included as part of the Air Quality improvement measures/action plan in response to Chapter 16 Transportation: Policy 102 Climate change and Air Quality does could highlight for example, the potential impacts of increased canopy cover on air quality. Trees could be included as part of the following chapters:

- Chapter 8: Improving road safety.
- Chapter 9: Managing the condition and resilience of our transport system.
- Chapter 10: Managing the impact of our transport system on quality of life.

The above chapters are areas where quantified contributions could be included towards achieving the goals of the Local Transport Plan whilst working towards relieving the root causes of some of the core issues. Tree planting would be a good KPI supplement in Chapter 9. Chapter 10 could utilise the quantified impacts of their urban forest to recognise the ongoing contributions towards achieving many of the aims such as air quality, noise pollution and vehicle speeds and most importantly/directly biodiversity. Further to this including trees when considering streetscapes would be beneficial. Trees could be included in the section that discusses ways to reduce the negative impact of the transport system. Trees are considered an essential part of the fabric of place, may be considered as infrastructure and if so tree planting and urban forest development plans, strategies and goals should be included in Chapter 18: Development and Infrastructure.

https://consultations.leicester.gov.uk/sec/draft-local-plan/

Local Transport Plan LTP3: 2011

LCC vision for transport to 2026. It explains how we will ensure that transport continues to play an important part in Leicestershire's success. Core elements duplicated within Local Plan above.

Chapter 6: Encouraging active and sustainable travel
Chapter 10: Managing the impact of our transport system on quality of life
Outcomes: Our transport system is resilient to the impacts of climate change
The natural environment can be accessed easily and efficiently, particularly by bike or on foot I6
Desire to increase tree cover and biodiversity highlighted in chapter one.

Potential of Street trees to reduce street level temperatures and reduce impacts of urban heat island effects recognised in section 10.45 PG 145:
“Hotter summer temperatures and higher peak temperatures may increase the need to create shade within the streetscape through engineering or natural interventions, such as the provision of additional measures to reduce the implications of climate change that come with having a transport system. However urban forest/tree planting not included as a way to make a successful contribution.

Include trees within

- Chapter 8: Improving road safety.
- Chapter 9: Managing the condition and resilience of our transport system.
- Chapter 10: Managing the impact of our transport system on quality of life.

The above chapters are areas where quantified contributions could be included towards achieving the goals of the Local Transport Plan whilst working towards relieving the root causes of some of the core issues. Tree planting would be a good KPI supplement in Chapter 9. Chapter 10 could utilise the quantified impacts of their urban forest to recognise the ongoing contributions towards achieving many of the aims such as air quality, noise pollution and vehicle speeds and most importantly/directly biodiversity. Further to this including trees when considering streetscapes would be beneficial. Trees could be included in the section that discusses ways to reduce the negative impact of the transport system. Trees are considered an essential part of the fabric of place, may be considered as infrastructure and if so tree planting and urban forest development plans, strategies and goals should be included in Chapter 18: Development and Infrastructure.

https://www.leicestershire.gov.uk/roads-and-travel/road-maintenance/local-transport-plan

Rights of Way Action Plan: 2011

Sets out a programme for the continuing delivery of the rights of way service, within the context of the broader proposals for the management of the network set out in the Rights of Way Improvement Plan, part of the Cycling and Walking Policy and Strategy within the Network Management Plan 2020
Recognition that "Physical activity, walking in particular, could make the single most effective contribution to the health of the county."

Recognition that "Physical activity, walking in particular, could make the single most effective contribution to the health of the county." Urban Forest Contributions towards goals is a clear opportunity within this document. Trees could be used to create environments which encourage sustainable transport, and outdoor activity and recreation.

Importance of trees for creating a sense of place, improving air quality, reducing the impact of noise and creating a feeling of safety could be highlighted within the introduction.

Trees/urban forests are not currently included as part of the key aims, however, they could in fact be a vehicle to meet many of the aims. For example:

- Contribute towards improving the health of residents of Leicestershire and reduce their carbon footprint.
- Promote Leicestershire as an attractive place to walk, cycle & ride for all including those living in or visiting the county.
- Develop and manage a rights of way network that meets the current and future needs of the local community.

Use trees a good contributor to:

- Goal 3 - A transport system that helps to reduce the carbon footprint of Leicestershire.
- Goal 5 - A transport system that improves the safety, health and security of our residents.
- Goal 6 - A transport system that helps to improve the quality of life for our residents and makes Leicestershire a more attractive place to live, work and visit.

https://www.leicestershire.gov.uk/sites/default/files/field/pdf/2015/12/8/leics_rowip2.pdf

Leicester and Leicestershire Strategic Transport Priorities: 2020

Leicestershire County Council and Leicester City Council outline priorities for the two Local Transport Authorities (LTAs). It highlights where the two authorities will work together to deliver common transport aims and objectives, including those in support of the Leicester and Leicestershire Strategic Growth Plan (LLSGP).

It is the starting point to create high quality environments for communities to thrive; ensure development is sustainable and maximises social and environmental benefits.

N.B. Contains comprehensive list and context of Key national regional and local plans and strategies considered relevant to meeting their Strategic Transport Priorities, Urban Forest development could benefit the interpretation of the Governments' key policy drivers of: economic growth; housing delivery; the environment and climate change; health and wellbeing; and social mobility and inclusion - PG 8.

More than half of the key aims from this document could benefit from further growth of the urban forest: Create high quality environments for communities to thrive. Ensure development is sustainable and maximises social and environmental benefits.

- Support the transition to a low carbon and circular economy.
- Support national and international efforts in combatting the impacts of climate change and adapting to it.
- Support and drive the economy to unlock growth.
- Address wider social challenges including accessibility, severance, and deprivation.
- Improve public health, by tackling sedentary behaviour and poor air quality.

https://www.leicestershire.gov.uk/sites/default/files/field/pdf/2020/11/23/Leicester-and-Leicestershire-Strategic-Transport-Priorities-LLSTP.pdf

Leicestershire Highways Design Guide: 2016

The Leicestershire Highways Design Guide deals with highways and transportation infrastructure for new developments in areas for which Leicestershire County Council is the highway authority.

References to trees largely limited to dedicated sections

- Part 4 Materials and Construction - Section MC16 Trees and soft landscaping
- Part 7 Appendix f preserving trees when carrying out roadworks and building new developments
- Part 7 Appendix g landscaping on new developments and in highway improvement schemes

https://resources.leicestershire.gov.uk/environment-and-planning/planning/leicestershire-highway-design-guide

Recommendations

25. **It is highly recommended that, given the complex and varied policy framework outlined above and the inherent difficulties in harmonising policies across Leicestershire as a county, that the existing Tree Charter produced by Leicestershire County Council and the National Forest Company in 2021, is developed, and its scope widened.**

26. **The current Charter outlines three drivers for action:**
    - **Support a secure and safe future.**
    - **Enhance well-being in communities.**
    - **Facilitate sustainable enterprise.**

27. **The current charter suggests that action should be evidence led and outlines the following actions:**
    1. **Target tree planting in locations that will help alleviate flood risk, improve air quality, connect and enhance biodiversity networks.**
    2. **Choose species which can deliver and balance a range of benefits including carbon sequestration, biodiversity enhancement, landscape and sustainable timber production.**
    3. **Plant trees close to where people live and work to improve accessibility and well-being benefits**
    4. **Promote good woodland management in including the number of well supported volunteer opportunities.**
    5. **Encourage outdoor and woodland learning for children and young people to help them connect and understand the importance of nature while experiencing the benefits of being outdoors.**
    6. **Ensure that trees are considered as part of future transport, housing and employment infrastructure.**

28. **The six actions listed above are all represented in the policy review and the development of the existing charter potentially provides a means where policy can be harmonised without the need to rewrite or amend existing documents. It is highly recommended that development of the charter is used to this effect.**

29. **It is highly recommended that the existing charter is developed to include delivery. This includes articulating a common approach to design, species selection, procurement, planting best**

practice, management and maintenance of trees with a view to producing an agreed and uniform approach across Leicestershire

30. **That the revised charter is publicised widely and signatories to the charter enlarged to include as many stakeholders as possible including developers, local community groups, business and others who own and manage land in Leicestershire. The concept of a tree charter is communicated beyond Leicestershire with other local authorities encouraged to develop charters of their own.**

31. **That the vision statement underpinning the current charter is developed and extended.**

Tree Charter

The complex and varied policy framework outlined above and the inherent difficulties in harmonising policies across Leicestershire as a county it is suggested that the existing Tree Charter produced by Leicestershire County Council and the National Forest Company in 2021, offers an opportunity to incorporate much of the information contained in this report into a delivery tool.

The enhanced Tree Charter could be developed in such a way that it becomes a meaningful engagement tool for all stakeholders at all levels across Leicestershire with those stakeholders becoming signatories to the Charter. It would have the advantage of harmonising and providing uniform methodologies, creating a shared vision and provide a framework for decision making.

The current Charter outlines three drivers for action:

1. Support a secure and safe future.
2. Enhance well-being in communities.
3. Facilitate sustainable enterprise.

The current charter suggests that action should be evidence led and outlines the following actions:

1. Target tree planting in locations that will help alleviate flood risk, improve air quality, connect and enhance biodiversity networks.
2. Choose species which can deliver and balance a range of benefits including carbon sequestration, biodiversity enhancement, landscape and sustainable timber production.
3. Plant trees close to where people live and work to improve accessibility and well-being benefits
4. Promote good woodland management in including the number of well supported volunteer opportunities.
5. Encourage outdoor and woodland learning for children and young people to help them connect and understand the importance of nature while experiencing the benefits of being outdoors.
6. Ensure that trees are considered as part of future transport, housing and employment infrastructure.

All of the above elements are addressed at some point in this report so the Charter could be developed and enhanced without changing the core structure of the existing Charter.

Appendices

Appendix 1 - Species Selection Matrix

This exists as a separate excel file: TheValueofTrees_Appendix1_SpeciesSelectionMatrix_May22.xls

	Names	Tolerances				Ecosyste	
Botanical Name	Common Name	Shade	Hardiness zone	Succession	Natural range	Carbon Ser	Avoided Runoff
Betula utilis	Himalayan Birch	Mod-tolerant	5-6	Pioneer	Himalaya, West	High	Medium
Broussonetia papyrifera	Paper Mulberry		6-10			High	Medium
Carpinus betulus	Hornbeam	Mod-tolerant	(4)5-7	Late succession	Europe, Wester	High	Medium
Carpinus japonica	Japanese Hornbeam	Mod-tolerant	(4)5-7		Japan	High	Medium
Carya illinoinensis	Pecan	Intolerant	5-9		Southern USA		
Castanea sativa	Sweet Chestnut	Mod-tolerant	5-7		Mediterranean,	High	High
Catalpa bignoniodes	Indian Bean Tree	Mod-tolerant	5-9	Pioneer	Eastern North A	High	Low
Cedrus atlantica	Atlas Cedar	Mod-tolerant	6-9		Morroco, Alger	Medium	High
Cedrus deodora	Deodor Cedar	Mod-tolerant	7-8(9)		Afghanistan, Nc	Medium	High
Cedrus libani	Cedar of Lebanon	Mod-tolerant	5-7		Lebanon, Syria	Medium	High
Celtis australis	Nettle Tree	Mod-tolerant			Meditteranean, Balkans		
Celtis occidentalis	Hackberry	Mod-tolerant	3-9	Pioneer	Eastern North America		
Cercidiphyllum japonicum	Katsura Tree	Mod-tolerant	4-9	Late succession	China,Japan, Eastern Himalayas		
Cercis canadensis	Redbud	Mod-tolerant	4-9	Pioneer	Eastern North A	High	Medium
Cercis siliquastrum	Judus Tree	Mod-tolerant	(6)7-8	Pioneer	South Eastern E	High	Medium
Chamaecyparis lawsoniana	Lawson Cypress	Mod-tolerant	5-7		North Western USA		
Cladastris kentukia	Yellow wood	Mod-tolerant	4-8		Eastern North America		

Figure 20. Image showing layout of Species Selection Matrix

Appendix 2 - Species Ecosystem Services

This exists as a separate pdf file: TheValueofTrees_Appendix2_SpeciesEcosystemServices_May22.xl

Name	Age	Replacement Value (£)	Carbon storage (kg)	CO2e storage (kg)	Carbon storage (£)	Carbon Sequestration (kg)	CO2e Sequestration (kg)	Carbon Sequestration (£)	Avoided runoff (m3)	Avoided runoff (£)	Total pollution removal (g)	Total pollution removal (£)
Abies nordmanniana (Nordmann fir)	10	£54	58	214	£53	1.1	3.9	£0.95	0	£0.00	4.5	£0.19
Abies nordmanniana (Nordmann fir)	20	£254	241	885	£220	2.1	7.8	£1.95	0.2	£0.00	20.3	£0.82
Abies nordmanniana (Nordmann fir)	30	£750	554	2,030	£503	3.3	11.9	£2.96	0.5	£0.00	49.2	£2.00
Abies nordmanniana (Nordmann fir)	40	£1,444	994	3,645	£904	4.4	16.1	£3.98	0.9	£0.00	81.7	£3.33
Abies nordmanniana (Nordmann fir)	50	£2,336	1,561	5,723	£1,419	5.5	20.2	£5.02	1.1	£0.00	107.1	£4.37
Abies nordmanniana (Nordmann fir)	75	£5,250	3,490	12,796	£3,174	8.4	30.7	£7.61	1.4	£0.00	128.6	£5.25
Abies nordmanniana (Nordmann fir)	100	£8,406	6,200	22,736	£5,638	7.4	27.2	£6.74	1.2	£0.00	109.8	£4.48
Abies nordmanniana (Nordmann fir)	150	£9,645	7,500	27,503	£6,821	1.7	6.1	£1.50	1.2	£0.00	108.2	£4.44
Abies nordmanniana (Nordmann fir)	200	£10,783	7,500	27,503	£6,821	0.8	2.8	£0.68	1.4	£0.00	130.0	£5.32
Abies nordmanniana (Nordmann fir)	250	£11,821	7,500	27,503	£6,821	0.1	0.3	£0.08	1.6	£0.00	154.4	£6.32
Abies nordmanniana (Nordmann fir)	300	£12,758	7,500	27,503	£6,821	0.1	0.3	£0.08	1.9	£0.00	181.0	£7.40
Abies fraseri (Fraser fir)	10	£54	59	215	£53	1.5	5.5	£1.37	0.1	£0.00	4.8	£0.19
Abies fraseri (Fraser fir)	20	£254	242	887	£220	3.1	11.3	£2.80	0.2	£0.00	22.0	£0.89
Abies fraseri (Fraser fir)	30	£750	555	2,035	£505	4.7	17.2	£4.26	0.6	£0.00	53.2	£2.18

Table 14. Species ecosystem services

Appendix 3 - Hedge Selection Matrix

Hedge Size (m) L x H x W	Species	Replacement Cost	Carbon Storage		Carbon Sequestration		Avoided Runoff		Pollutant Removal	
			(kg)	(£)	(Kg/yr)	(£)	(m_3/yr)	(£)	(g/yr)	(£)
10 x 2 x 2	*Acer campestre*	£865	42	38	16	0.02	0.27	0.33	<0.01	1.87
	Carpinus betulus	£865	66	60	28	0.03	0.35	0.42	<0.01	2.42
	Corylus avellana	£865	48	44	16	0.02	0.29	0.35	<0.01	1.97
	Crataegus monogyna	£763	37	34	16	0.02	0.29	0.35	<0.01	1.99
	Fagus sylvatica	£865	44	40	20	0.02	0.26	0.31	<0.01	1.75
	Ilex aquifolium	£865	40	36	12	0.01	0.24	0.29	<0.01	1.87
	Prunus spinosa	£865	44	40	28	0.03	0.28	0.33	<0.01	2.15
10 x 2 x 1	*Acer campestre*	£433	21	19	13	0.01	0.22	0.26	<0.01	1.48
	Carpinus betulus	£433	33	30	22	0.02	0.28	0.33	<0.01	1.92
	Corylus avellana	£433	24	22	13	0.01	0.23	0.27	<0.01	1.56
	Crataegus monogyna	£382	19	17	13	0.01	0.23	0.28	<0.01	1.58
	Fagus sylvatica	£433	22	20	16	0.02	0.20	0.24	<0.01	1.39
	Ilex aquifolium	£433	20	18	9	0.01	0.19	0.23	<0.01	1.49
	Prunus spinosa	£433	22	20	22	0.02	0.22	0.27	<0.01	1.71
10 x 1 x 1	*Acer campestre*	£216	10	9	7	0.01	0.13	0.15	<0.01	0.88
	Carpinus betulus	£216	16	14	13	0.01	0.17	0.20	<0.01	1.14
	Corylus avellana	£216	12	10	7	0.01	0.14	0.16	<0.01	0.93
	Crataegus monogyna	£191	9	8	7	0.01	0.14	0.16	<0.01	0.94
	Fagus sylvatica	£216	11	9	9	0.01	0.12	0.14	<0.01	0.82
	Ilex aquifolium	£197	9	8	6	0.01	0.11	0.14	<0.01	0.88
	Prunus spinosa	£197	10	9	13	0.01	0.13	0.16	<0.01	1.01

Table 15. Carbon storage, ecosystem service delivery and valuation data for selected hedges

Appendix 4 - Methodology

Throughout this report, all values of ecosystem services were established using i-Tree Eco software.

For species level ecosystem service values, each species from the Leicestershire CC tree inventory was run through the i-Tree software at standard age increments using estimated DBH values for a tree of that species at that age, up to its life expectancy. This estimation used only species and DBH information.

For hedges, information used to calculate ecosystem services included species, DBH, height and crown spread. Hedges are typically much shorter, wider and denser than a tree of the same age, therefore the ecosystem services provided by a hedge are significantly different than for a tree of the same age or DBH. For running through i-Tree, each hedge initially consisted of 42 stems, creating a baseline for ES which were then scaled to the volume and/or surface area the required size hedge. As benefits such as carbon storage are more connected to volume, but benefits such as pollution removal and rainwater interception are more connected to surface area, this was the best way to account for the size and shape of a hedge in a software tool designed for full trees.

Further information on the I-Tree tools and methodology can be found at https://www.itreetools.org/support/resources-overview/i-tree-methods-and-files/i-tree-eco-resources

Value calculations used the costs summarised below:

- Carbon storage and sequestration amounts are converted to the CO_2 equivalent (by multiplying by the atomic weight of $2O_2$ of 3.667) and then price is calculated using the UK value of £248 /tonne of CO_2e for 2022.
- Avoided runoff is calculated using the Severn Trent volumetric sewerage charge of £0.98 /m^3.
- Pollution values calculated based on the 2020 UK social damage costs: nitrogen dioxide - £14.574 per kg, sulphur dioxide - £6.926 per kg, particulate matter less than 2.5 microns - £276.264 per kg, carbon monoxide - £0.98 per kg.
- Replacement cost is converted from USD to GBP ate a conversion of $1=£0.75

Appendix 5 - Summary of Recommendations

1. A vision statement is developed and articulated for the trees under the management of Leicestershire County Council and in a wider context the tree population of Leicestershire County as a whole. Such a vision can be singular or multi- faceted. Below are just some of the elements which might be contained in such a vision statement.
    - Increase canopy cover
    - Increase tree diversity within the population
    - Increase stormwater interception through strategic tree planting
    - Reduce the impact of the heat island effect by providing shade
    - Increase pollution interception by strategic tree planting
    - Improve the management and maintenance of the existing tree population to
    - the benefits delivered.
    - Improve the health and wellbeing of the human population by enhancing tree cover.
    - Deliver ecosystem services appropriate to location.

It is important that the vision is based on evidence and that a clearly defined action plan is developed to achieving the vision.

2. Continue to develop and update the current evidence base.
    - A further i-Tree Eco report on the Leicestershire CC tree inventory would provide such information.
    - Widen the evidence base with regard to the tree population of Leicestershire as a county.
    - Leicestershire to use its position as an influencer to encourage the development and sharing of tree inventories by district councils and other landowners within Leicestershire where they do not exist and to encourage the use of i-Tree Eco where they do.
    - To create an on-line resource as a repository for information as it is gathered so that a comprehensive picture is developed of the tree population within Leicestershire which is available to the community.

3. To undertake an i-Tree Eco sample plot study of the whole of Leicestershire. This would include privately owned trees and therefore:
    - provide a picture of the tree population of Leicestershire as a whole.
    - Create a greater understanding of where and how the trees managed and maintained by L CC contribute to the tree population as a whole and how new development and planting can enhance the development of the urban forest.
    - Inform how new development and the strategisation of tree planting can enhance the development of the urban forest allowing identified aims and objectives to be achieved.

4. Consider the development of a Leicestershire Urban Forest Master Plan.

5. It is highly recommended that the data from sections one and two are combined and incorporated into an electronic dropdown system where the design requirements and constraints of any planting site are entered. The system then filtering out tree species which have the capacity to meet those requirements and producing a list of choices.

6. The data used to complete the tree species matrix is updated annually with new species introduced and additional species information added as required. Over time, as more information about the tree population of Leicestershire, as a whole ’is gained and recorded, the system will become increasingly Leicestershire focused.

7. The system is piloted with modifications added, if necessary, with an aim to make it as user friendly as possible.

8. Existing important hedges are mapped and assessed for condition and species present.

9. Areas of priority for hedge planting are identified and mapped with a focus on connectivity between disconnected parcels of land, particularly woodland.

10. Private landowners are engaged with a view to encouraging hedge planting.

11. Additional information is gathered to inform tree planting strategies and species selection where diversity within the tree population is low. These will usually be the more urbanised areas within LCC and areas where there is new development where a diverse population can be created at design stage.

12. A gradient is created, identified and mapped between urban, peri-urban and rural where the use of native species can be prioritised. The vulnerability of native species to changes caused by climate change and the threats from imported pest and or disease should be a consideration in this analysis.

13. That the decision-making process regarding species selection incorporates a calculation as to the return on investment over a defined number of years using the methodology outlined above.

14. That an agreed planting methodology and subsequent maintenance schedule is adopted (See Policy Review: Recommendations: Tree Charter) for the five scenarios considered above and accurate costs are created which apply directly to Leicestershire. It has been highlighted that the costs used above are indicative only.

15. Review current specifications for young tree procurement using guidelines as set out above.

16. Produce a set of procurement specifications which can be used to inform the proposed Tree Charter development and be adopted by potential signatories to that charter.

17. Build relationships with nurseries who fulfil the criteria set out in the revised procurement specifications. This will include regular nursery visits and selection of young tree stock on site.

18. Consider the preparation and development of contract grow contracts with selected nurseries to ensure that not only the quality of tree stock required is available but also the diversity of tree stock required to produce a resilient tree population for Leicestershire.

19. To further develop a knowledge of nursery production systems and the implications of each for planting success.

20. To develop a series of specifications for planting in each of the scenarios used in this report. Use the information referred to as a basis for producing a practical and workable series of specifications which can be agreed and used to inform the proposed Tree Charter development and adopted by potential signatories to that charter.

21. To ensure that the detail of the specification is realised on site.

22. Develop and implement a young tree management and maintenance programme which covers at least a five-year period following planting and ensure this programme is adhered to.

23. Include this management and maintenance programme as an integral part of the proposed Tree Charter.

24. Consider the development of an independent audit system with agreed criteria to measure and report on the development of newly planted young trees.

25. It is highly recommended that, given the complex and varied policy framework outlined above and the inherent difficulties in harmonising policies across Leicestershire as a county, that the existing Tree Charter produced by Leicestershire County Council and the National Forest Company in 2021, is developed, and its scope widened. The current Charter outlines three drivers for action:
    - Support a secure and safe future.
    - Enhance well-being in communities.
    - Facilitate sustainable enterprise.
    -

26. The current Charter outlines three drivers for action:
    - Support a secure and safe future.
    - Enhance well-being in communities.
    - Facilitate sustainable enterprise.

27. The current charter suggests that action should be evidence led and outlines the following actions:
    a) Target tree planting in locations that will help alleviate flood risk, improve air quality, connect and enhance biodiversity networks.
    b) Choose species which can deliver and balance a range of benefits including carbon sequestration, biodiversity enhancement, landscape and sustainable timber production.
    c) Plant trees close to where people live and work to improve accessibility and well-being benefits.
    d) Promote good woodland management in including the number of well supported volunteer opportunities.
    e) Encourage outdoor and woodland learning for children and young people to help them connect and understand the importance of nature while experiencing the benefits of being outdoors.
    f) Ensure that trees are considered as part of future transport, housing and employment infrastructure.

28. The six actions listed above are all represented in the policy review and the development of the existing charter potentially provides a means where policy can be harmonised without the need to rewrite or amend existing documents. It is highly recommended that development of the charter is used to this effect.

29. It is highly recommended that the existing charter is developed to include delivery. This includes articulating a common approach to design, species selection, procurement, planting best practice, management and maintenance of trees with a view to producing an agreed and uniform approach across Leicestershire.

30. That the revised charter is publicised widely and signatories to the charter enlarged to include as many stakeholders as possible including developers, local community groups, business and others who own or manage land.

31. That the vision statement underpinning the current charter is developed and extended.

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The Value of Trees

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