Trees and Climate Change

Friends of Lewes

November 2025

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www.thurmanconsultancy.com

What this Presentation will cover:

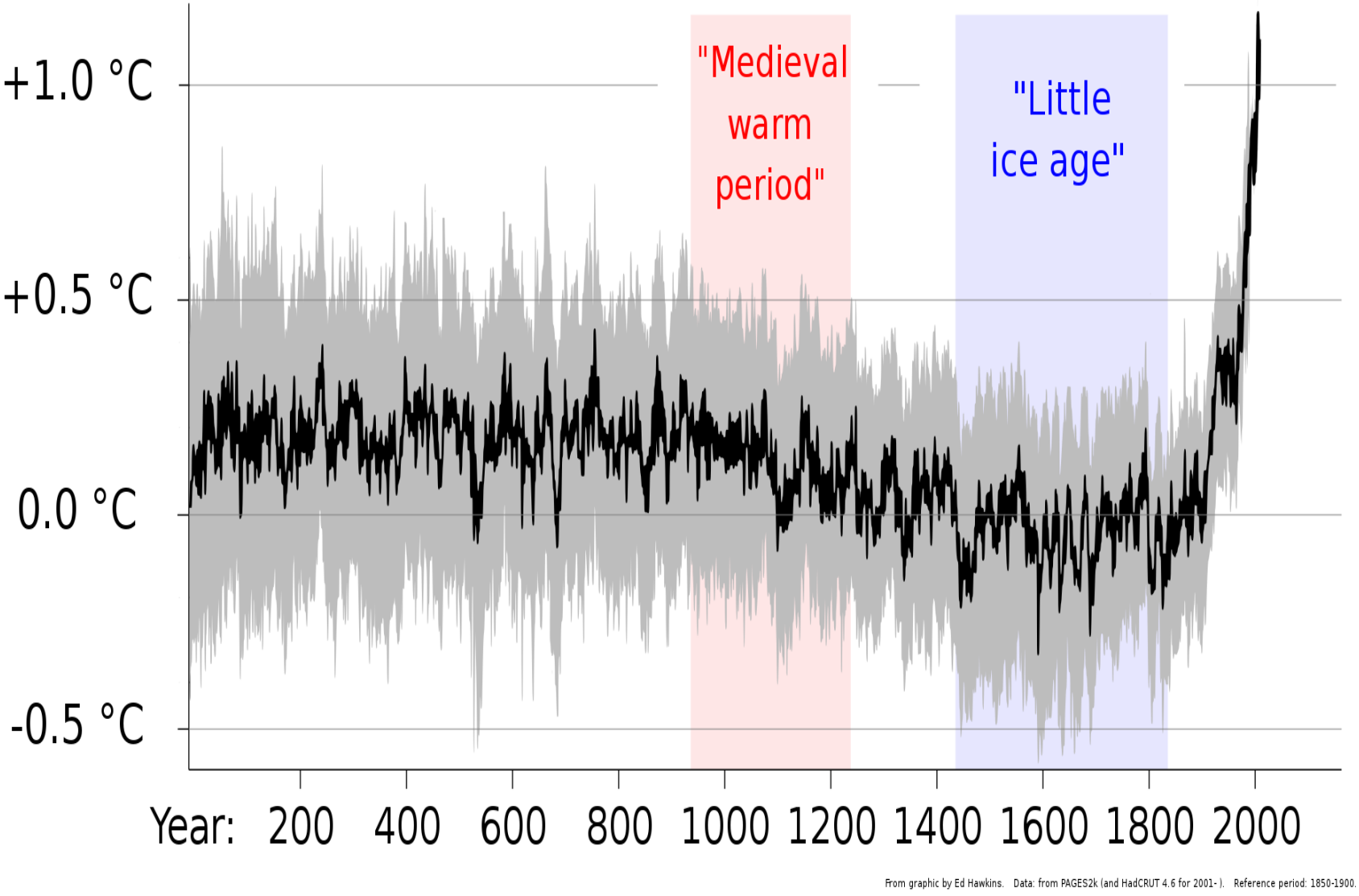
- Climate Change – in brief
- How trees may help us
- What we need to do to help trees help us
- Trees for the Future

Climate Change – In Brief

- **Long-term shifts in weather patterns especially average temperatures.**
- **These can be natural, but since the early 1800s, human activities have been the main driver of climate change.**
- **Primarily due to the burning of fossil fuels (coal, oil and gas), which produces heat-trapping gases.**

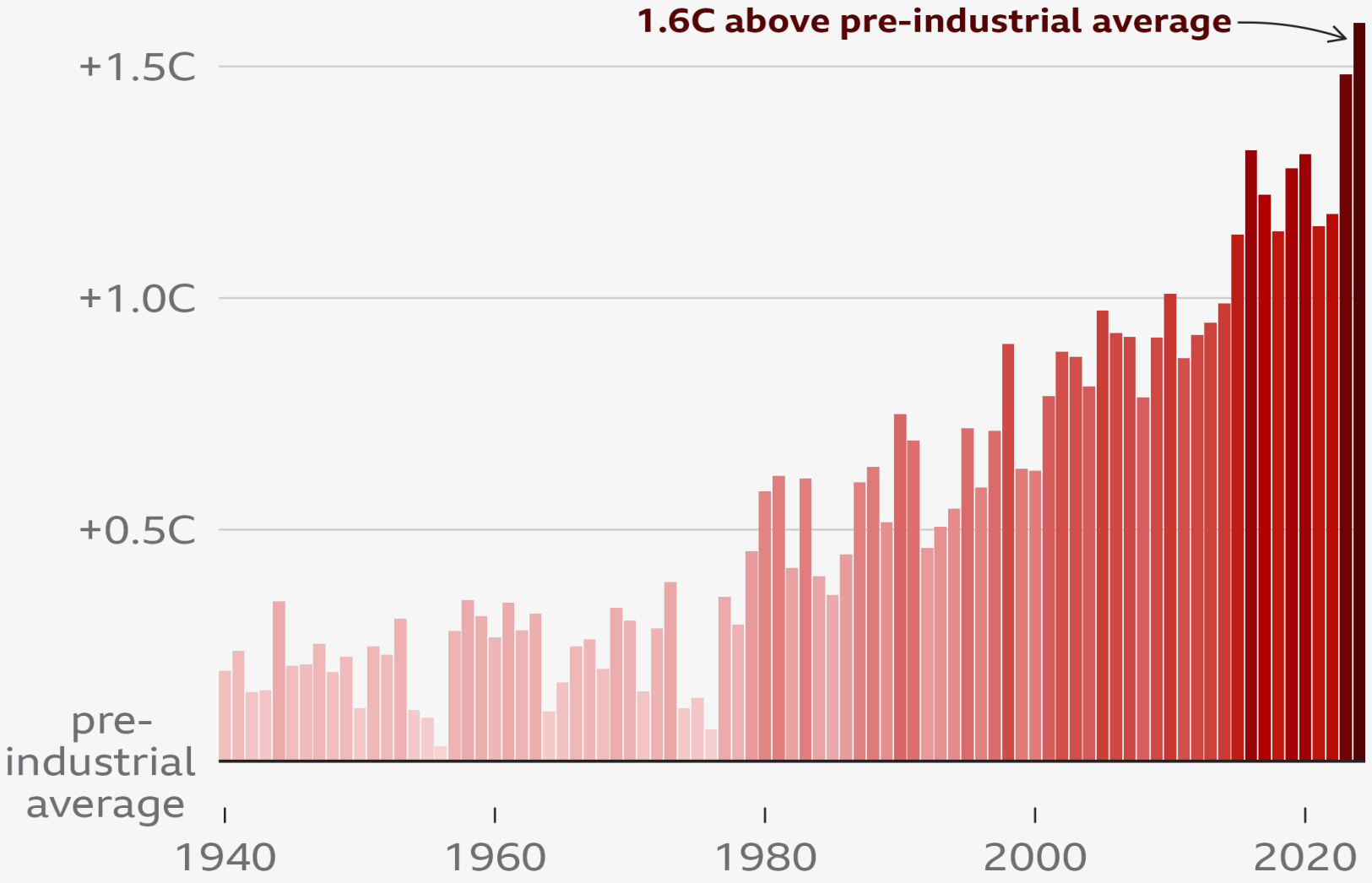
Source: United Nations

Global Average Temperature Change – 0 to 2000



2024 was the first year above 1.5C

Global average temperature by year, compared with the pre-industrial average (1850-1900)

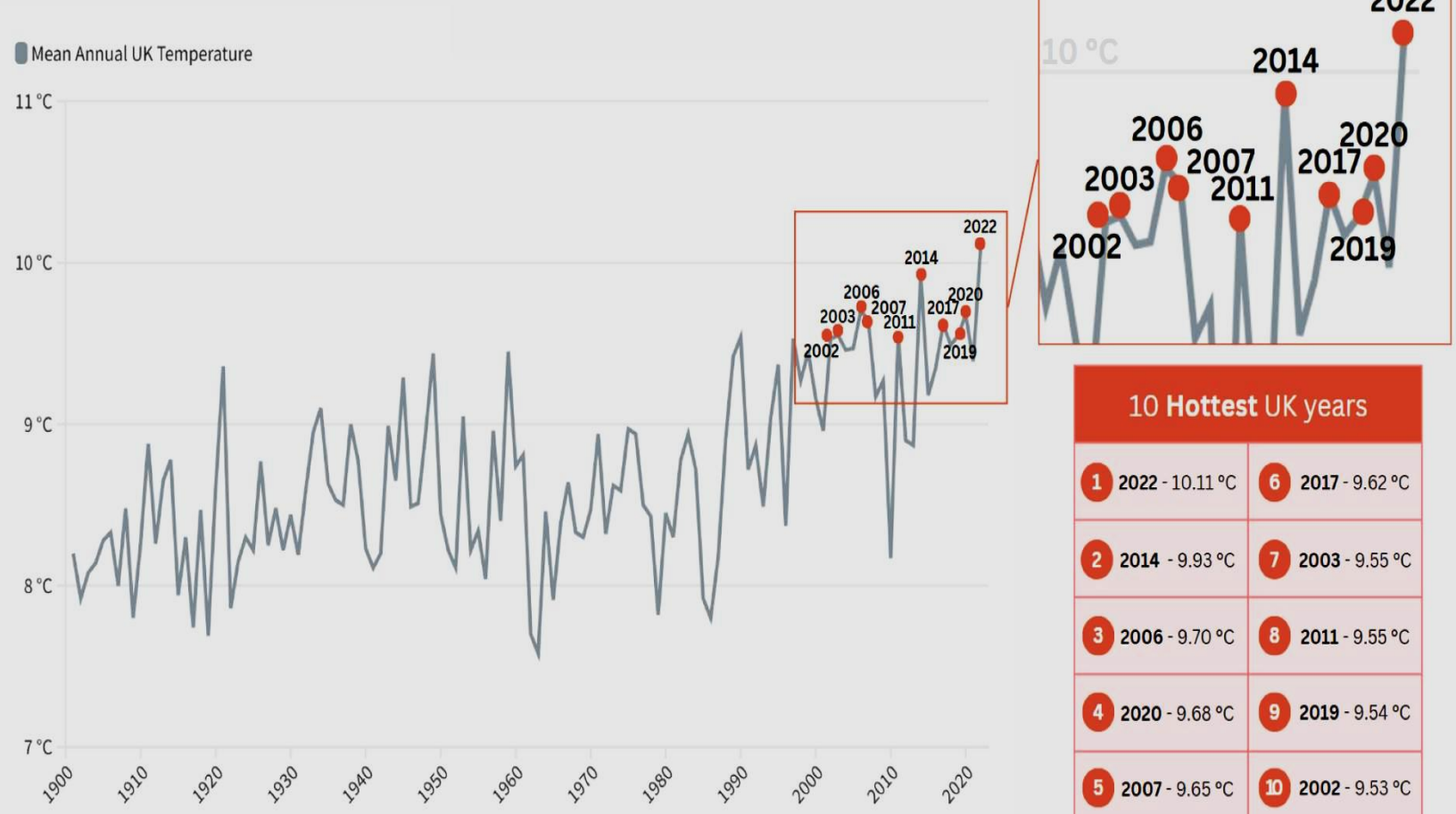


Source: ERA5, C3S/ECMWF. Darker reds reflect greater warming

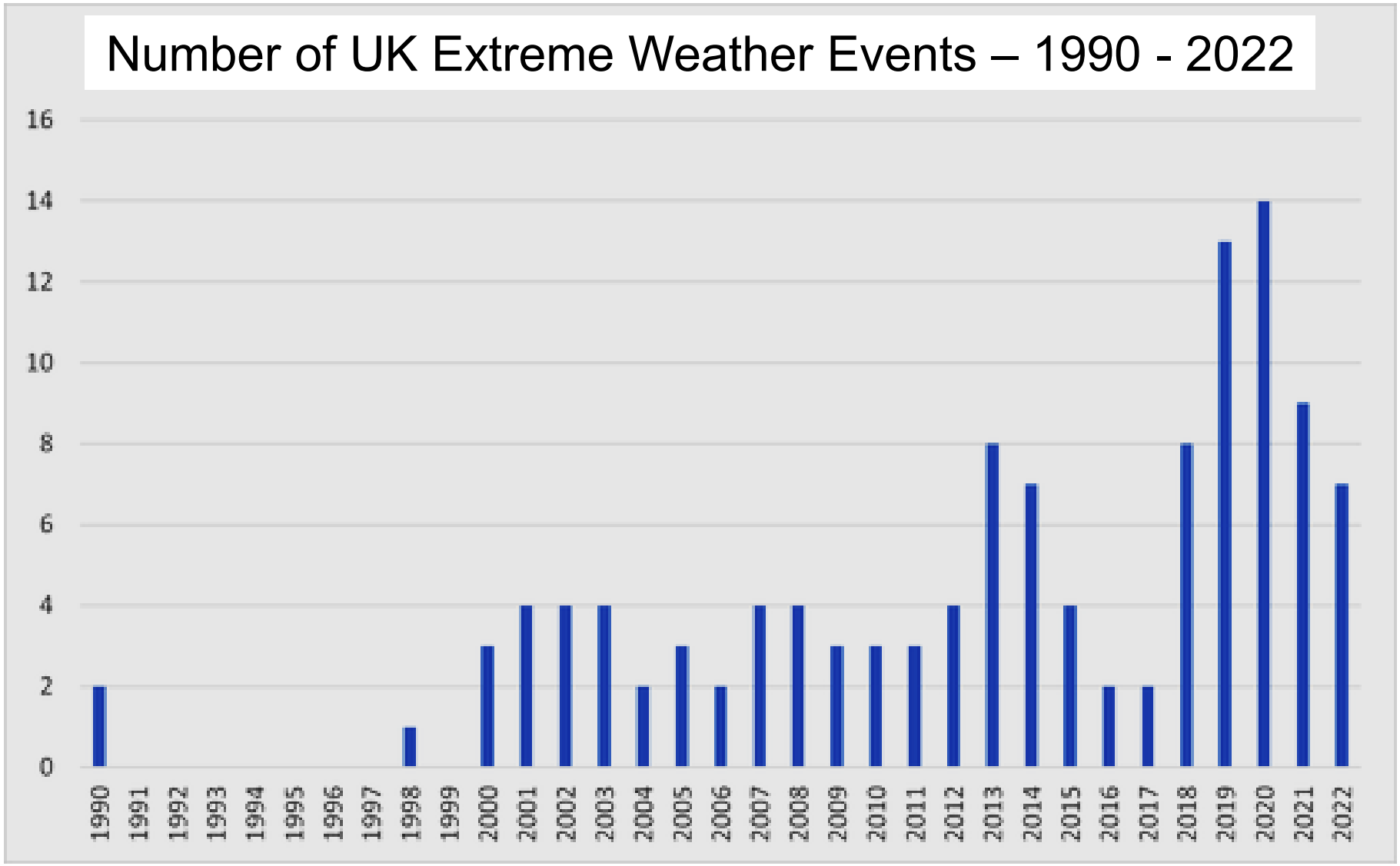
BBC

Hottest UK years since 1900

CogX



10 **Hottest** UK years	
1 **2022** - 10.11 °C	6 **2017** - 9.62 °C
2 **2014** - 9.93 °C	7 **2003** - 9.55 °C
3 **2006** - 9.70 °C	8 **2011** - 9.55 °C
4 **2020** - 9.68 °C	9 **2019** - 9.54 °C
5 **2007** - 9.65 °C	10 **2002** - 9.53 °C



In September 2021, Oman had 4 years of rain in 2 days

Arctic Ocean (Svalbard)

105 years apart

Source:
Norwegian Polar Institute

Recent
Photographer
Christian Aslund

Unpredictable bouts of Snow and Hail

More Thunderstorms and Heavy Rains and at odd times

Stronger Winds, more often

Higher Rainfall, more Flooding
& Wetter Winters

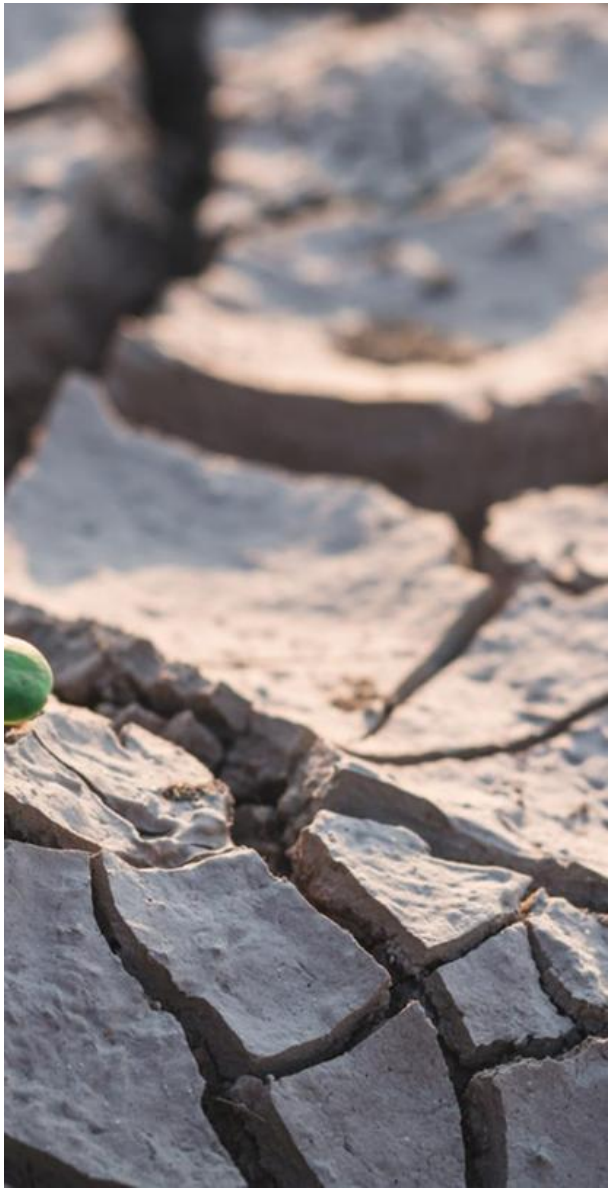
More Soil Degradation and Erosion

Increased Risk of Wildfires in Hot + Dry conditions

(Ashdown Forest – April 29, 2019 – 40 acres)

Low Ground and Air Temperatures will remain – but more unseasonal

More Droughts and not just in Summer



Higher Temperatures & more Heat Waves and not just in Summer

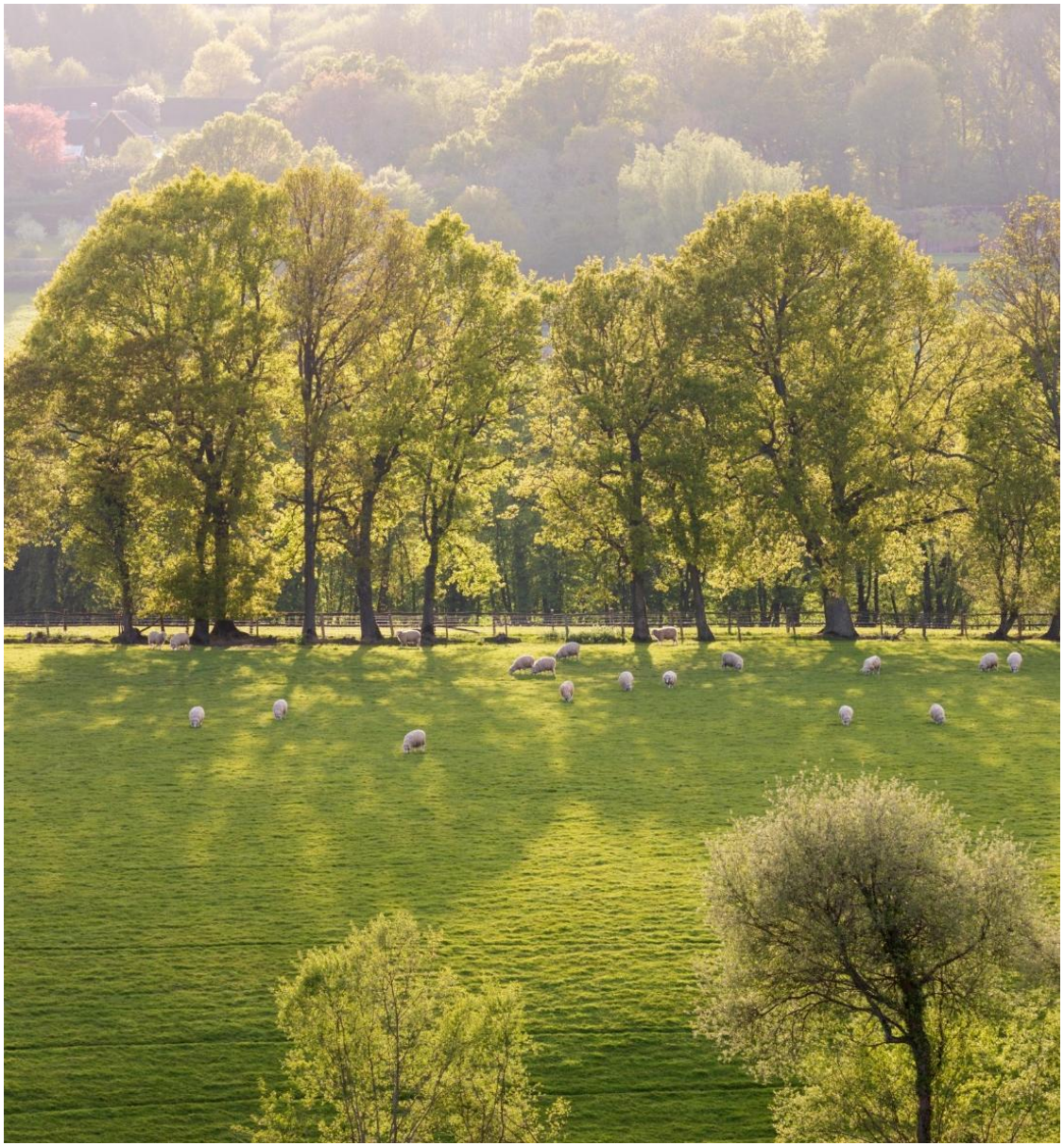
Ability to grow a wider range of plants?
Or just a shift in range?

Changes to Flowering and Fruiting Times of Plants
Affecting Wildlife and Pollination Synchronisation and Feeding

Increased Weed Growth

Some Native Plants are Struggling

E.g. Beech in the South of England



New Pathogens already in the UK or on their way
Due to Climate Change and Global Trade

How Trees Help Us

Urban Ecosystem Services

Provided by Trees – a Summary:

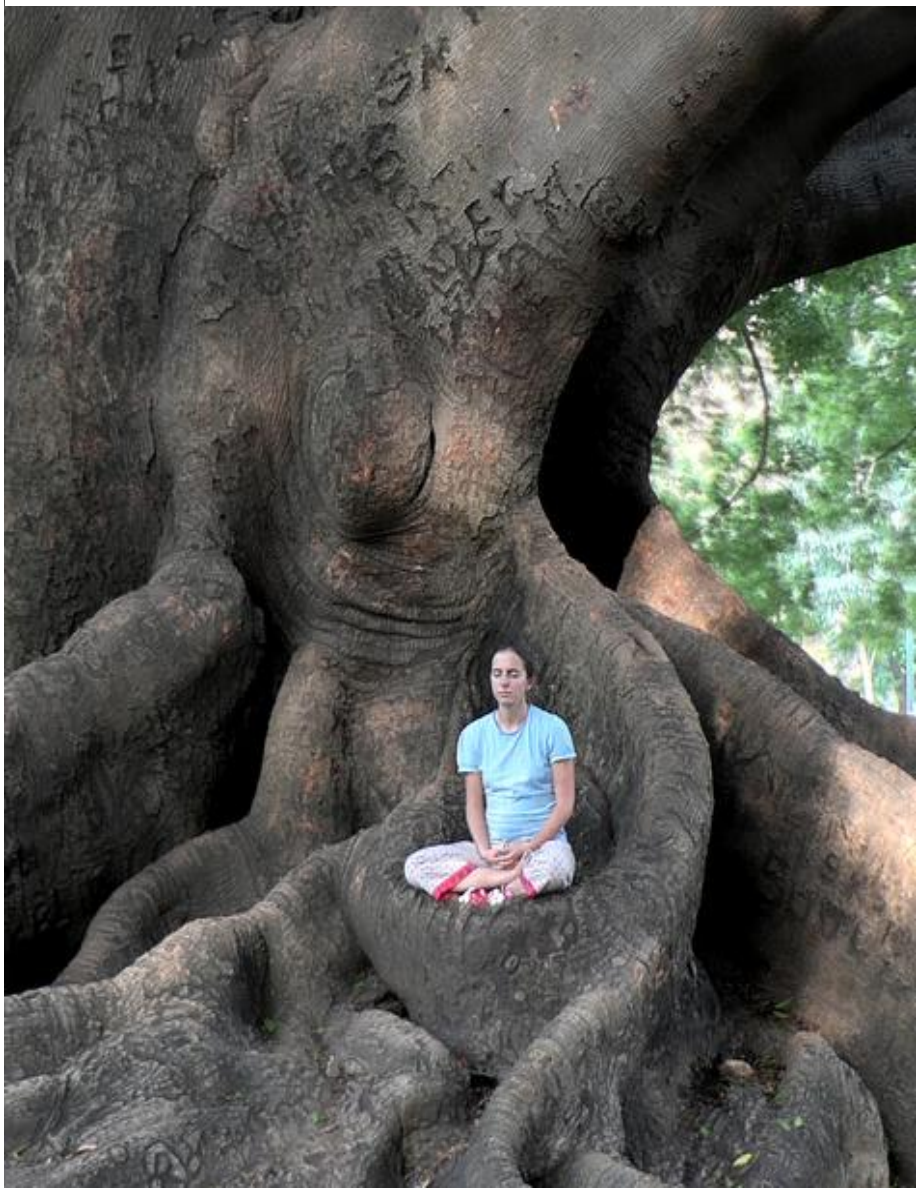
- Air Quality - Pollution Filtration & Collection
- Biodiversity & Wildlife
- Carbon Sequestration
- Energy Savings
- Human Well Being
- Shade & Temperature Amelioration
- Shelter
- Soil Management & Erosion Control
- Water Management - SUDs

Filtering, Collecting and Absorbing both Ground and Air Pollution

SUDs and Rain Gardens reduce the risk of Flooding

“Forest Bathing”
shinrin-yoku 森林浴

Peaceful and Contemplative urban spaces

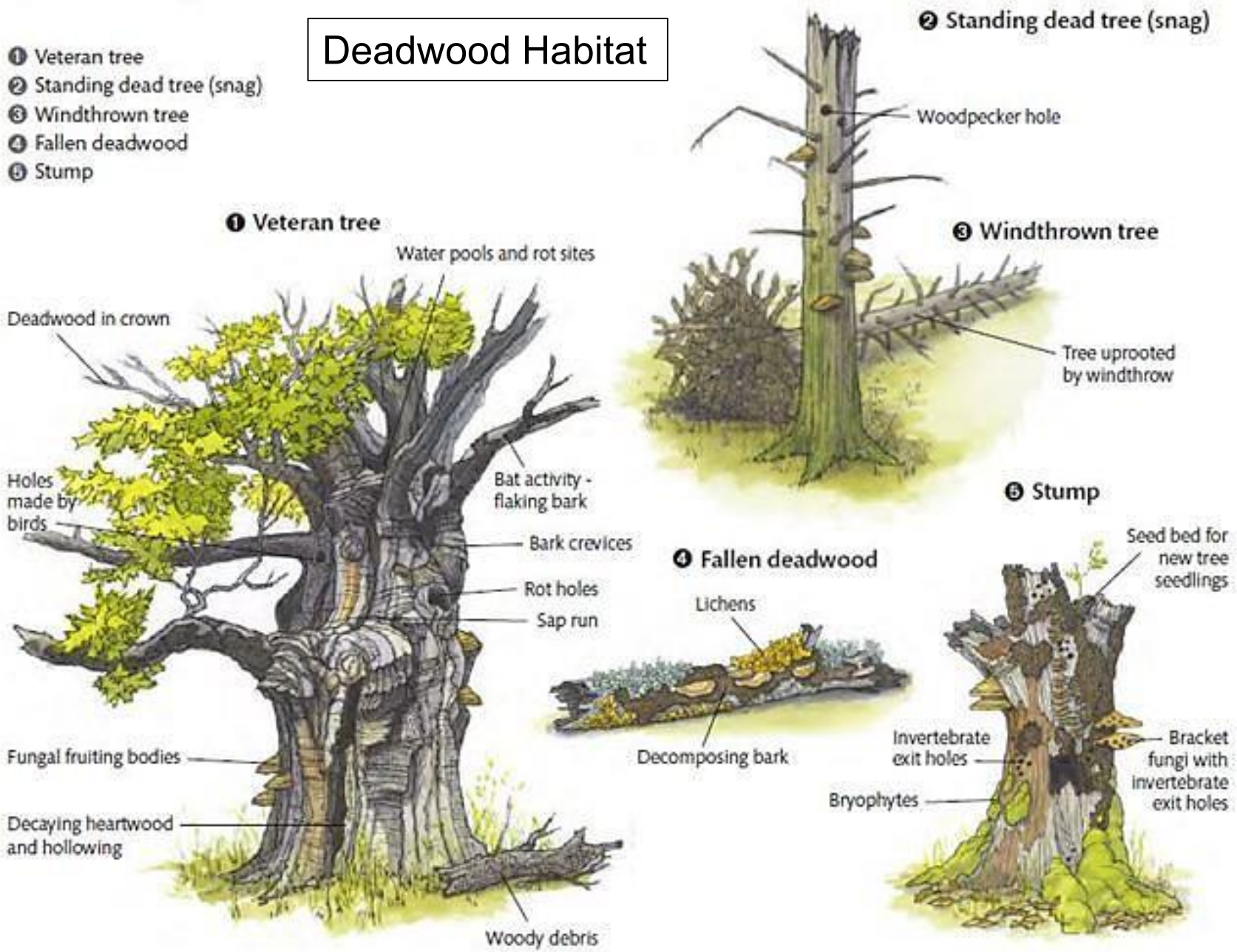


Wildlife and Biodiversity

Golden Oriole

Brown Long-Eared Bat

Deadwood Habitat

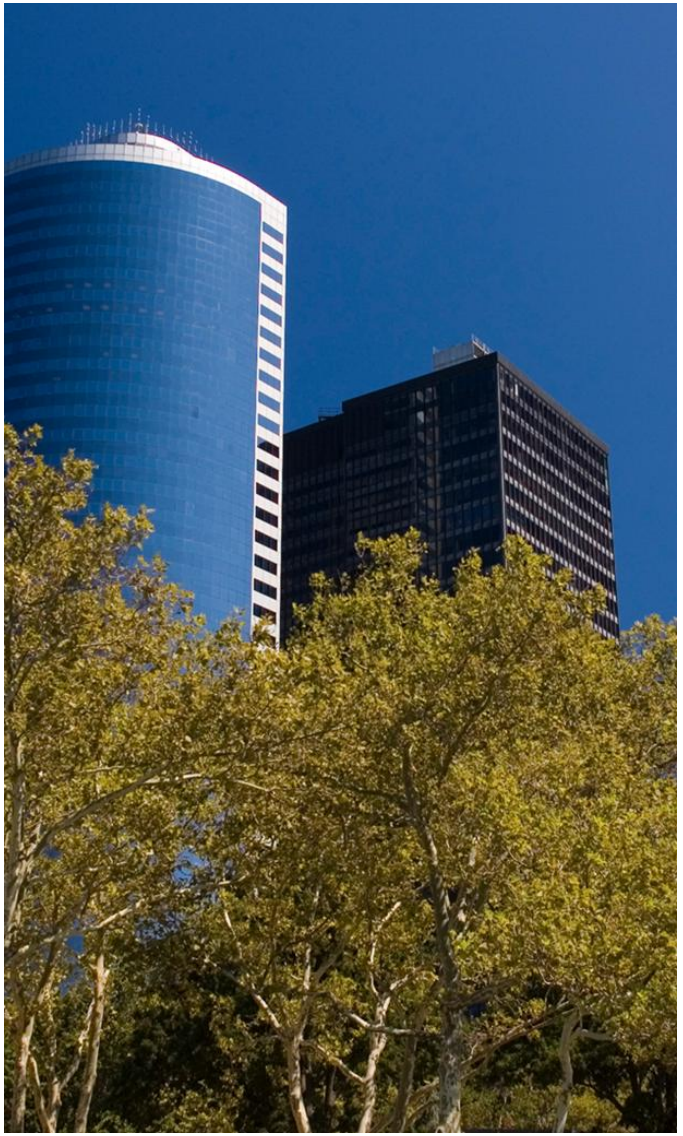


Trees and our Culture

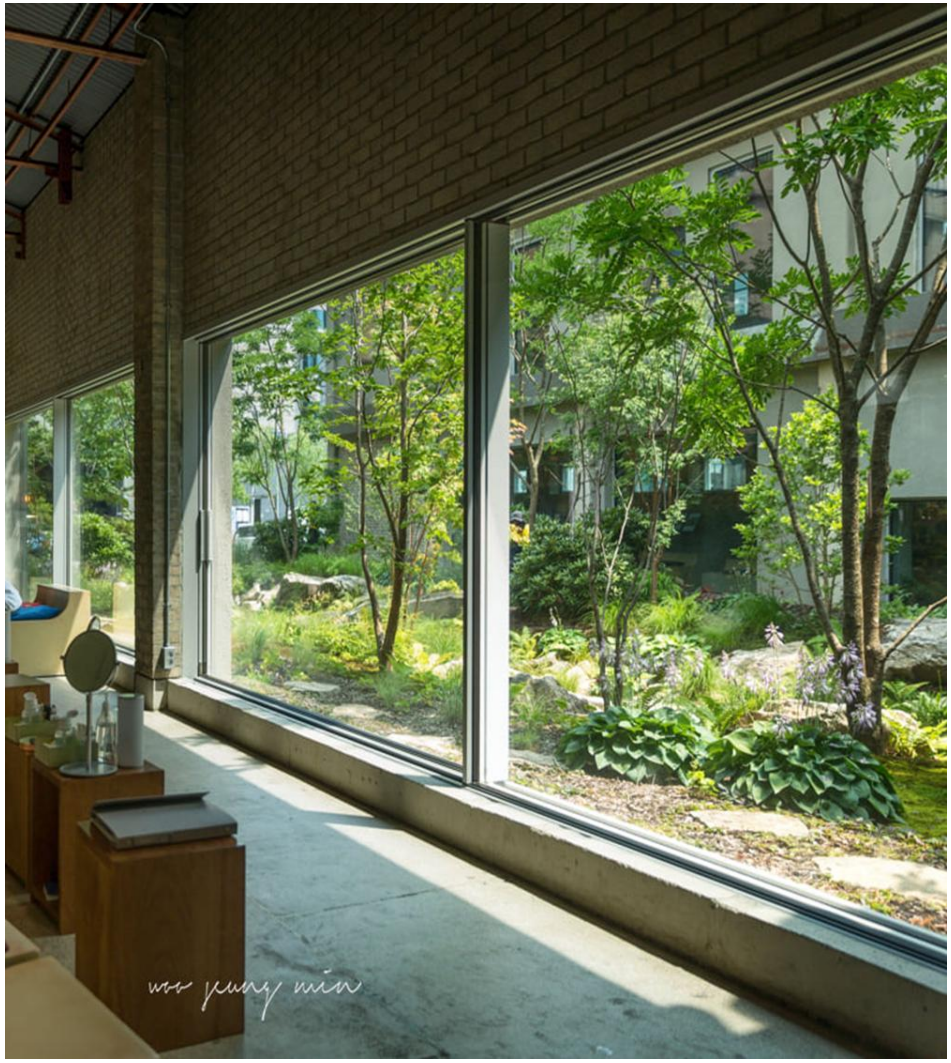
‘Welcome Avenues’, ‘Town Trees’, ‘Gateway Trees’ & ‘Signature Trees’

They provide a unifying and connecting link of similarity in cities, towns, parks & gardens – a green backcloth

Trees offer a comforting ‘umbrella’ more in scale with humans…



Creating useful space between buildings



Frame good architecture or hide bad

Carbon Sequestration

A relatively minor reason for planting amenity trees?

The Top 5 most efficient ecosystems for carbon storage are:

1. Tundra
2. Seagrass
3. Mangrove forests
4. Salt marshes
5. Tropical rainforests

In the UK:

1. **Salt marshes and Seagrass Meadows** – most efficient and faster than our forests
2. **Peatlands** – but damaged (still better than all our forests combined)
3. **Native woodlands/forests and their soils** – best are the old and undisturbed
4. **Grasslands & Heathlands** – especially unimproved and species rich grasslands
5. **Hedgerows** - highly effective per unit area

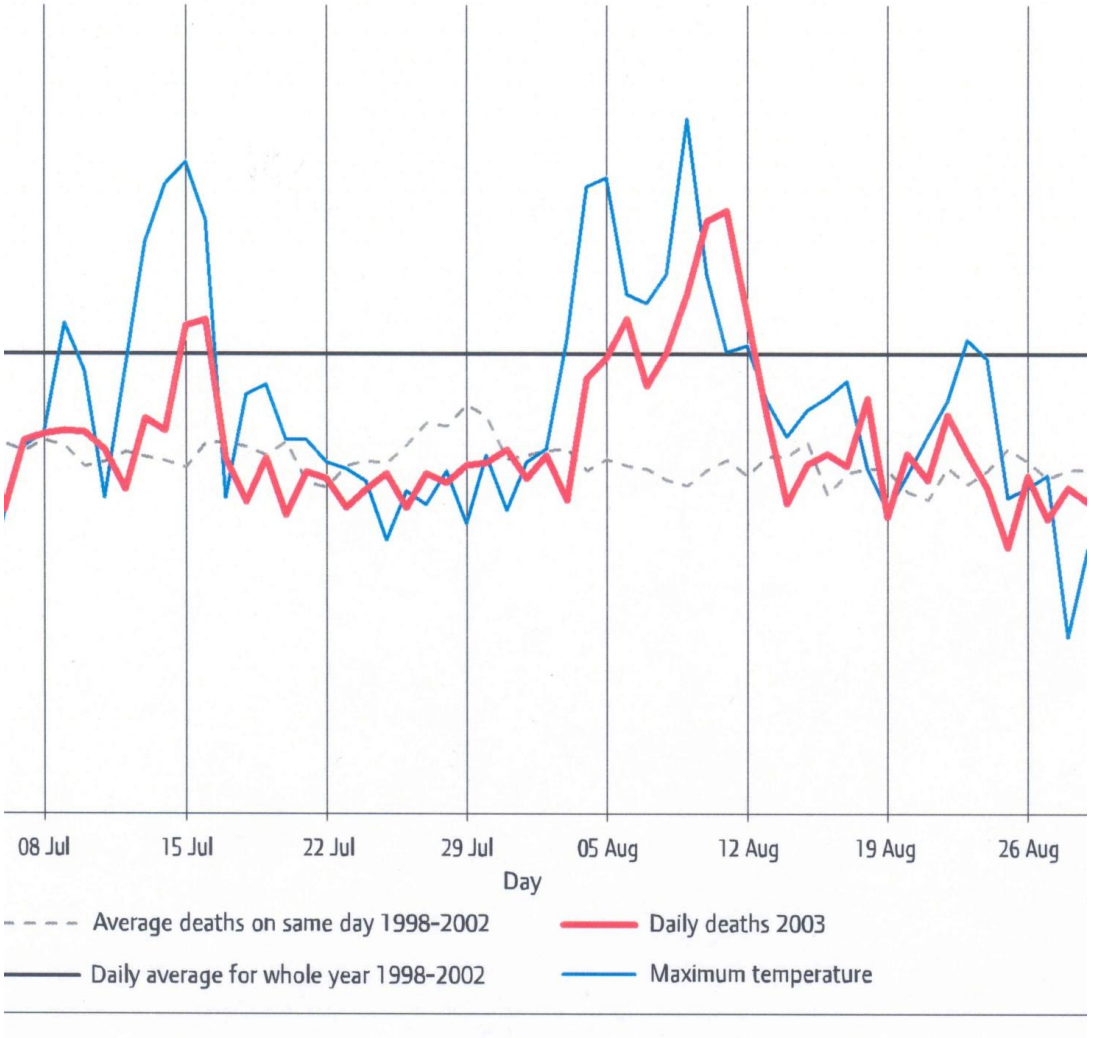

Barcelona
Caser
Shade and Temperature Amelioration

Temperatures and Deaths

The Summer Heatwave in England and Wales - 2003

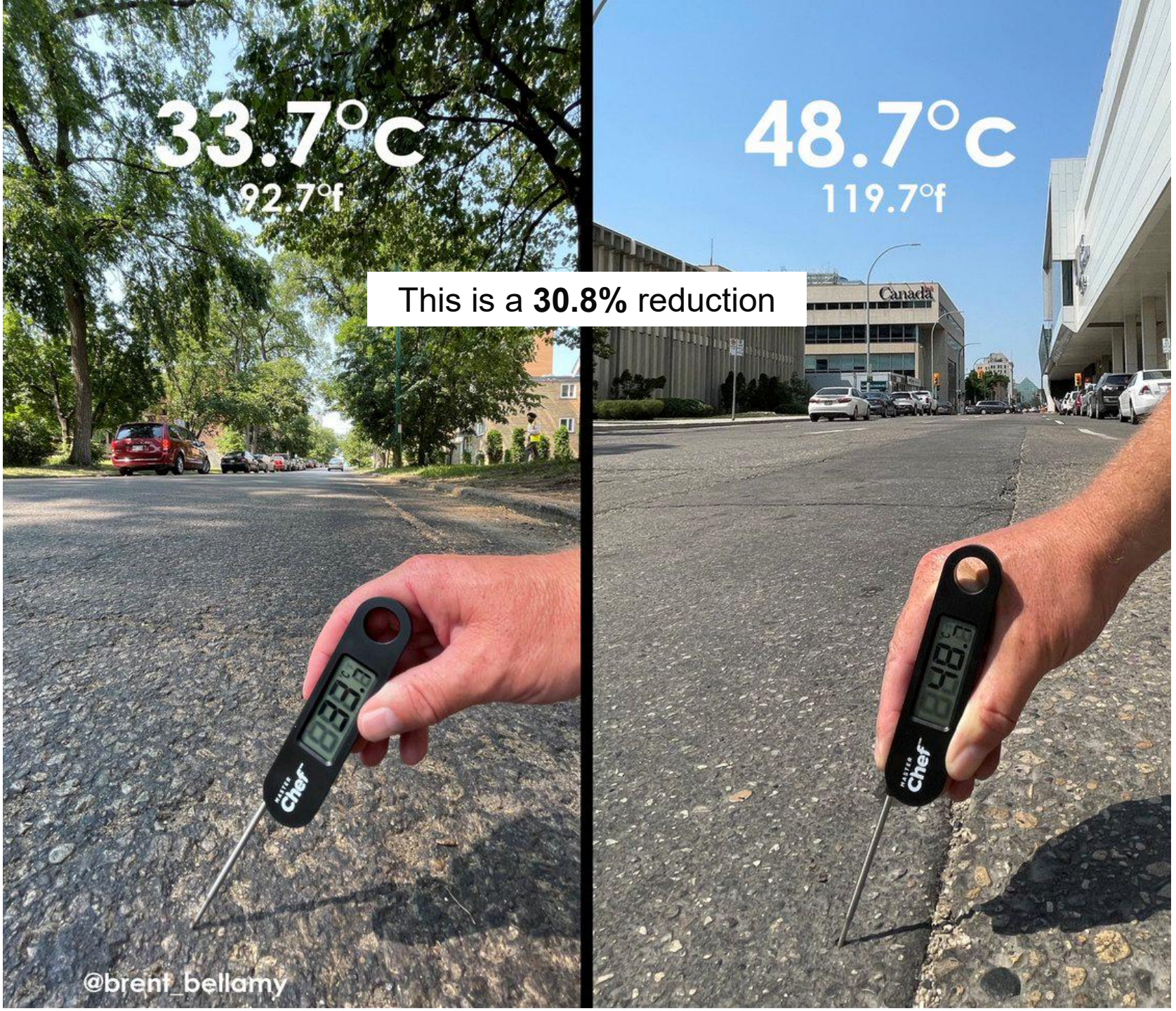
Between June and August 2003, 56,303 deaths occurred in England and Wales

This was 3,271 deaths (6.2%) above the five-year average



In the UK it is thought that, if we increase tree canopy cover by 10%, we will lower annual mean temperatures by 6%

By 2050, London will have the same climate that Madrid has now


33.7°c
92.7°f
48.7°c
119.7°f
This is a **30.8%** reduction
@brent_bellamy

Oh, and Oxygen

How can we help trees help us?

1. Plant more of them (with aftercare)

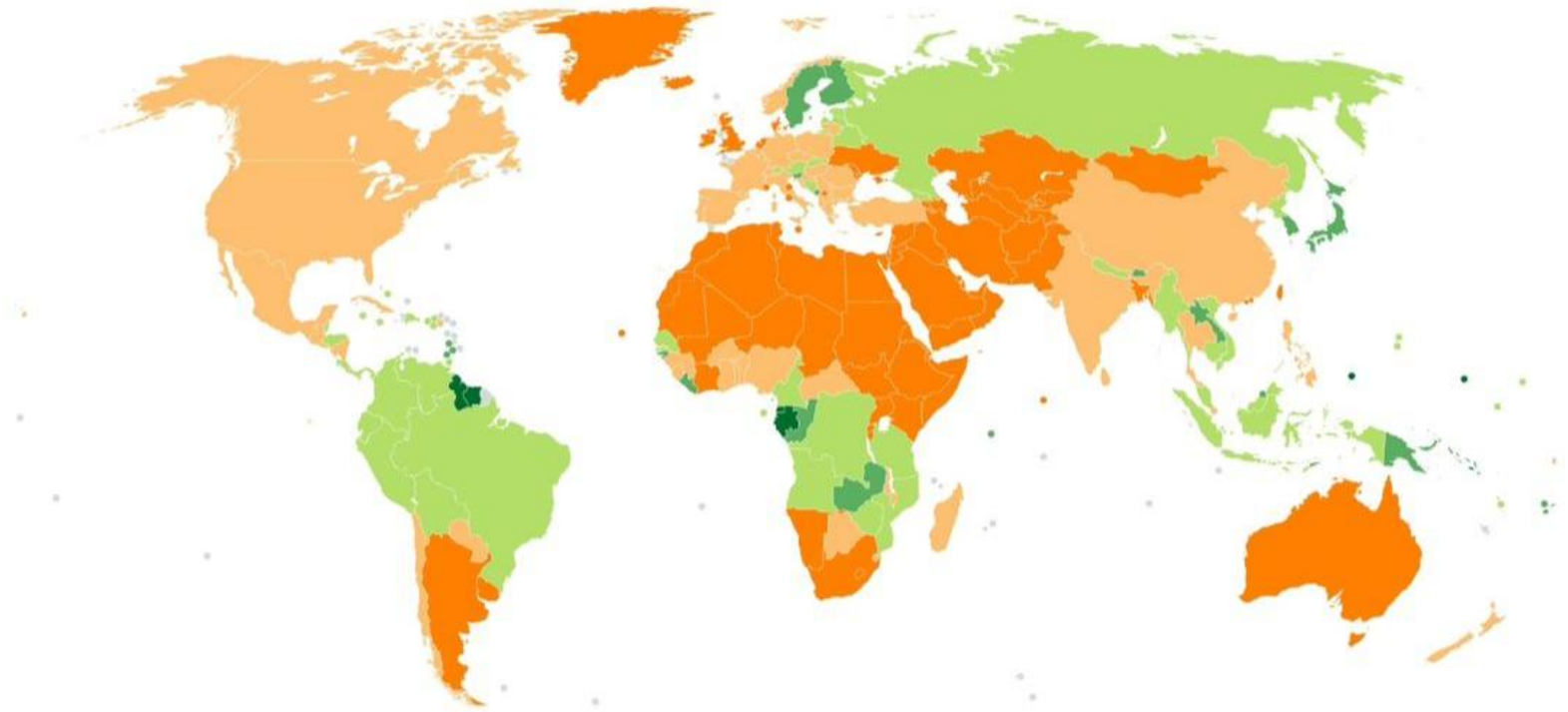
2. Protect those already growing

Source: World Bank

Forest Cover

Countries categorized by percentage of their land covered in forests as of 2023. Forests are large areas covered in trees.

ROYAL MAPS



Forest Cover By Country

Some Examples

Highest

Suriname	97.4%
Guyana	93.6%
Micronesia	92%

Lowest

Libya	0.1%
Kuwait	0.4%
Saudi Arabia	0.5%

Europe

Finland	73.7%
Sweden	68.7%
Slovenia	61.5%
Estonia	57%
Latvia	54.8%

Selected Other Countries

Japan	68.4%
Brazil	59%
Russia	49.8%
Canada	39.5%
United States	33.9%
Germany	32.7%
France	32.5%
China	24%

UK	13%

The Top Five Cities in the World for Canopy Cover

5th - Sydney, Australia – 25.9%

4th - Vancouver, Canada – 26%

3rd - Oslo, Norway – 29%

2nd - Singapore – 29.5%

1st - Tampa, Florida, USA – 36%

London, UK – 21%

Lewes, East Sussex – 11%

Highest in the UK and above Tampa (Surveyed by i-Tree)
Farnham, Surrey – 45%

1. Plant more of them

There is plenty of scope!

Even in Urban Areas

Breda, Netherlands


Populus nigra ‘Italica’ - 3/5m away from buildings & 5/8m apart.
Munich, Germany in sandy soil

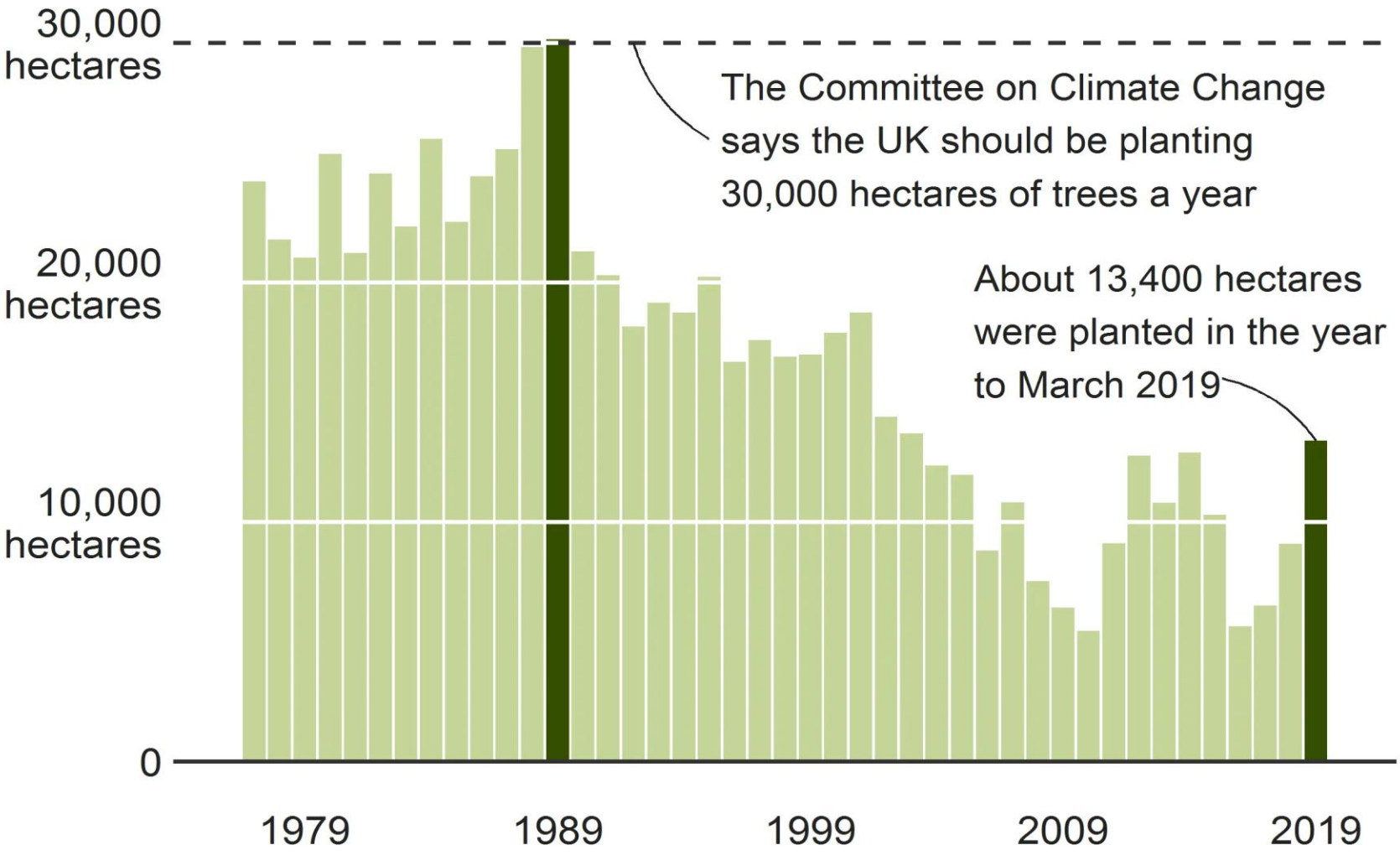

Clear-stemmed trees do not block sight lines or visibility splays
Planted at wide spacings gives enough light for herbaceous pollinators

A New Daycare Centre Extension

Camarzana de Tera, Spain

Tree planting rates in the UK

Experts want tree planting back at levels last seen in 1989



Note: A standard football pitch is about two thirds of a hectare - 1 pitch = 0.64 hectares

Source: Forest Research

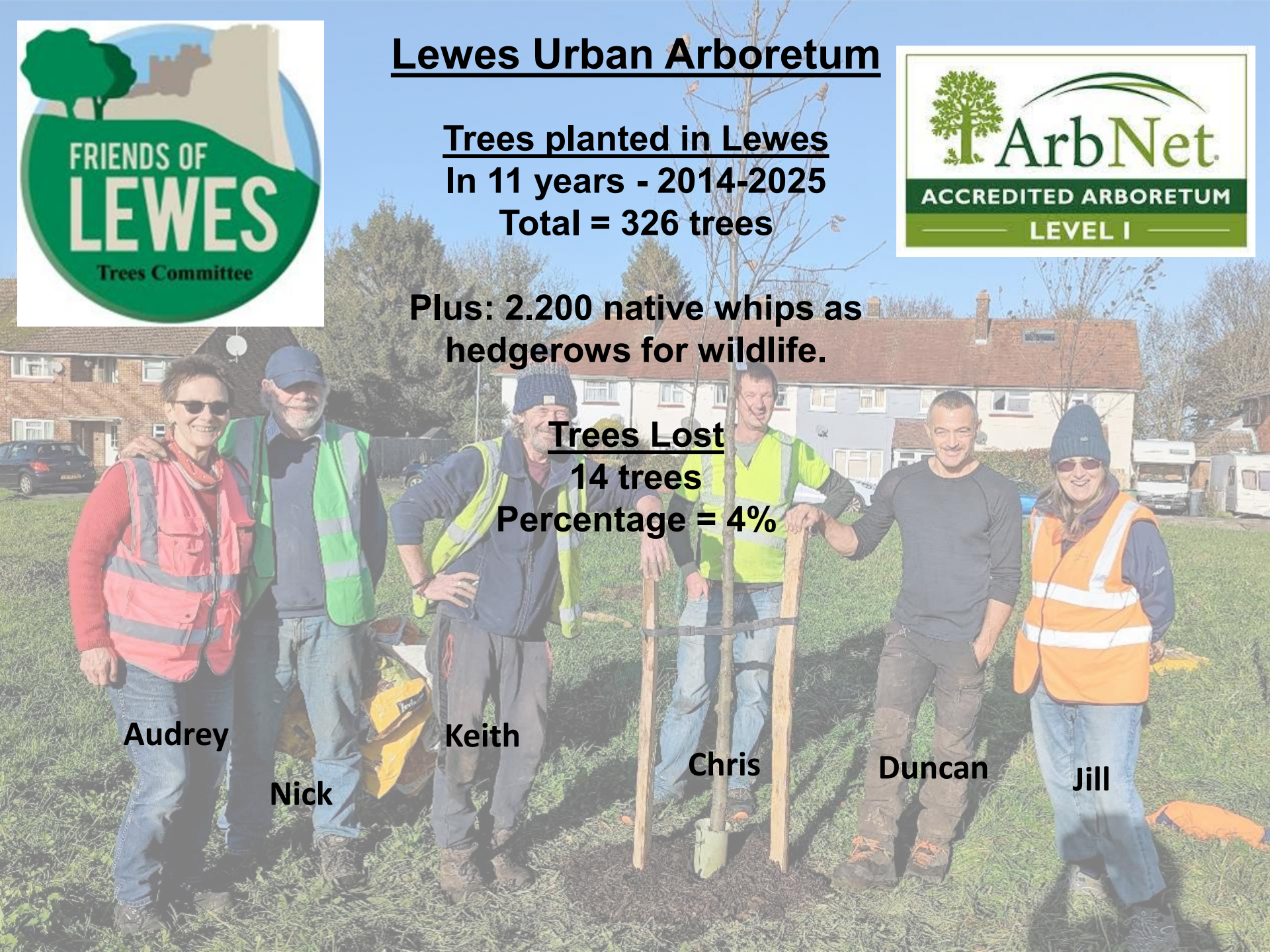
BBC

Lewes Urban Arboretum

Trees planted in Lewes
In 11 years - 2014-2025
Total = 326 trees

Plus: 2.200 native whips as hedgerows for wildlife.

Trees Lost
14 trees
Percentage = 4%



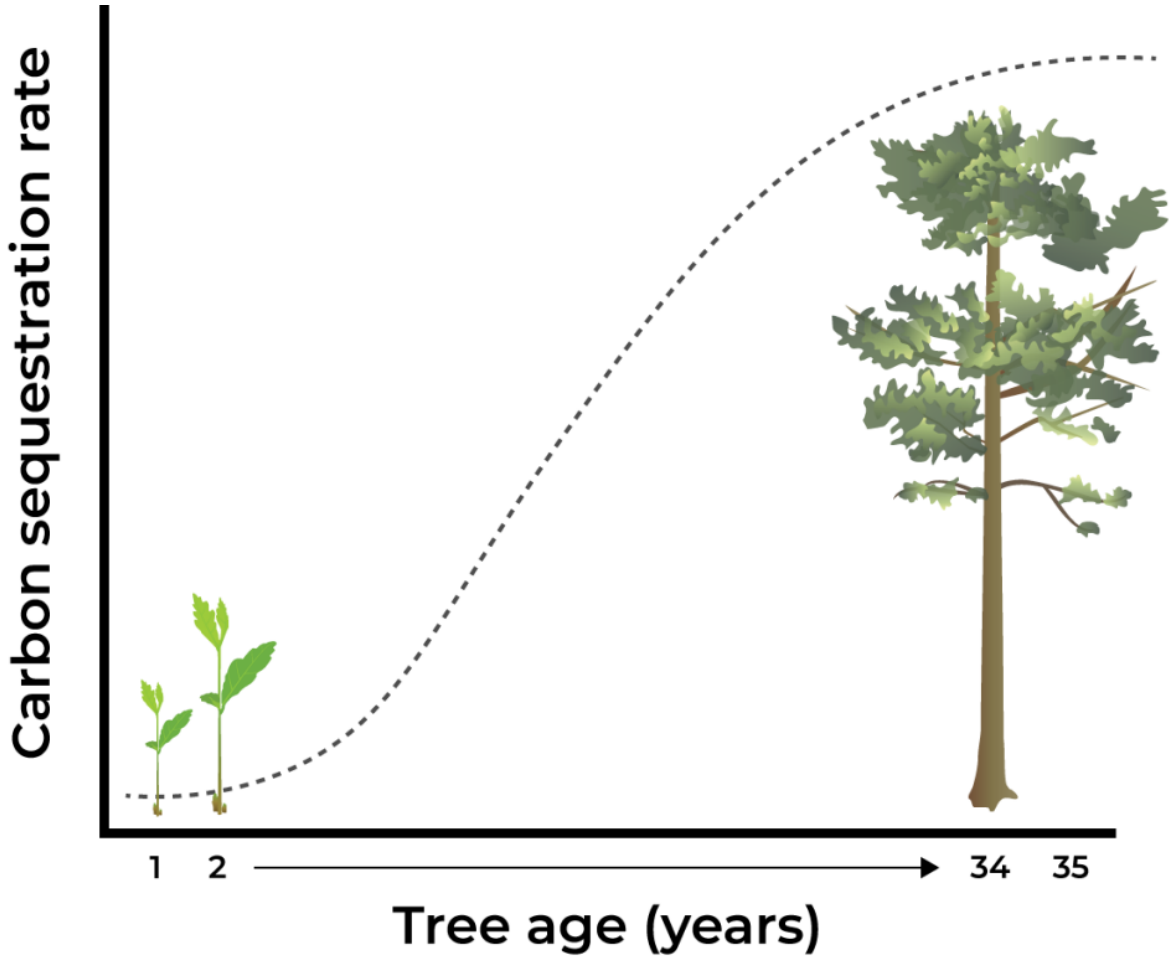
Miyawaki or ‘Tiny’ Forests

Are: Unnecessary, Wasteful, Expensive, Unnatural and Unfriendly IMO!

2. We need to protect those trees already growing

Construction of the HS2 railway's Phase One (London to Birmingham) has directly impacted **25 ancient woodlands**, with approximately **20.6 hectares (51 acres)** of ancient woodland felled (as of late 2024)

For decent Carbon Capture
We need to plant long-lived species - Such as: Oak, Lime, Hornbeam and Yew
Our Ancient Woodlands are our top performers for this

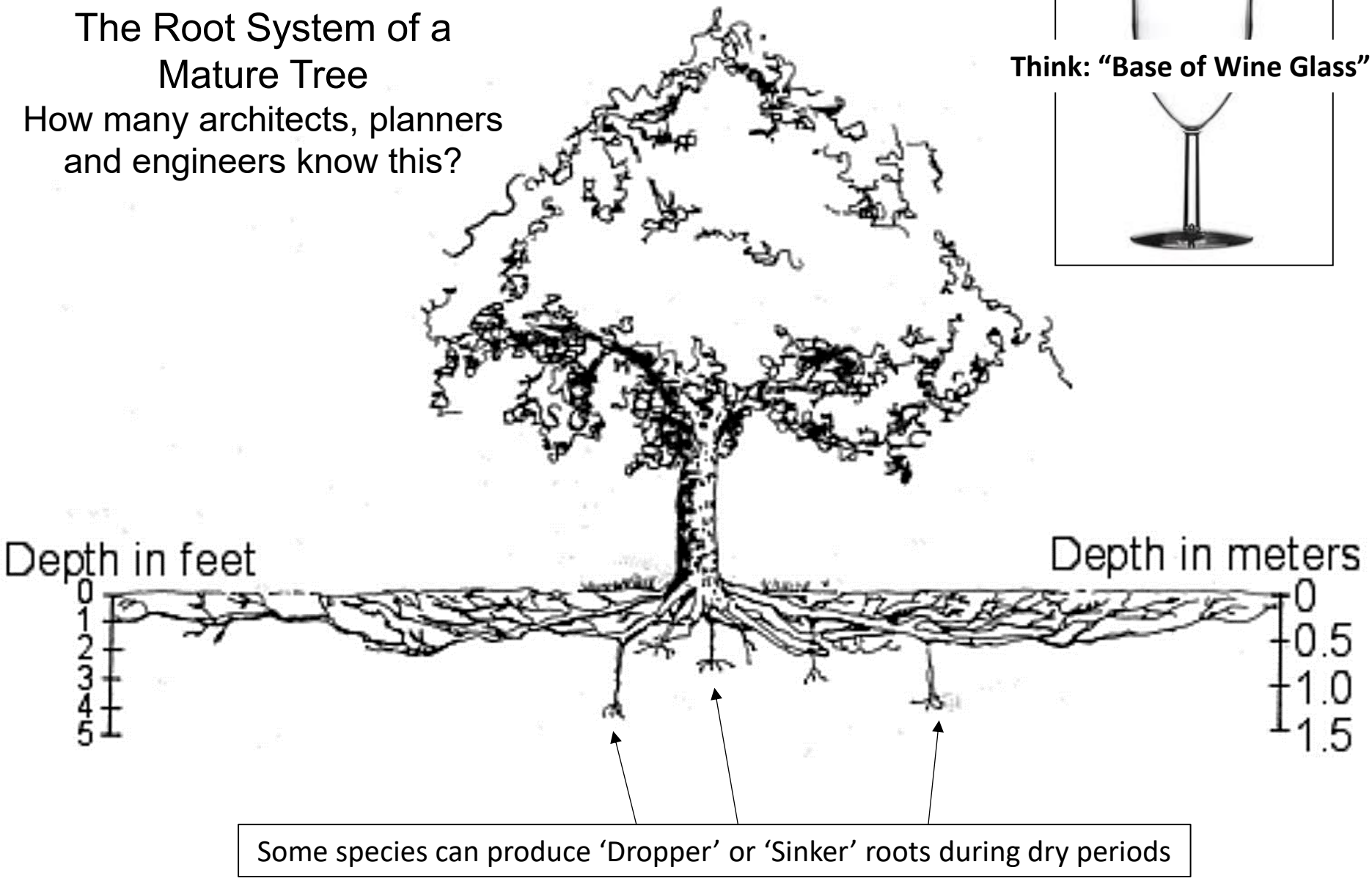


Development Sites

The Root System of a Mature Tree

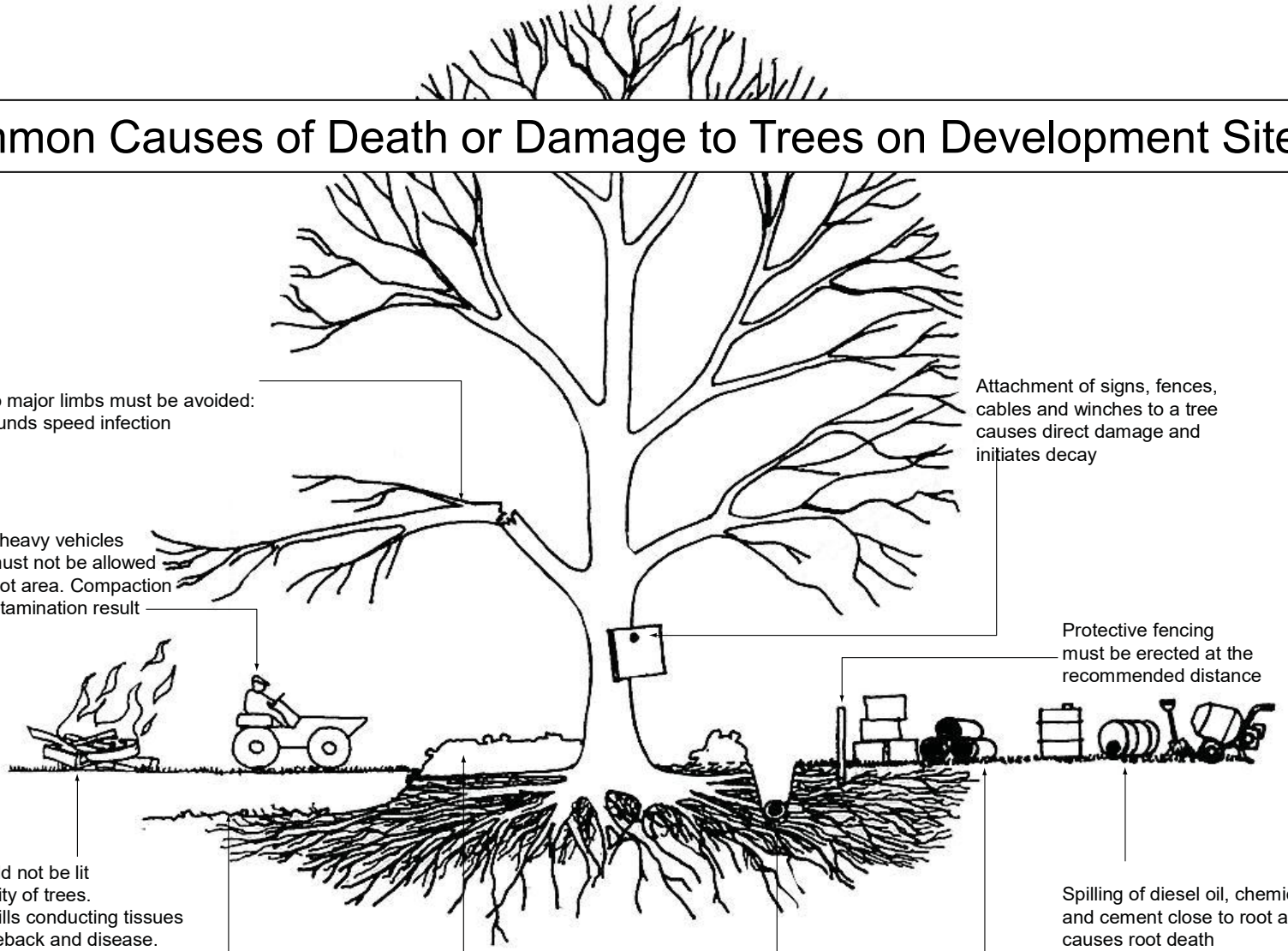
How many architects, planners and engineers know this?

Think: "Base of Wine Glass"



Some species can produce 'Dropper' or 'Sinker' roots during dry periods

Common Causes of Death or Damage to Trees on Development Sites



Damage to major limbs must be avoided: ragged wounds speed infection

Attachment of signs, fences, cables and winches to a tree causes direct damage and initiates decay

Parking of heavy vehicles and cars must not be allowed near the root area. Compaction and oil contamination result

Protective fencing must be erected at the recommended distance

Fires should not be lit in the vicinity of trees. The heat kills conducting tissues causing dieback and disease. The soil beneath is sterilized.

Spilling of diesel oil, chemicals and cement close to root area causes root death

Lowering ground levels severs roots causing severe dieback and instability

Raising ground levels even for only a few weeks and by only several centimetres can suffocate roots, causing severe dieback

Trenches dug within root areas may sever roots, causing instability and reduce longevity.

Storage of materials within root area causes compaction and root suffocation

BS 5837:2012: “Trees in relation to design, demolition and construction – Recommendations”

12 x stem diameter = root protection radius – this oak tree needed 12m radius protection

Existing trees that are retained need to be protected

Croydon Council now expect ALL trees to be retained

No Protective Fencing
Storage of Materials & Rubbish
Under Trees & Toxic Spillage

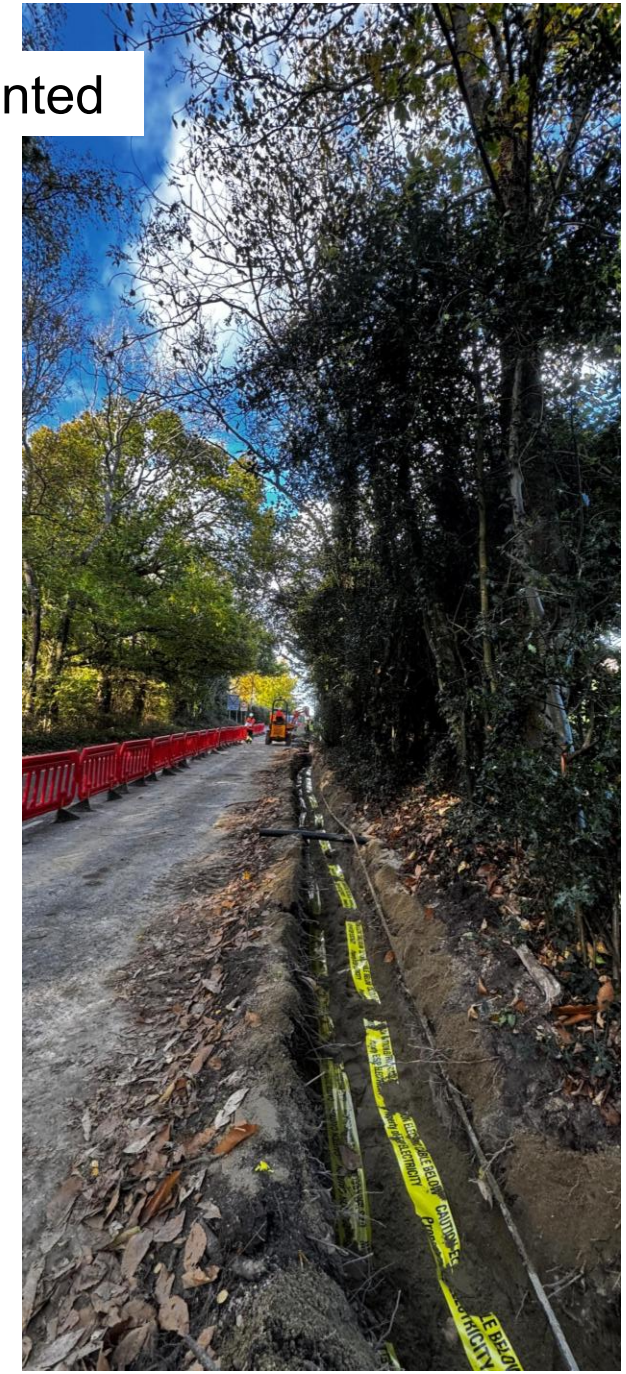
Kentucky, USA

Mechanical Trenching WITHIN the
Tree Protection Area
Inside the Tree Protection Fencing

Surrey, England

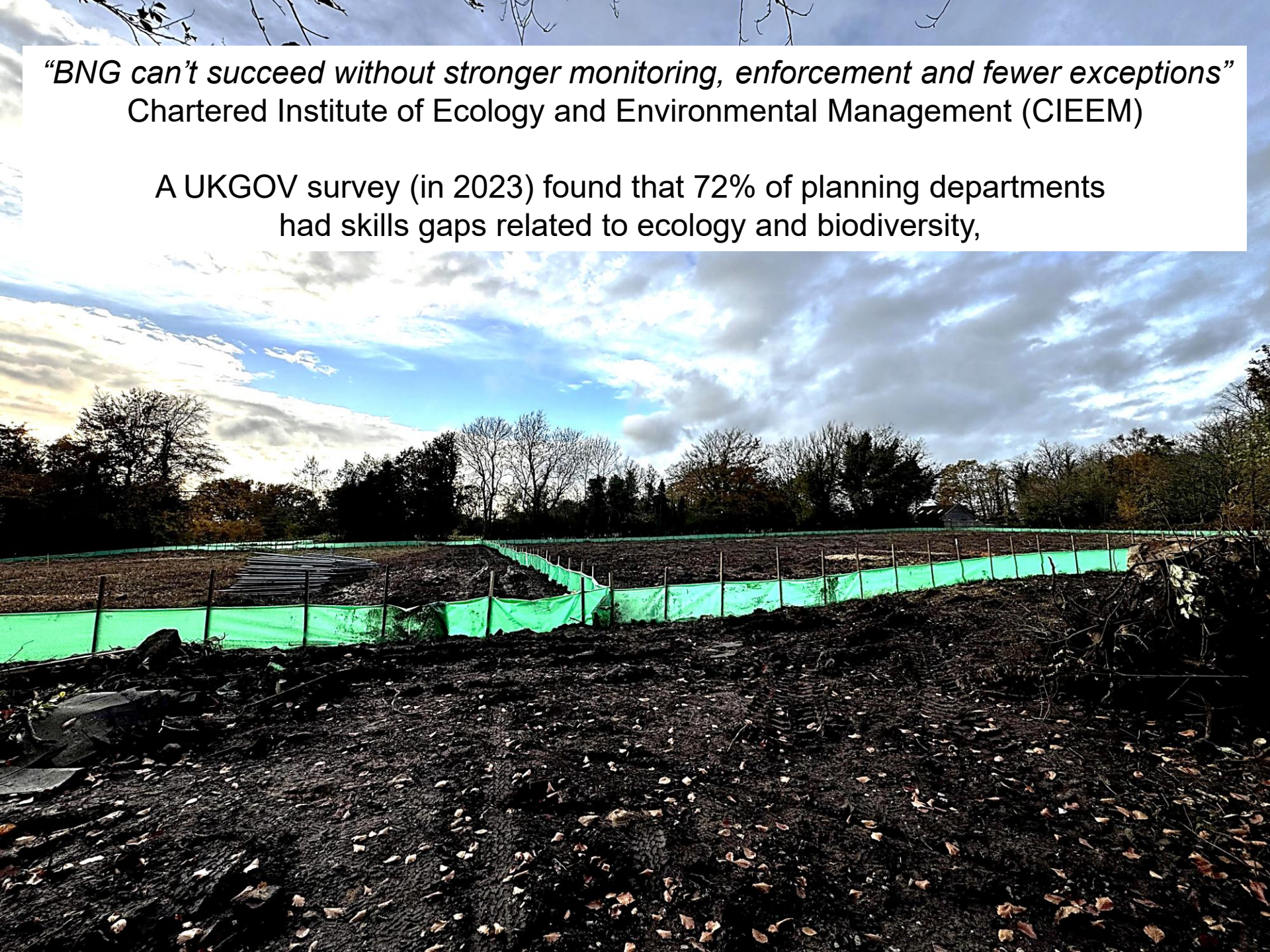
Three current/recent projects in Newick and North Chailey

No Project Arboriculturist Appointed



“BNG can’t succeed without stronger monitoring, enforcement and fewer exceptions”
Chartered Institute of Ecology and Environmental Management (CIEEM)

A UKGOV survey (in 2023) found that 72% of planning departments had skills gaps related to ecology and biodiversity,

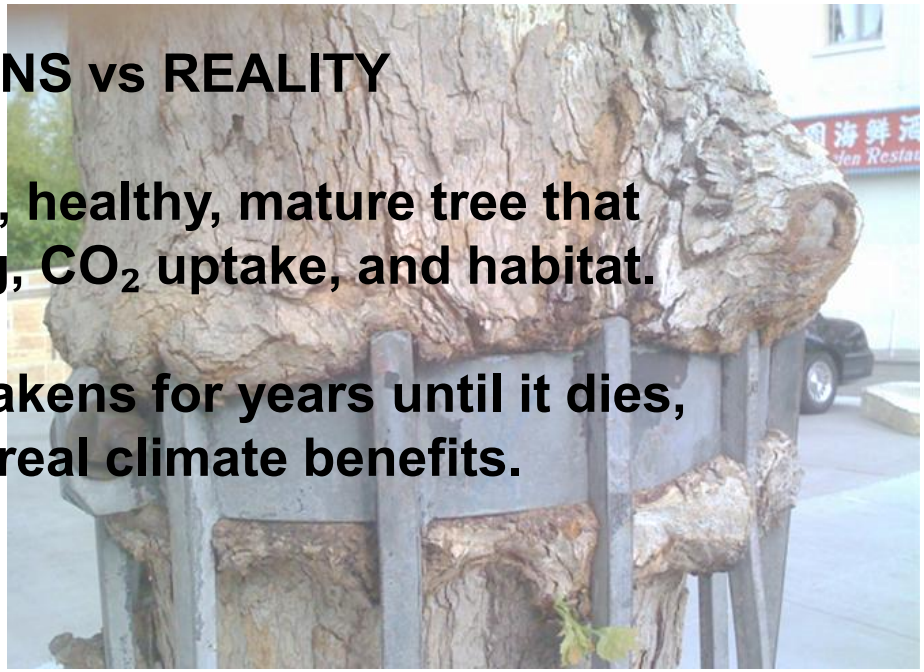


Chailey Heritage - Symptom Delay - 6 years after the contractors have left

Subsequent Road and Path works & Excavations + high winds

Haarlem, Netherlands

What is the average life expectancy of an urban tree?

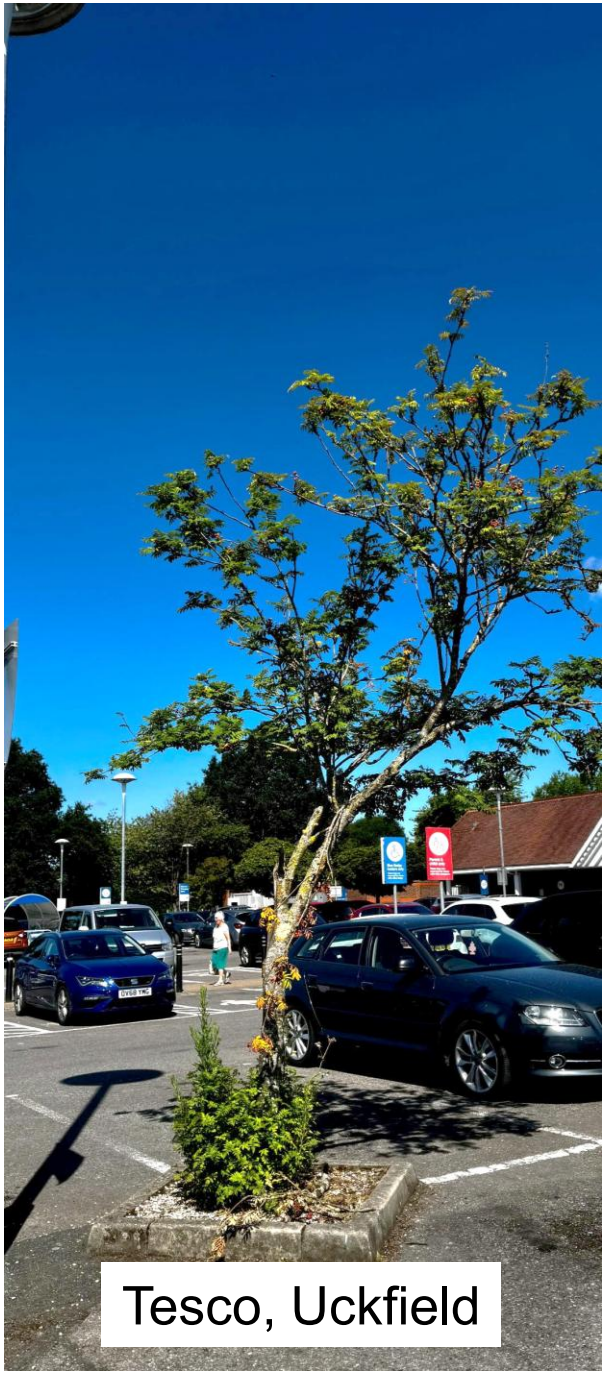


EXPECTATIONS vs REALITY

EXPECTATION: A large, healthy, mature tree that provides shade, cooling, CO_2 uptake, and habitat.

REALITY: A tree that weakens for years until it dies, without providing real climate benefits.

Supermarket Car Parks



Tesco, Uckfield

Tesco, Lewes

Tesco, Lewes

Trees
&
Assessing Tree Work Applications

Lewes Town Council – Planning Committee

October 22, 2024

Peter Thurman
www.thurmanconsultancy.com

CASE STUDY 2
SDNP/24/03117/TCA
St Pancras Vicarage, Irelands Lane, Lewes BN7 1QX

Description:
T1 - Pine - Fell
T2 - Hazel - Pruning/coppicing

Dates:
Received :
Tue 30th July 2024

Validated :
Tue 30th July 2024

Received:
Application Form
Plan

Street View Screenshot - No photographs were provided

“ Fell tall pine tree. Root ball moves in windy conditions. At risk of falling and causing damage to surrounding structures. Excess shading. Replacement not proposed to allow improved use of garden”.

My Comments on this Application:

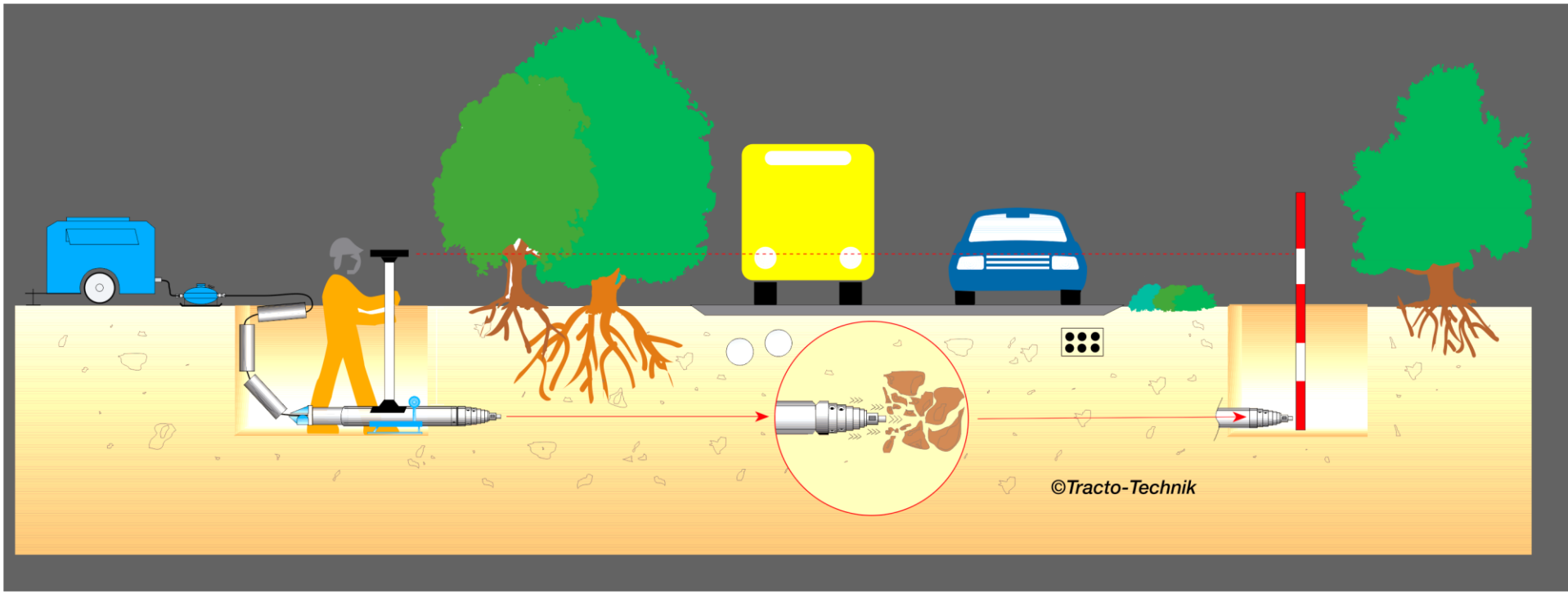
- Conifer is highly visible - so has high amenity value
- No expert report to assess and confirm the alleged instability of the Cypress
- Plan appears to be inaccurate – location of the tree is incorrect
- Conifer is a Cypress – not a Fir or Pine
- No photographs provided

Some Development Site Solutions Near Trees

Temporary Ground Protection Matting

Excavation by hand and air spade

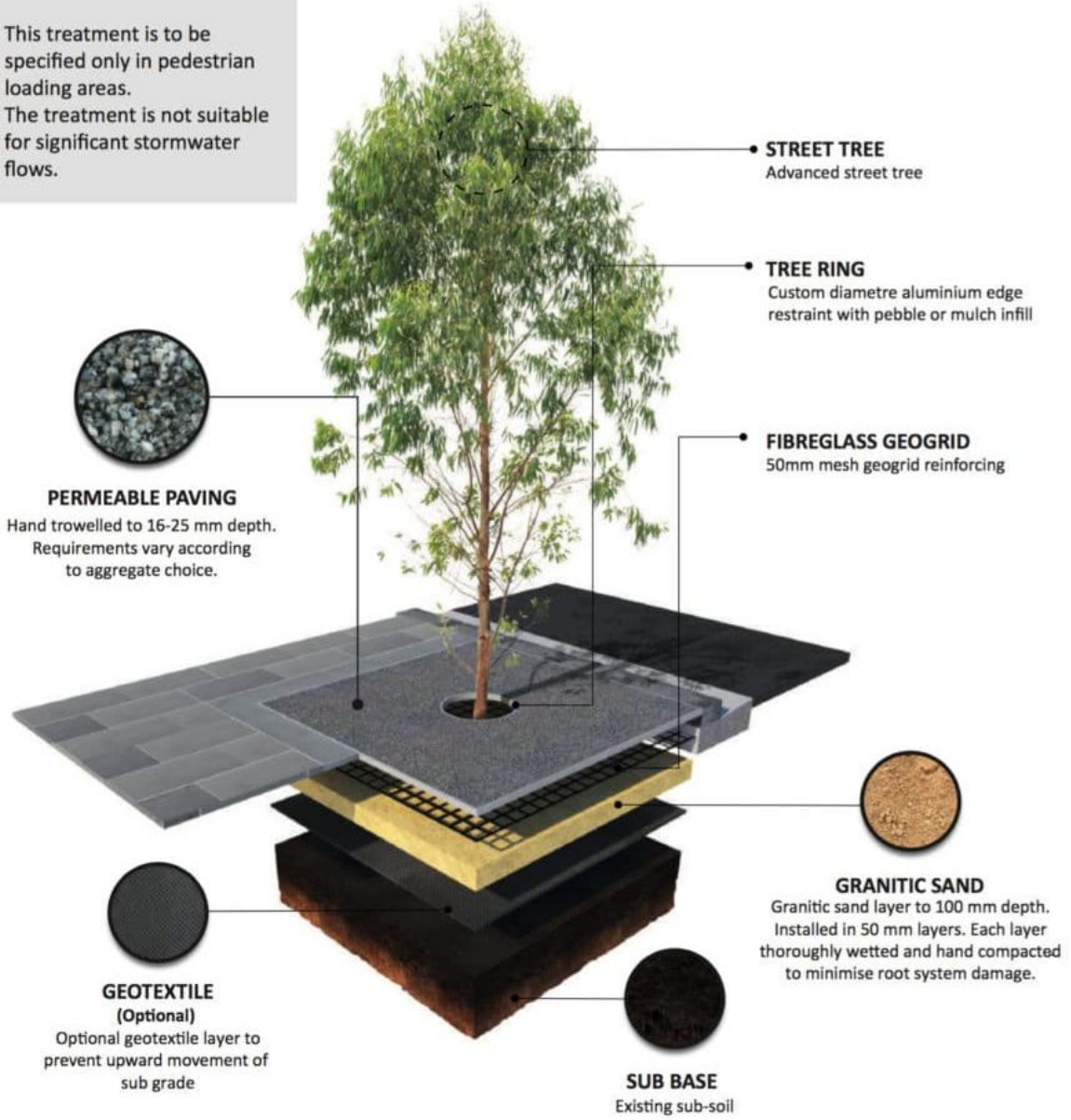
Trenchless Moling for Underground Utilities



Porous / Flexible Paving
e.g. Tarmac or Resin-Bonded Gravel

Treatment Application

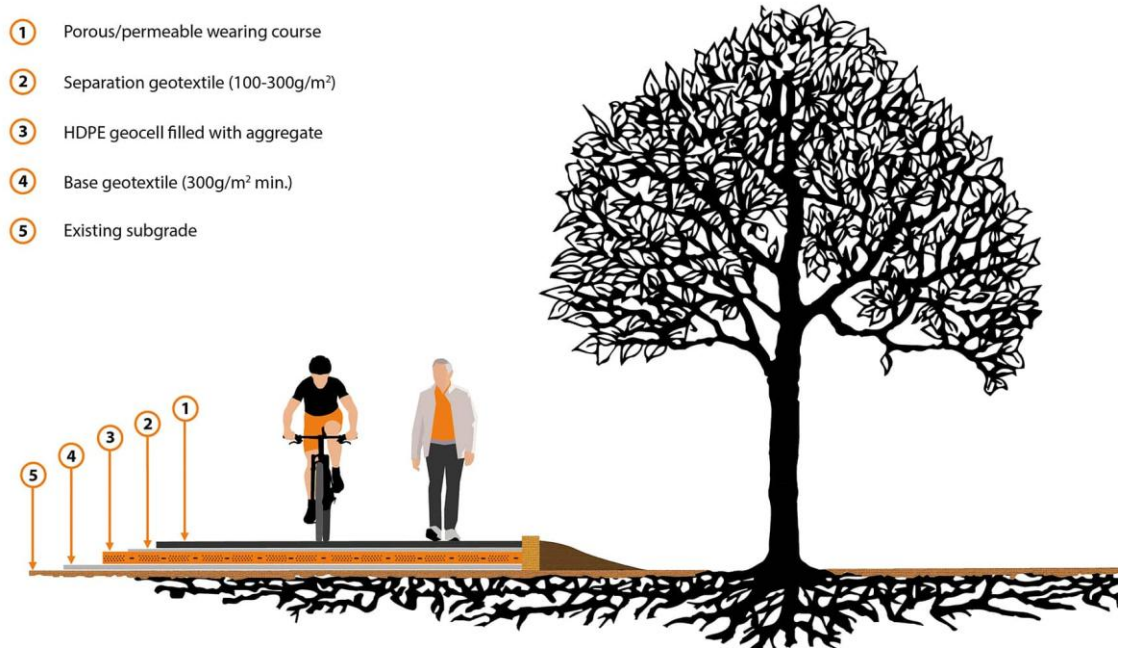
- This treatment is to be specified only in pedestrian loading areas.
- The treatment is not suitable for significant stormwater flows.



Cellular Confinement Systems (CCS)
No dig construction near trees

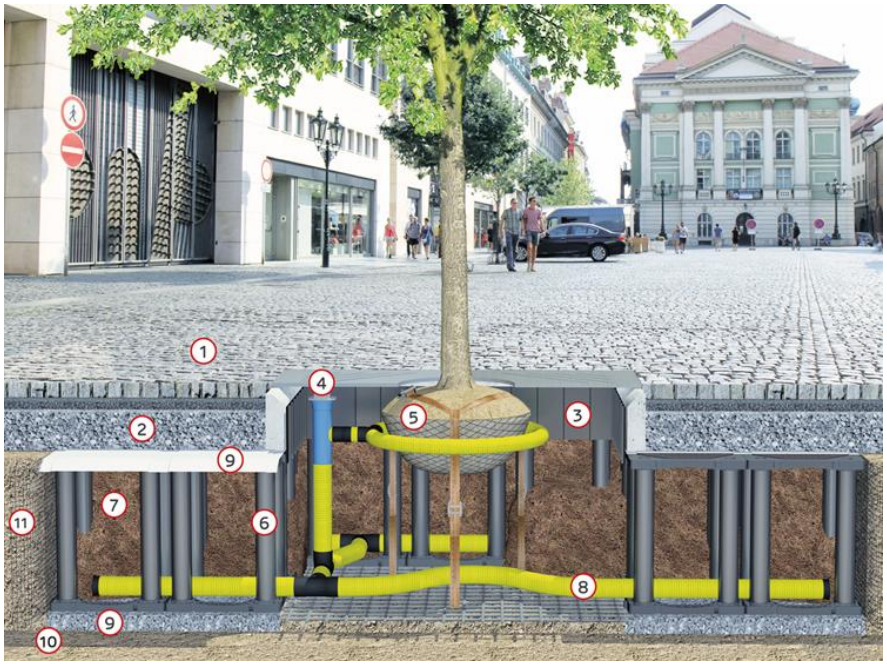
Minimal excavation – a surface scrape
Porous / permeable surface and sub-base
No root severance
No compaction
Allows gaseous exchange: O2 in and CO2 out

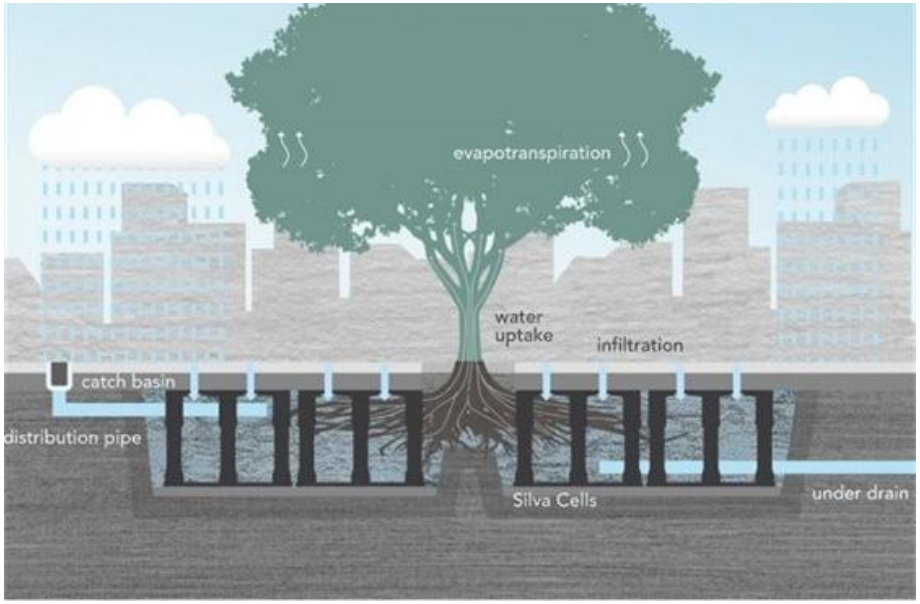
Surface finish can be
porous tarmac
or brick paving with
porous/open joints



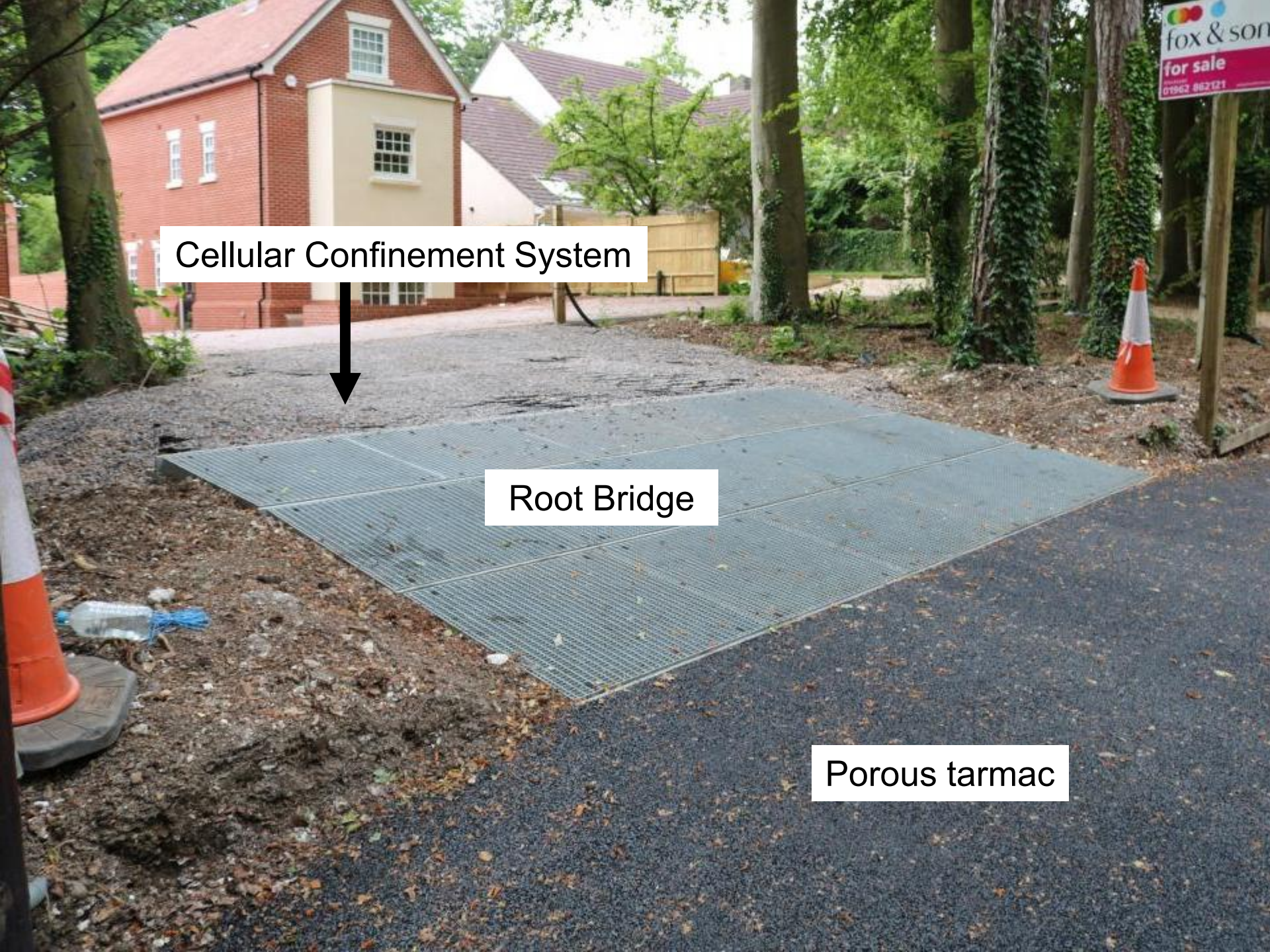
CORE TRP®

Loadbearing ‘Soil Cells’ filled with soil to extend Rooting Space under Hard Surfaces





Tree ‘Root Bridges’ that straddle roots – minimal dig on mini piles


Cellular Confinement System
Root Bridge
Porous tarmac
for sale


Good Tree Selection
Catalpa bignonioides 'Nana' – but right for here?

Out of 5-7 years of study, Landscape Architects learn about plants for around 3 months

Part of a Planting Schedule for a proposed residential courtyard

A rare North American shrub only available from one specialist nursery in the UK

Bramble – not available as a tree

Short-lived, invasive pioneer species

Small Trees and Shrubs	
Carpinus betulus	Hornbeam
Cretagus monogyna	Hawthorn
Cornus sanguinea	Common Dogwood
Cornus racemosa	Grey Dogwood
Corylus avellana	Common Hazel
Prunus spinosa	Blackthorn
Ribes nigrum	Blackcurrant
Rubus fruticosus 'Loch Ness'	Blackberry 'Loch Ness'
Rubus fruticosus	European Blackberry
Salix caprea	Goat Willow
Salix cinerea	Grey Willow
Salix purpurea	Purple Willow
Salix viminalis	Common Osier

for tree locat

Trees for the Future

What Trees?

- Non-natives that are Resilient
- Those considered Tender and described as ‘Conservatory Plants’ in books
- Forgotten or Neglected species only growing in a few collections
- Species only previously collected from a Small Part of their Natural Range
- More species from Suitable Regions and habitats such as the Caucasus and Central and South America


Caucasus
KAZAKHSTAN
Caspian Sea
RUSSIA
North Caucasus
Abkhazia
Sukhumi
Black Sea
South Ossetia
Kutaisi
Tskhinvali
GEORGIA
Tbilisi
Batumi
N
Shaki
Gyumri
TURKEY
Ganja
Sumgait
Baku
ARMENIA
AZERBAIJAN
Yerevan
200 Kilometers
Nakhchivan (Azer.)
Nakhchivan City
Lankaran
IRAN
200 Miles

Thank You for Listening


Phoenix canariensis [Canary Island Date Palms]
Outside the Town Hall in Hackney. Int.1860s
277
ATOMIC BLONDE
BAR

Radermachera sinica – the “China doll” plant

Native to the subtropical mountain regions of southern China and Taiwan

Hackney
North Central London

Ex – Houseplant?

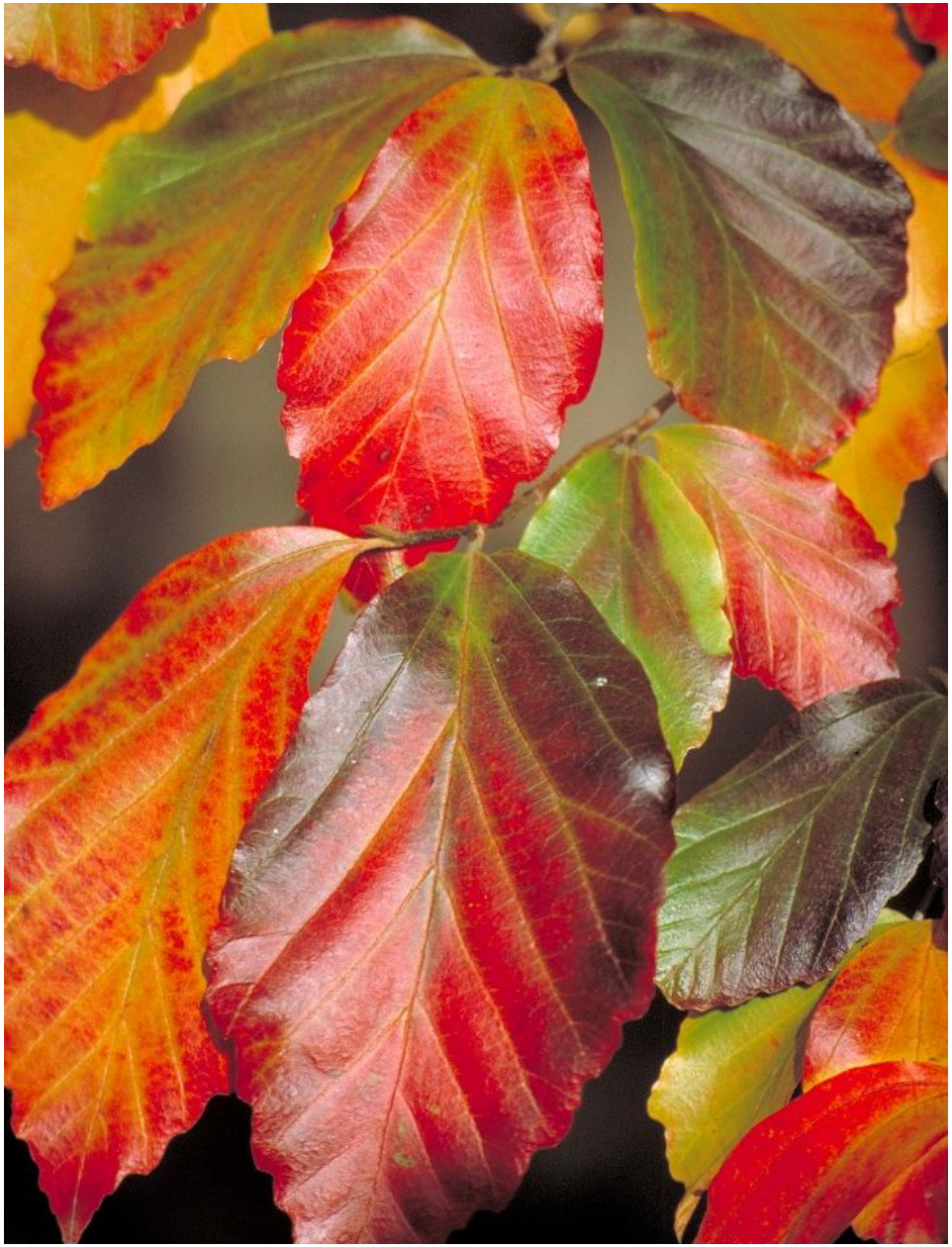
Araucaria heterophylla
"Norfolk Island Pine"

Endemic to
Norfolk Island

Ex-houseplant
London SW1

Araucaria heterophylla “Norfolk Island Pine” Endemic to Norfolk Island

Parrotia persica ‘Vanessa’ N. Iran and the S. Caucasus. Int. 1840



x Chitalpa tashkentensis

A hybrid of Catalpa and Chilopsis (both American natives). Bred at the Uzbek Academy of Science in Tashkent, Uzbekistan, in the 1960s. Introduced into Europe and internationally in the 1970s.

Carpinus fangiana
SW China. Int.1992

Quercus castaneifolia
Caucasus & Iran. Int.1846

Styphnoloium japonicum SE. China Int. 1753

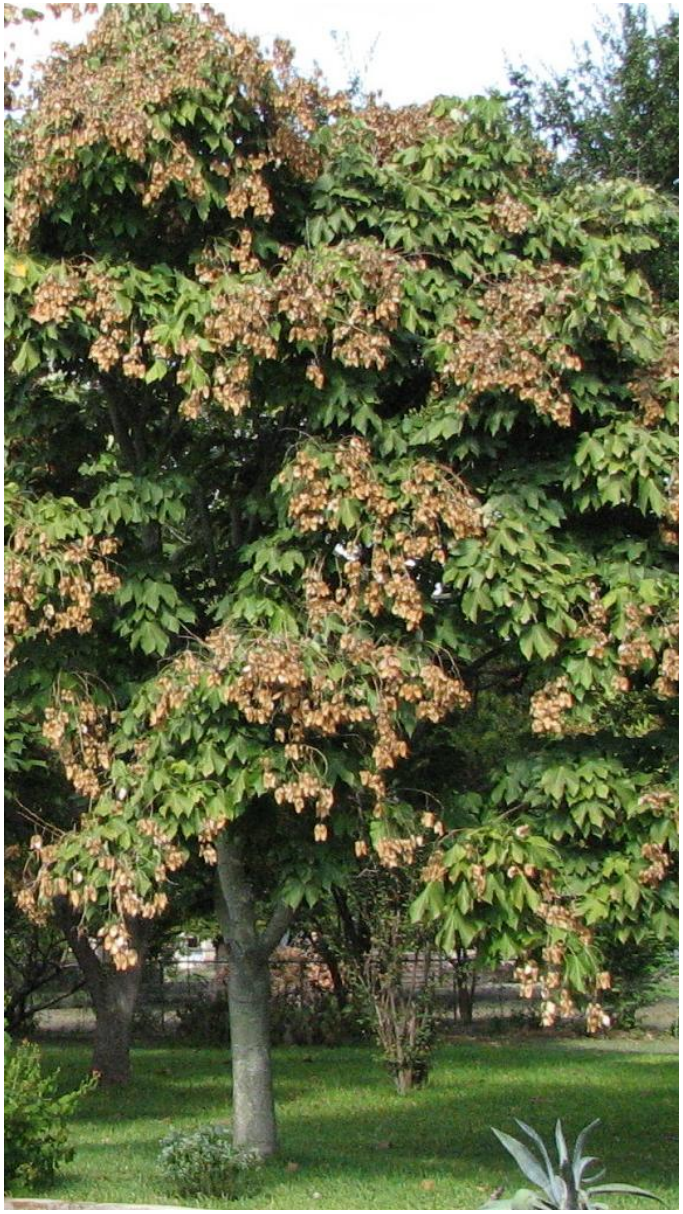
Columnar forms of long-lived species – for tighter spaces

Quercus robur ‘Fastigiata’

Ginkgo biloba ‘Fastigiata’

Firmiana simplex

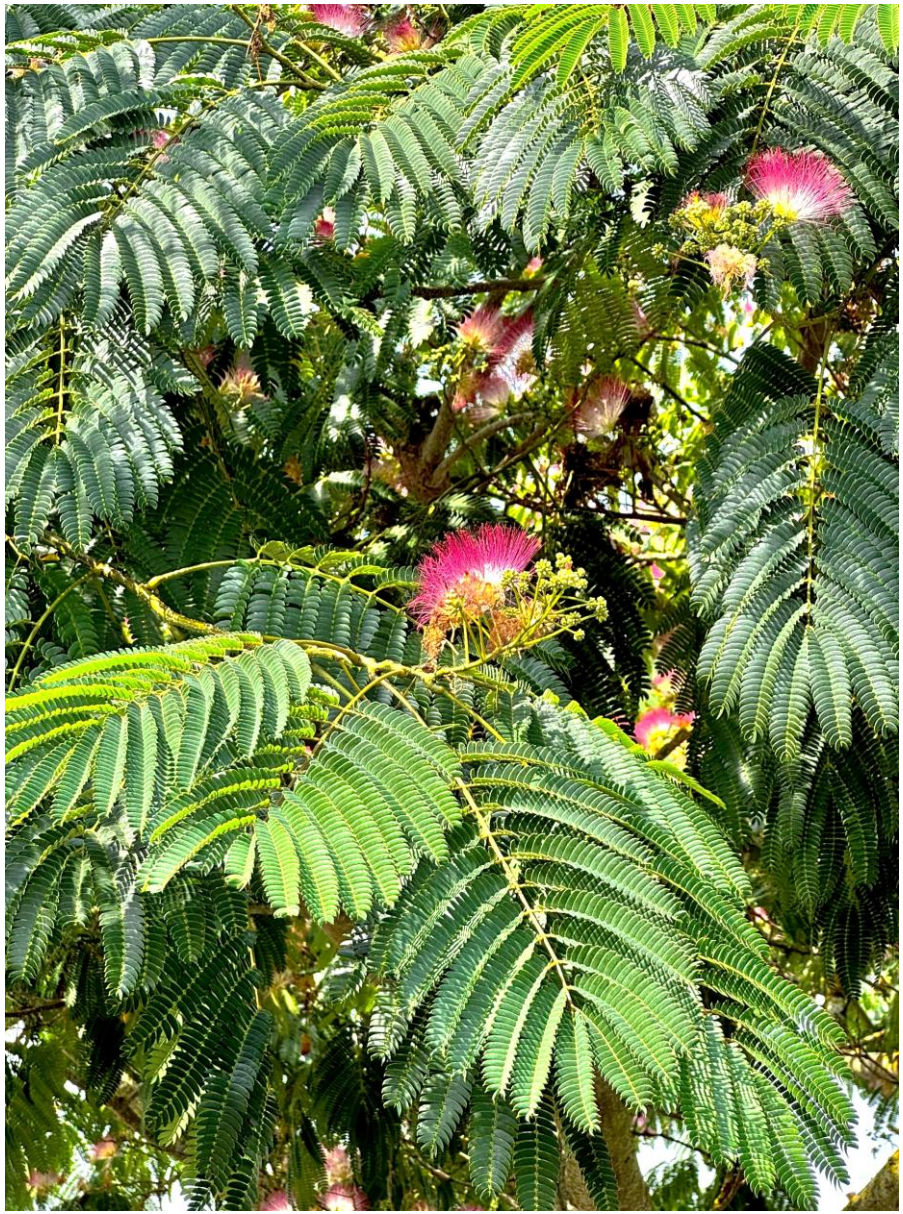
Native to S. China, Japan, and SE Asia. Int.1757



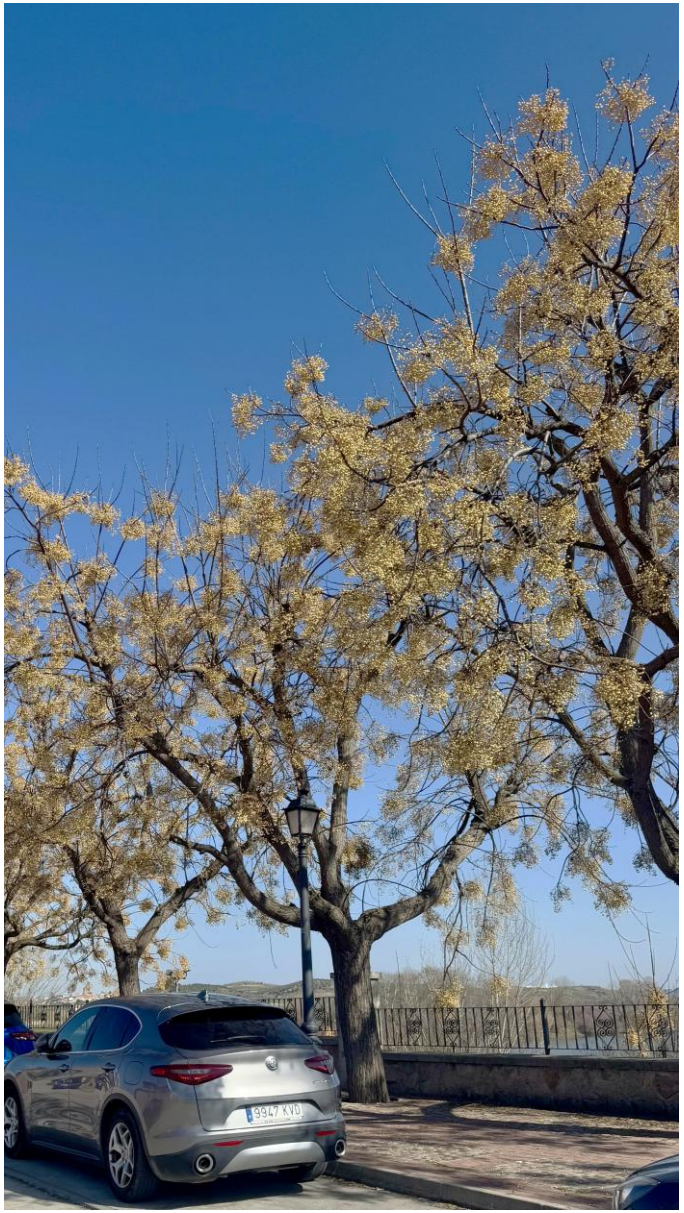
Acer monspessulanum S. Europe & W. Asia. Int. 1739

Lagerstroemia indica China, Korea, Japan and India. Int. 1759

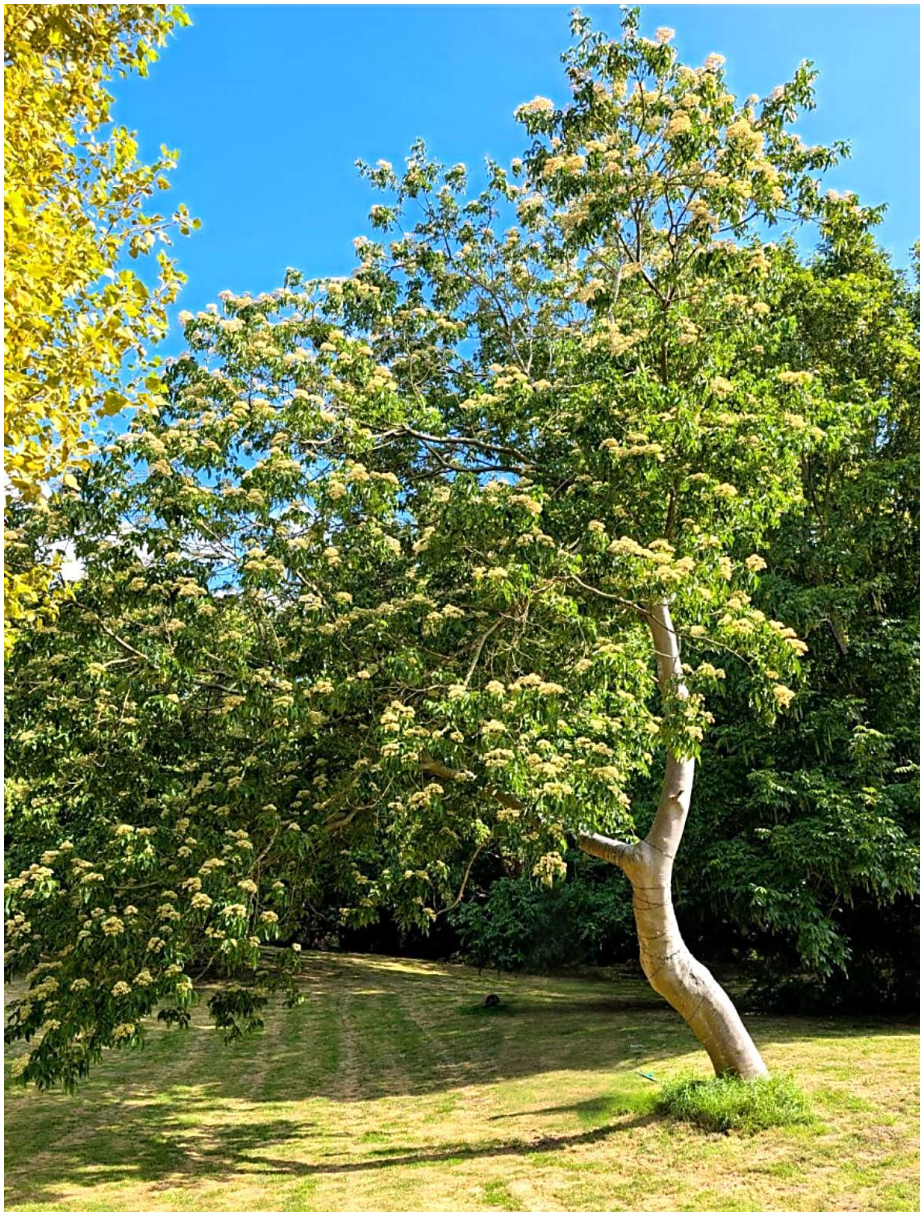
Albizia julibrissin, Persian silk tree. SW. and E. Asia. Int.1850s



Melia azedarach Indomalaya & Australasia. Int.16th C



Tetradium danielii The Bee Bee tree. China & Korea. Int. 1908



Some trees to avoid…?

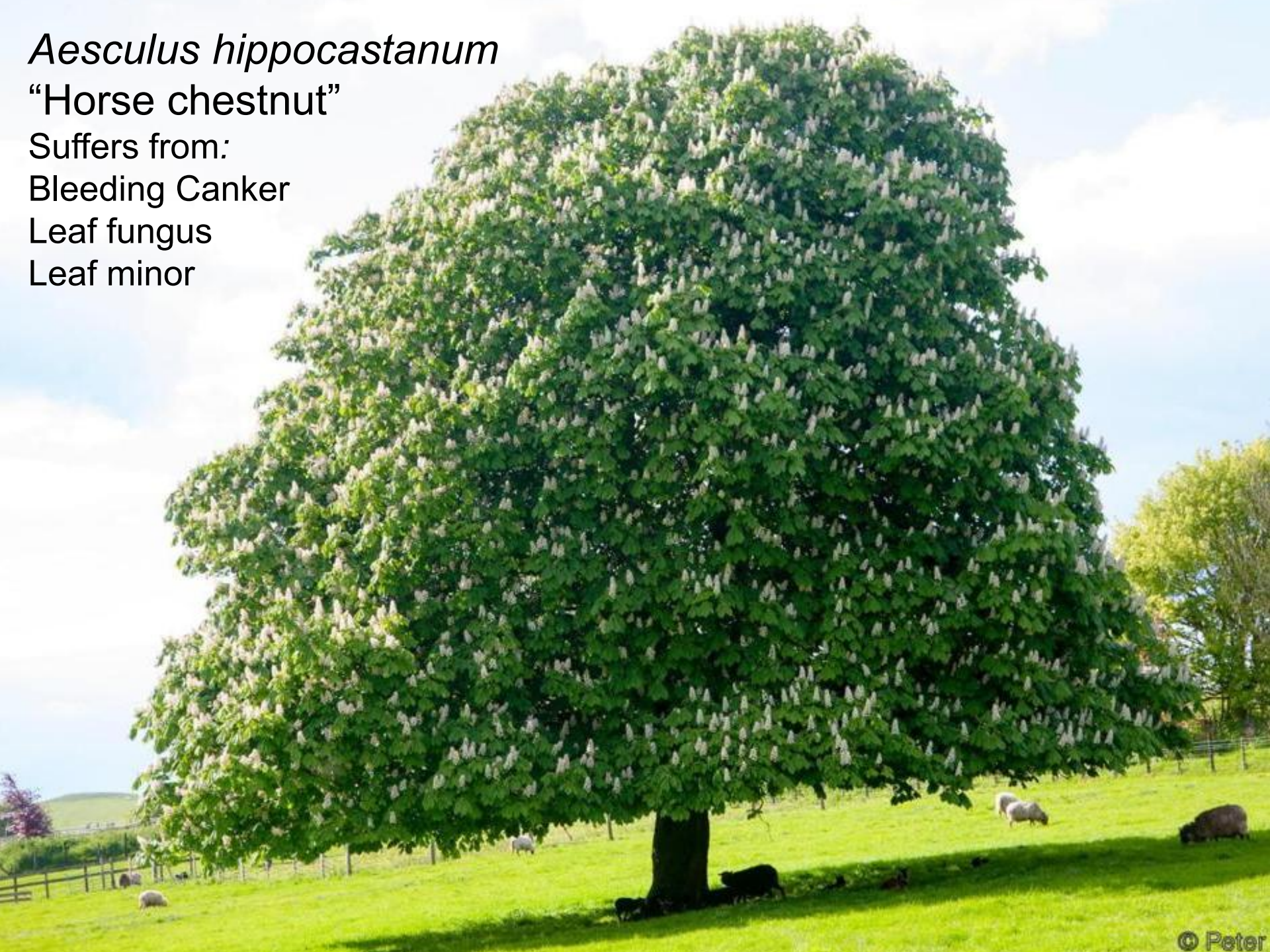
Gleditsia species, “Honey Locusts”, Central N. America

Fruiting Trees in Streets - NO?
Community Orchards in Parks - YES?

Oranges in Spain

Crab Apples in the USA


Ailanthus altissima, rapid growth, invasive & toxic mulch chips


Aesculus hippocastanum
"Horse chestnut"
Suffers from:
Bleeding Canker
Leaf fungus
Leaf minor
© Peter

Weak branch attachments – prone to failure
Fraxinus angustifolia oxycarpa ‘Raywood’


Leaf Reversion - *Acer platanoides* ‘Drummondii’

Overused because they are easy to propagate and therefore cheap

Betula pendula
Native, short-lived pioneer, dislikes pruning

Pyrus calleryana ‘Chanticleer’
Low water-demand tree used near (NHBC) houses with one metre footings

Purple leafed trees – ‘black holes’ in the shade or if the sun is behind the tree?

Use sparingly