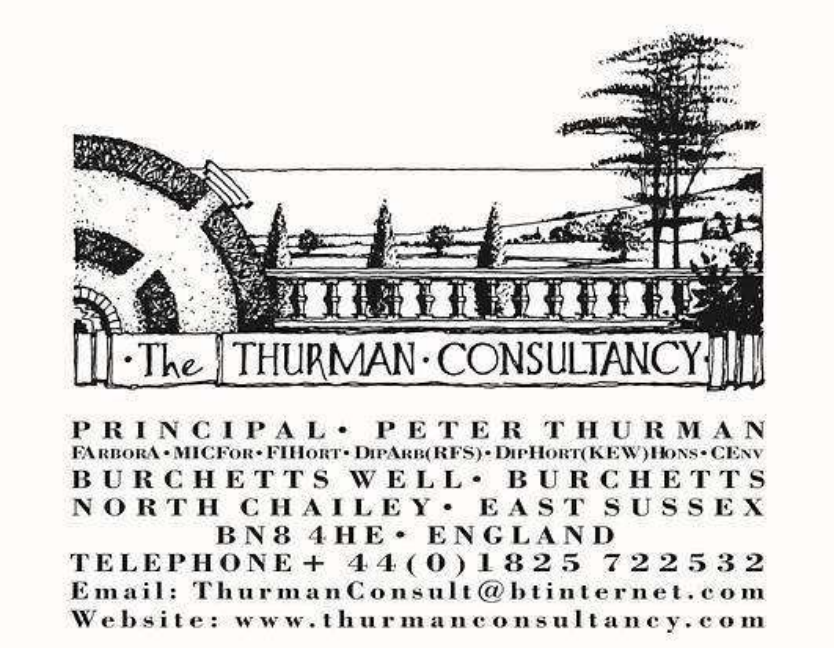



# Various Stuff!

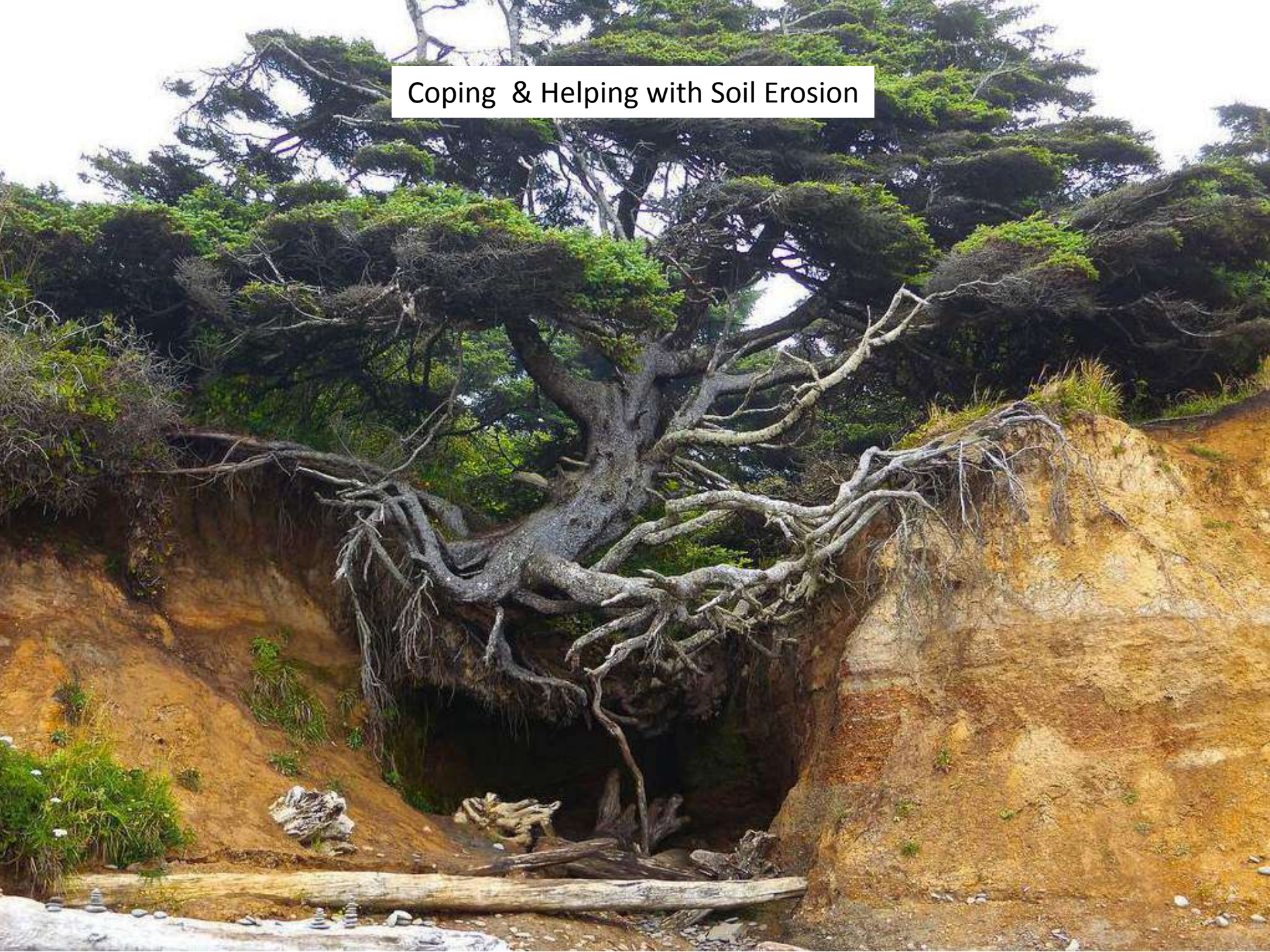
Peter Thurman

*thurmanconsult@btinternet.com*

# Some Notes On:

- The Tenacity of Trees
- Some Benefits of Trees
- Trees and Culture
- Some Threats to Trees + Some Solutions
- Biosecurity
- Biodiversity
- Tree Planting & Aftercare
- Some Trees to Avoid
- New trees to Consider?

# The Tenacity of Trees


Coping & Helping with Soil Erosion


Moving Concrete
St Jose, USA

Chinese privet
(*Ligustrum lucidum*)

Clipped hard
every 4 years

“Planting the Space”

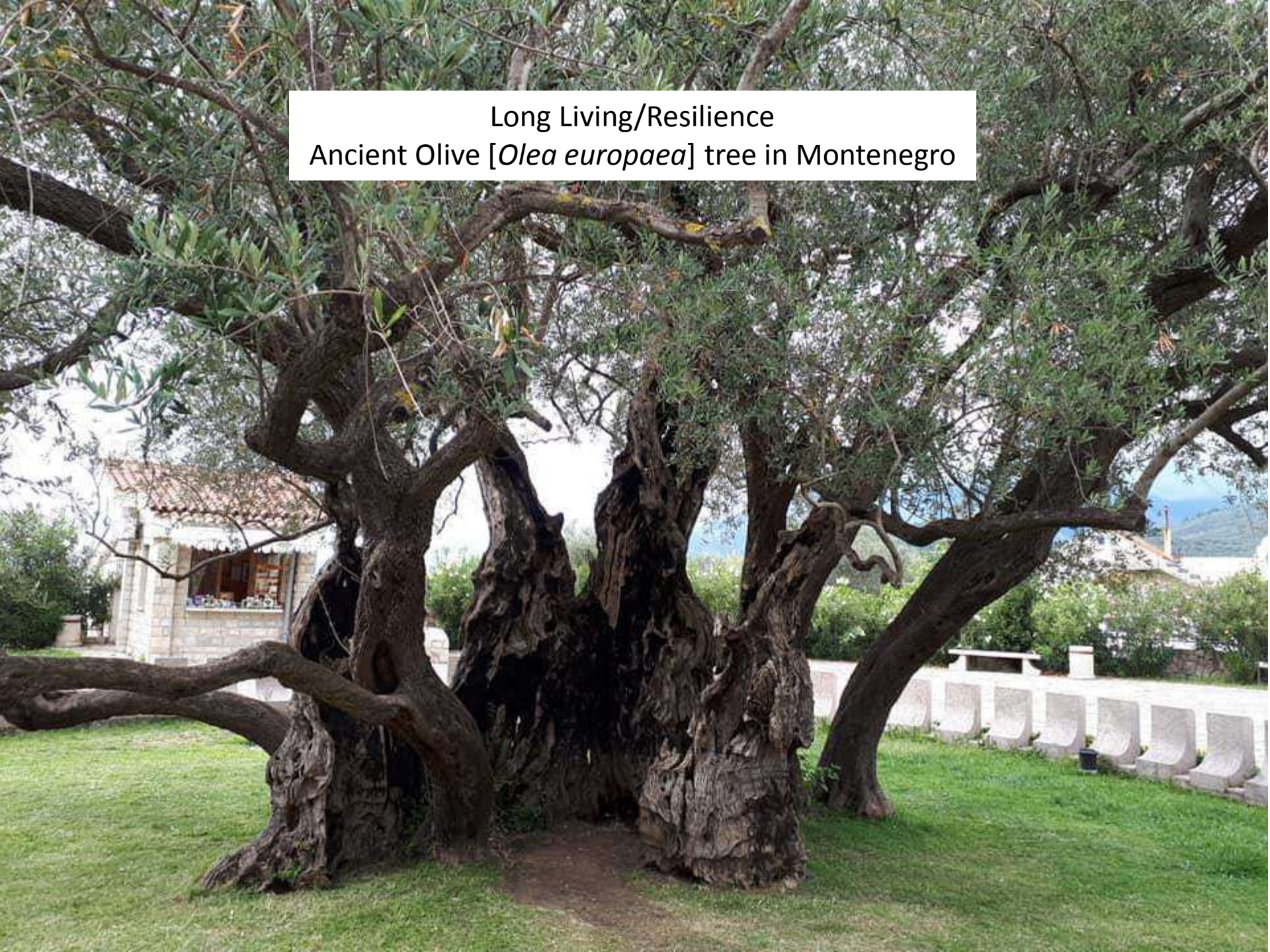
Orvieto, Italy

Proliferating root growth
*Tetrameles nudiflora* at Ta Prohm Temple in Cambodia


Hong Kong
Chinese banyan
*Ficus microcarpa*

Looking for oxygen and trying to get rid of carbon dioxide but seeking moisture in the paving joints - Hong Kong

Tolerance of Very Low Ground and Air Temperatures [here = Bavaria]


Long Living/Resilience
Ancient Olive [*Olea europaea*] tree in Montenegro

High wind / exposure
Trees adapt, evolve and survive – Phenotypic and Genotypic adaptation

...but not always...

“Base of a Wine Glass root systems”

# Benefits

Why do we plant trees?

- **Aesthetics**

Their attractive visual appearance – Decoration and Ornament

- **Oxygen!**

The Air that we Breathe

- **Architecture and Landscape Design**

Framing, Screening, Shelter, Unifying, Softening, Space Division, Green Mass and Infrastructure

- **Engineering**

SUDS, Canopy Cover, Climate and Pollution Amelioration, Soil Stabilisation, Erosion Control

- **Cultural/Historical/Educational**

Linking the past with the present and the future, Social Traditions

- **Wildlife**

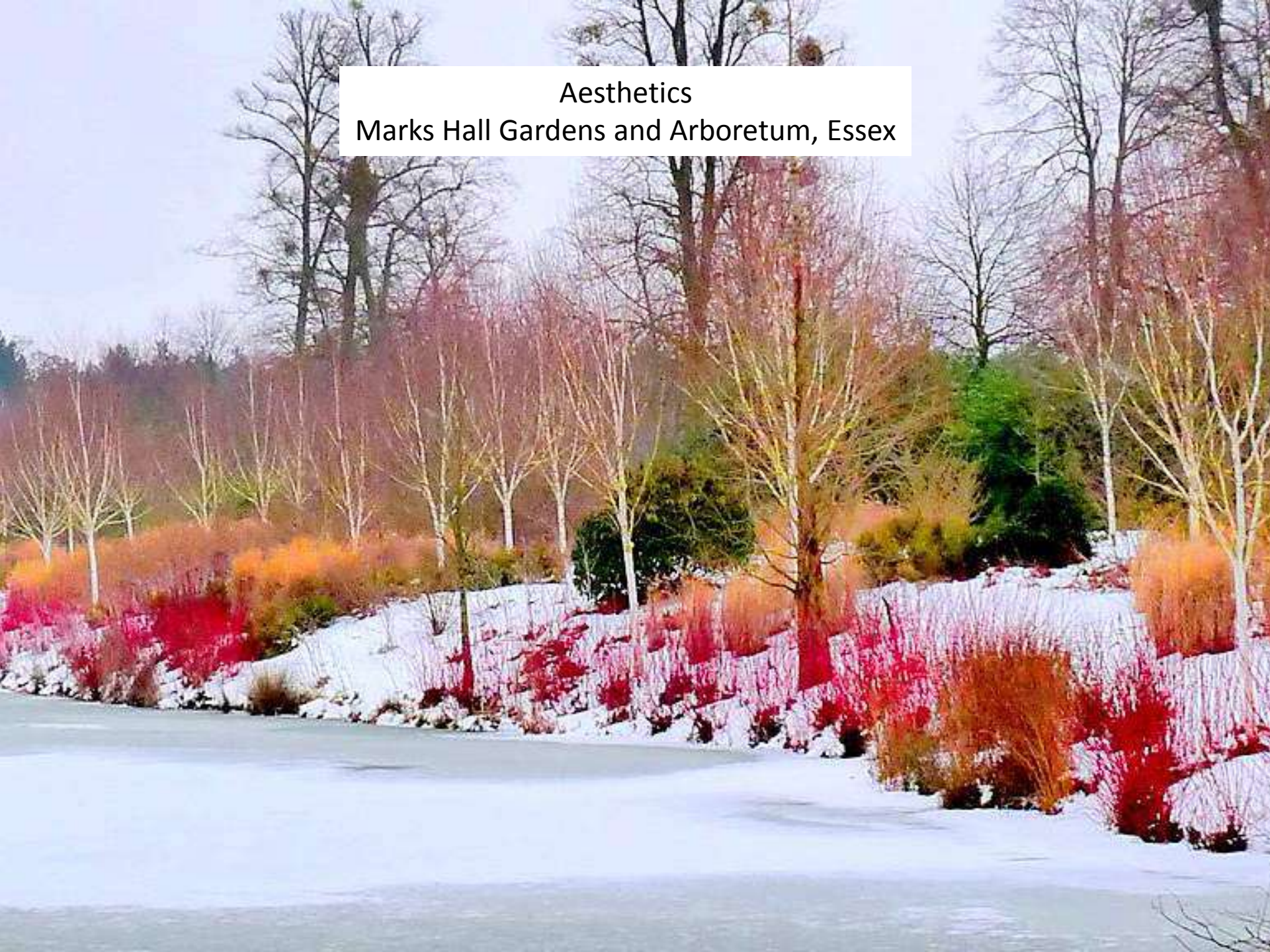
Biodiversity and Flora, Fauna & Habitat Conservation

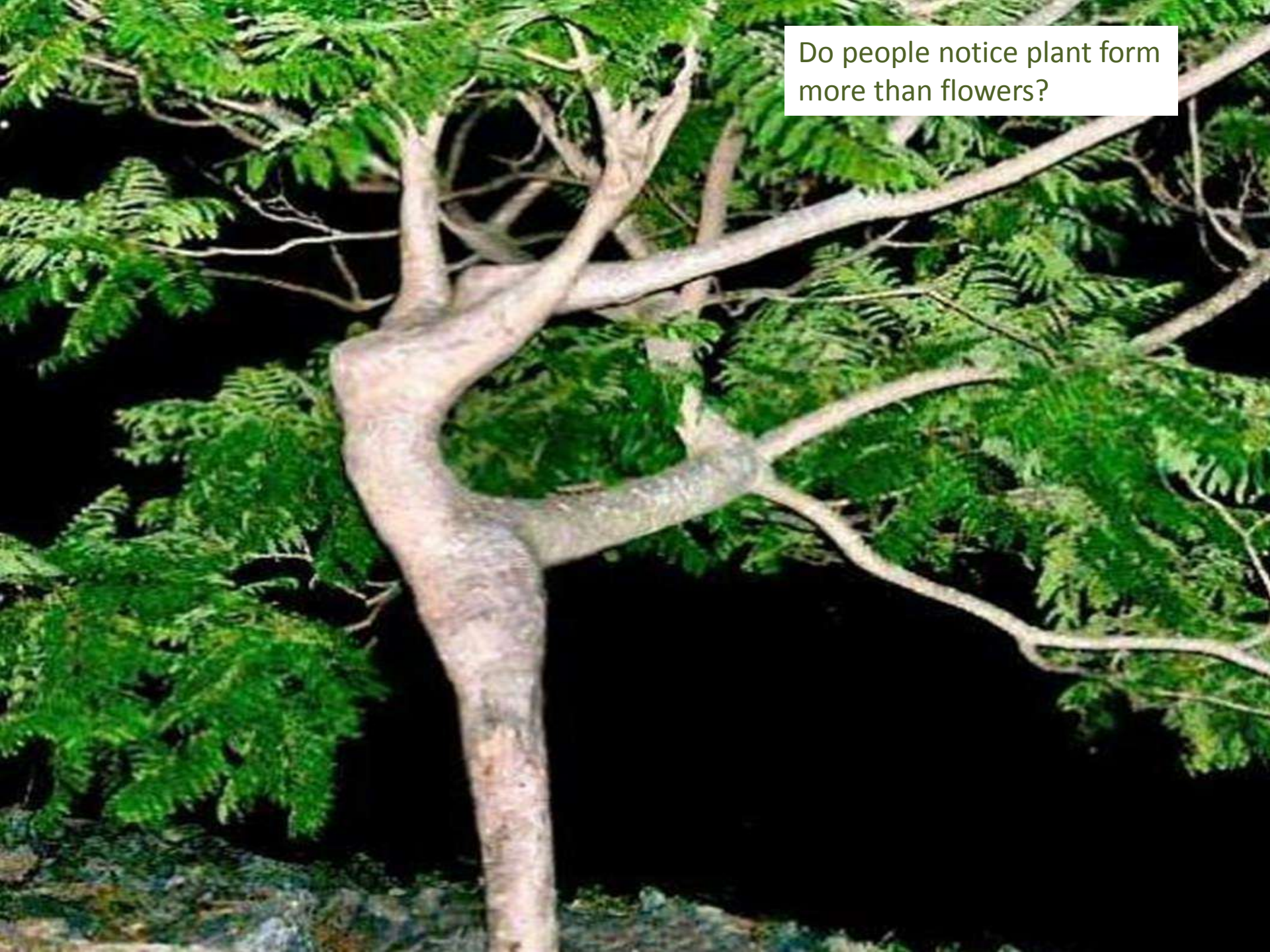
- **Well Being and Recreation**

Contributing to the Mental and Physical Health & Happiness of humans - Biophilia

- **Economic**

Added-value to properties and districts, Energy conservation, Bio-Fuels, Timber and many other Bi-products

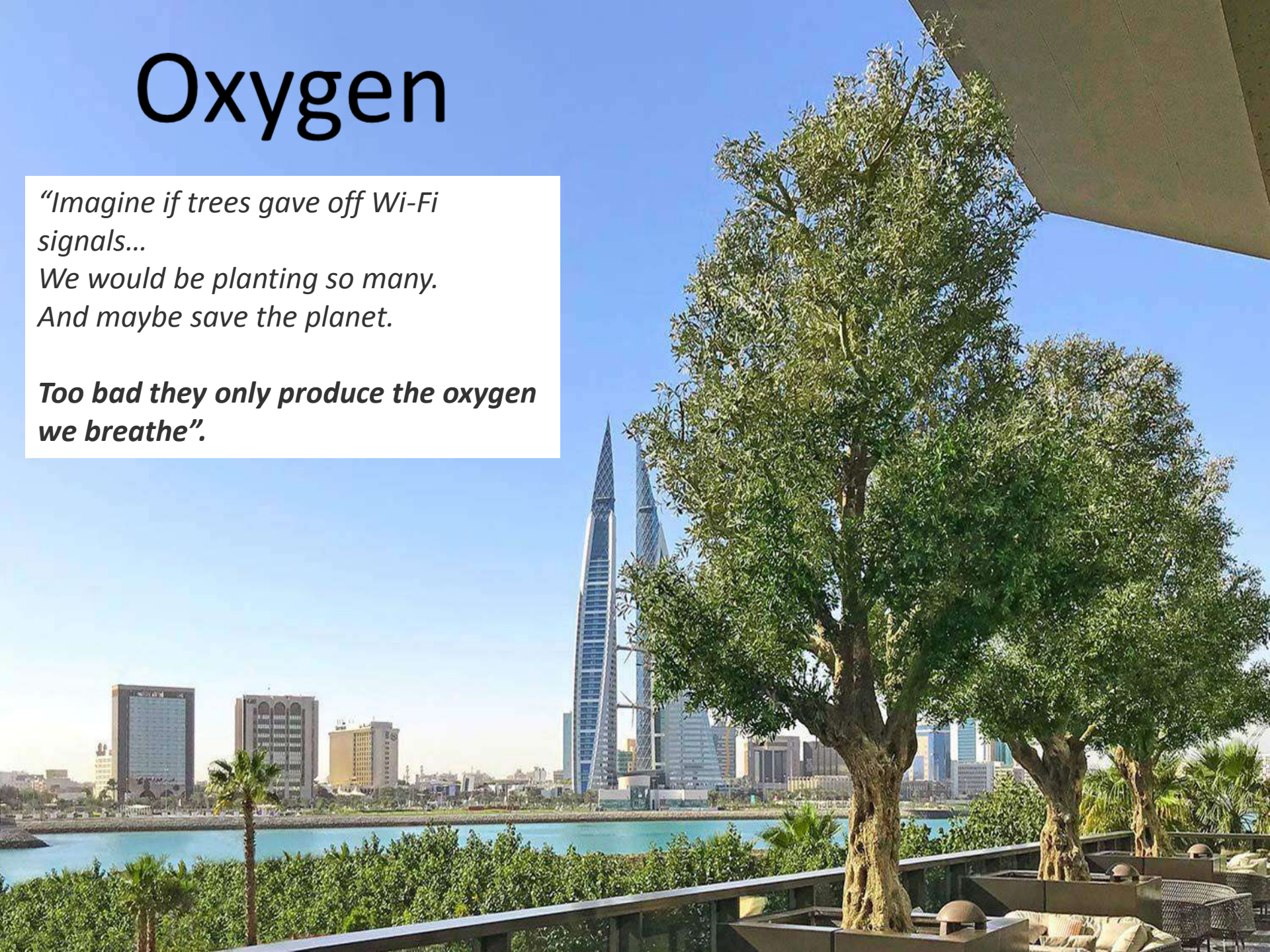

Aesthetics
Marks Hall Gardens and Arboretum, Essex


Do people notice plant form more than flowers?

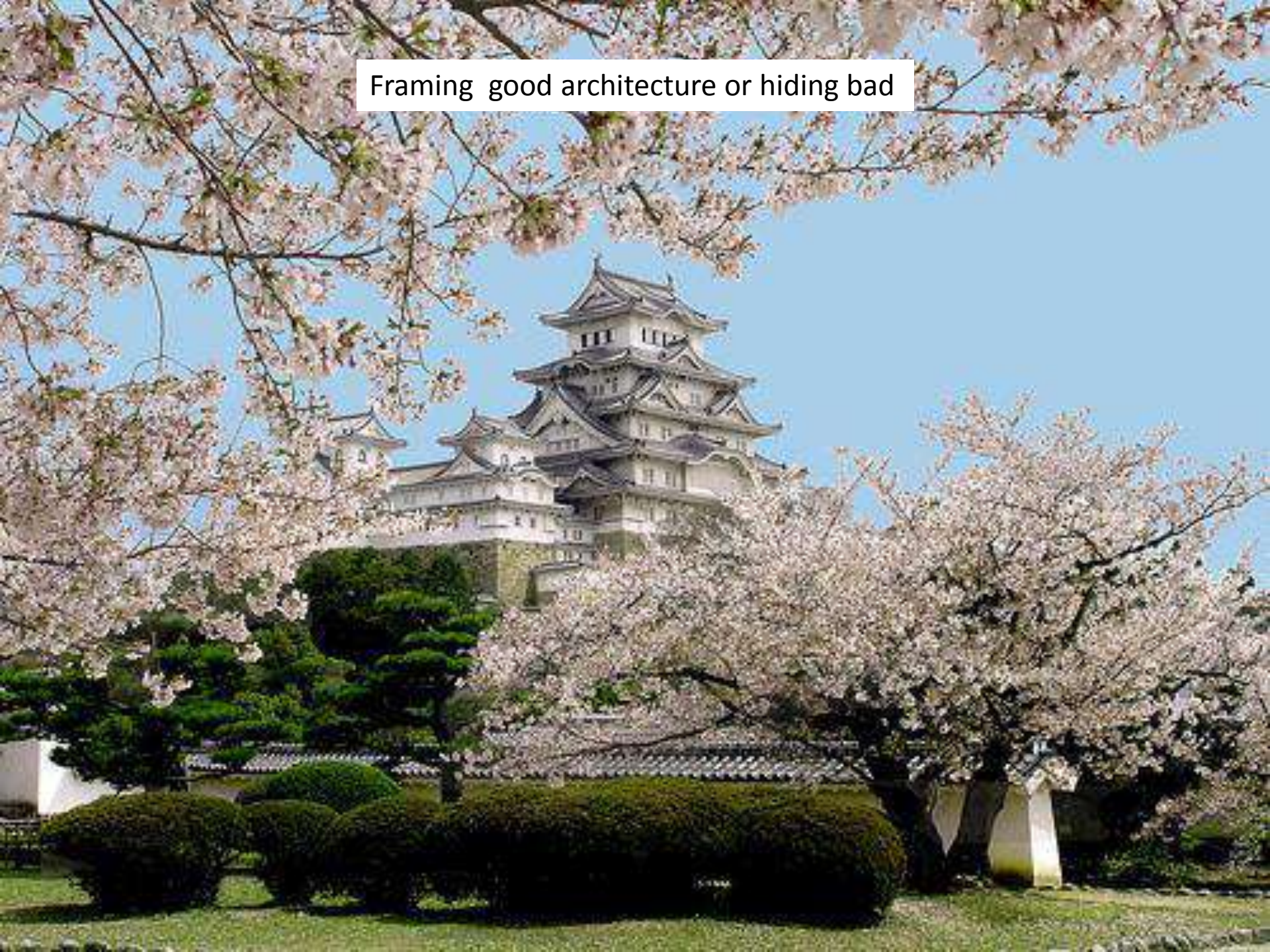
# Oxygen

*“Imagine if trees gave off Wi-Fi signals…*
*We would be planting so many.*
*And maybe save the planet.*

***Too bad they only produce the oxygen we breathe”.***




Central Park, New York
The ‘lungs’ of the city


Framing good architecture or hiding bad

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

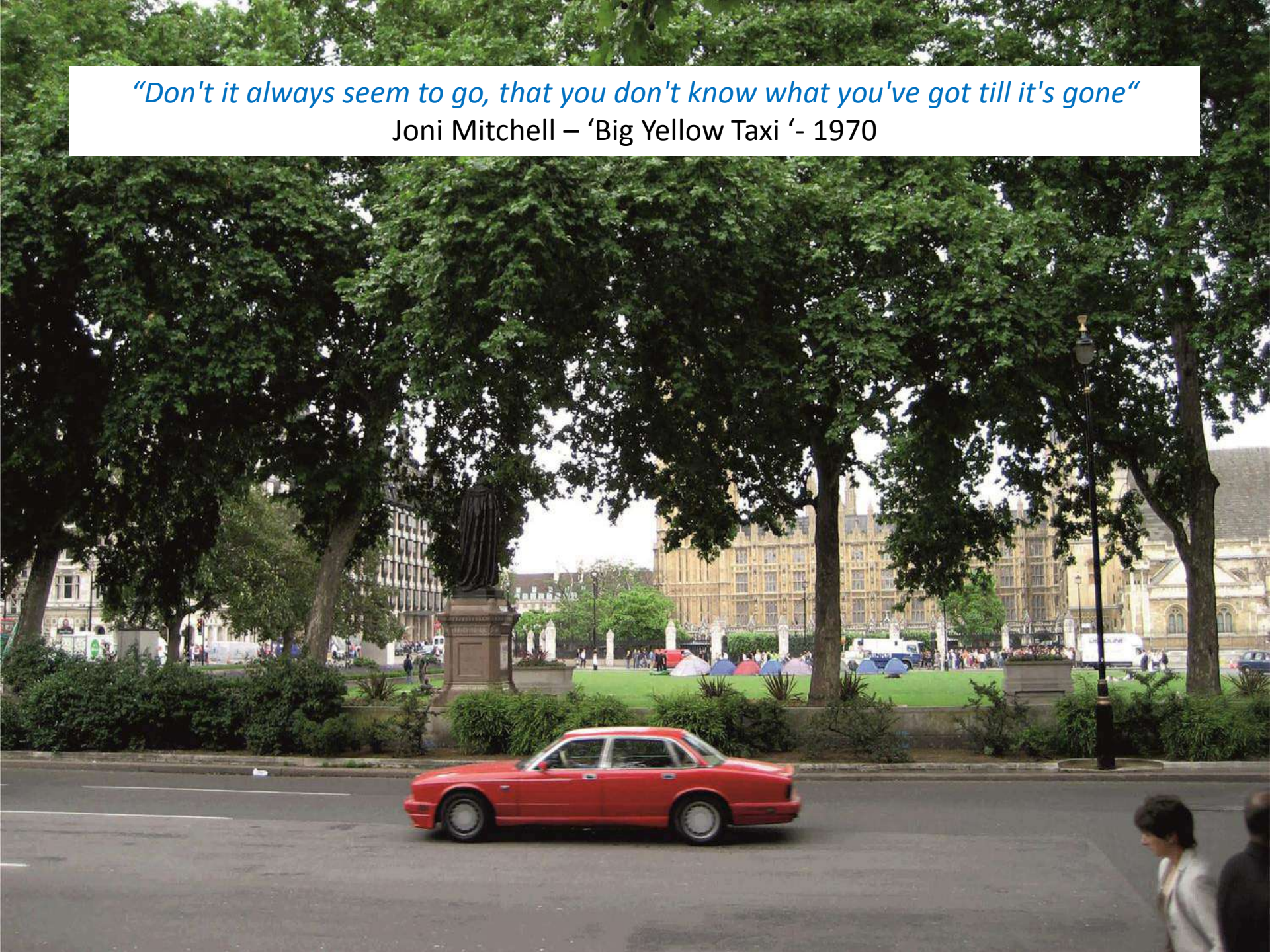
Trees provide a unifying and connecting link of similarity in cities, towns parks & gardens


They increase property values and save on energy costs
Rainham Village Dry Cleaners
Peter Jones Bookmakers


Clipped Magnolia in Wiltshire , England – In the USA they call it “Curb Appeal”

*“Don't it always seem to go, that you don't know what you've got till it's gone“*

Joni Mitchell – ‘Big Yellow Taxi ‘- 1970

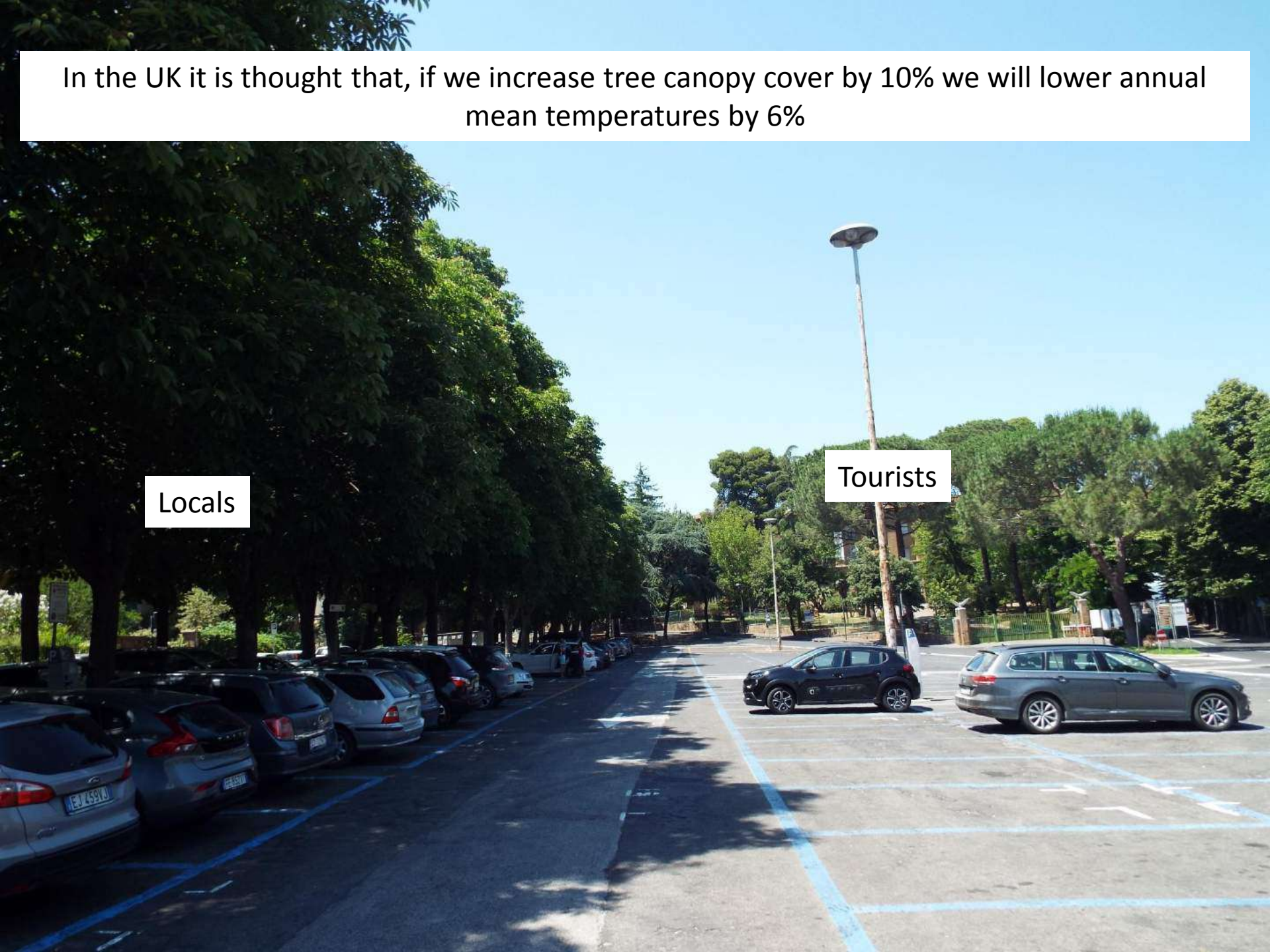



Filtering, Collecting and Absorbing both Ground and Air Pollution

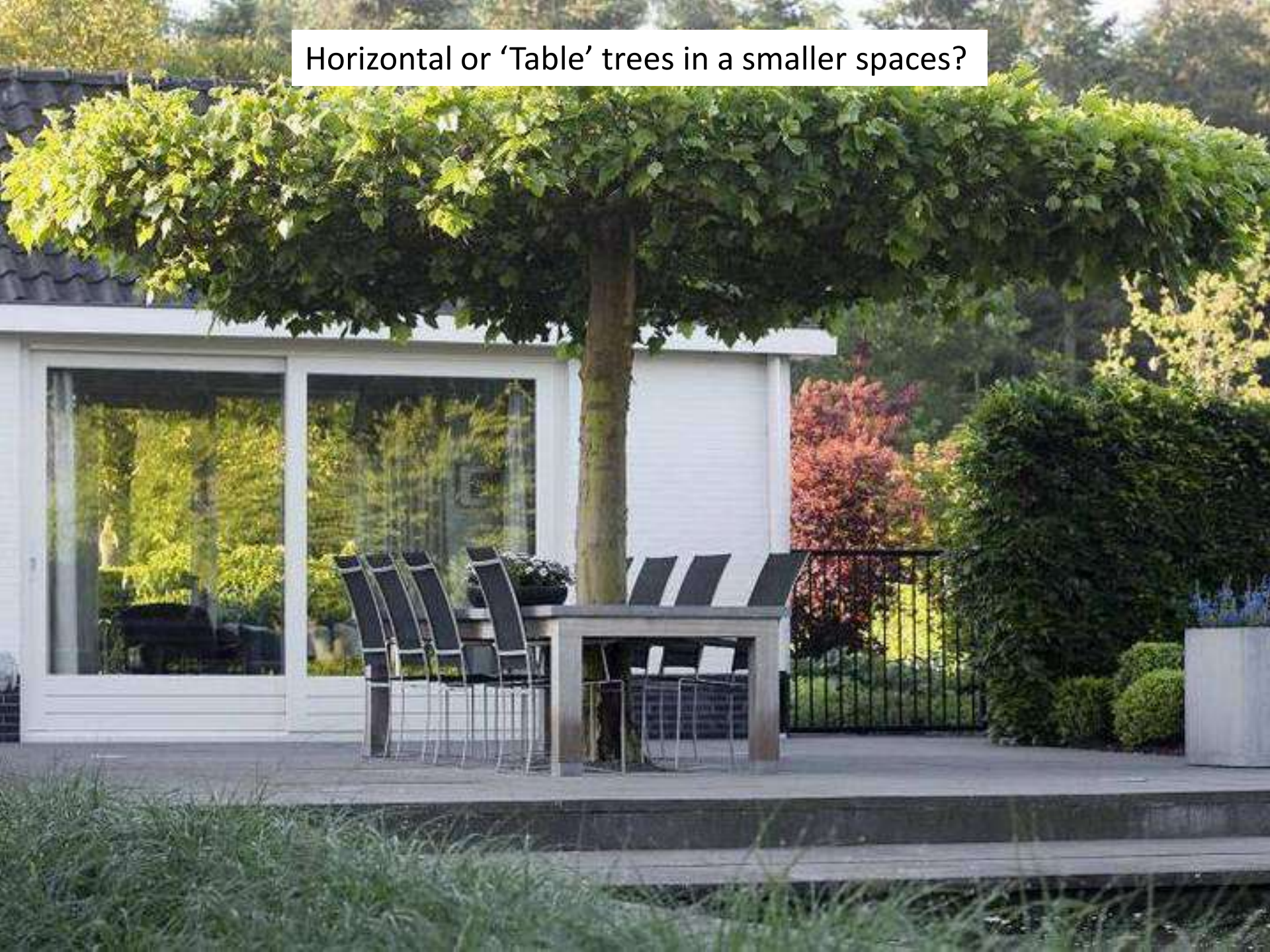

Contributing to SUDS and reducing the risk of flooding


We need to keep planting big trees!
Shade and canopy cover are very important
*Albizia saman* [not hardy in the UK]

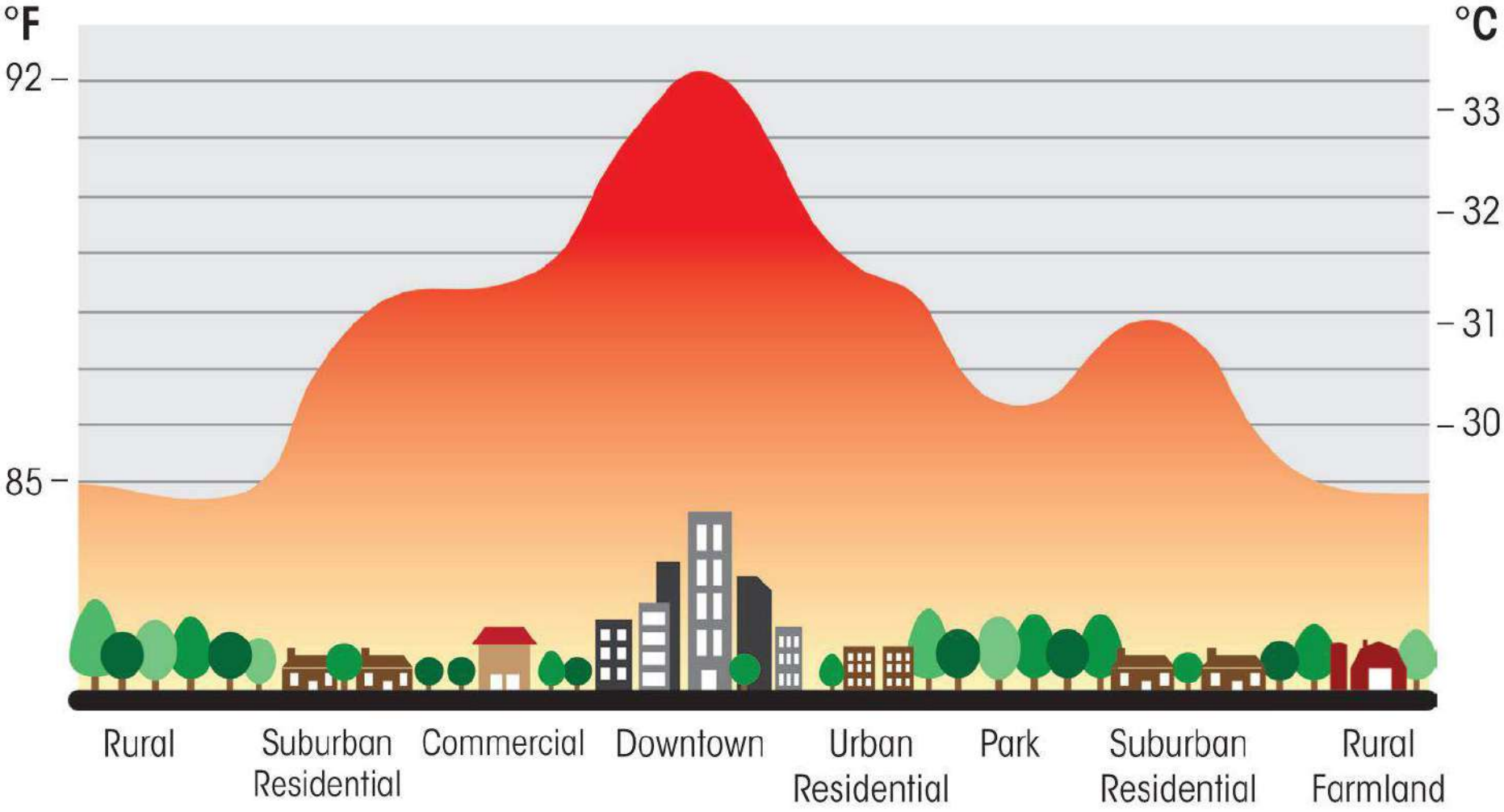
In the UK it is thought that, if we increase tree canopy cover by 10% we will lower annual mean temperatures by 6%

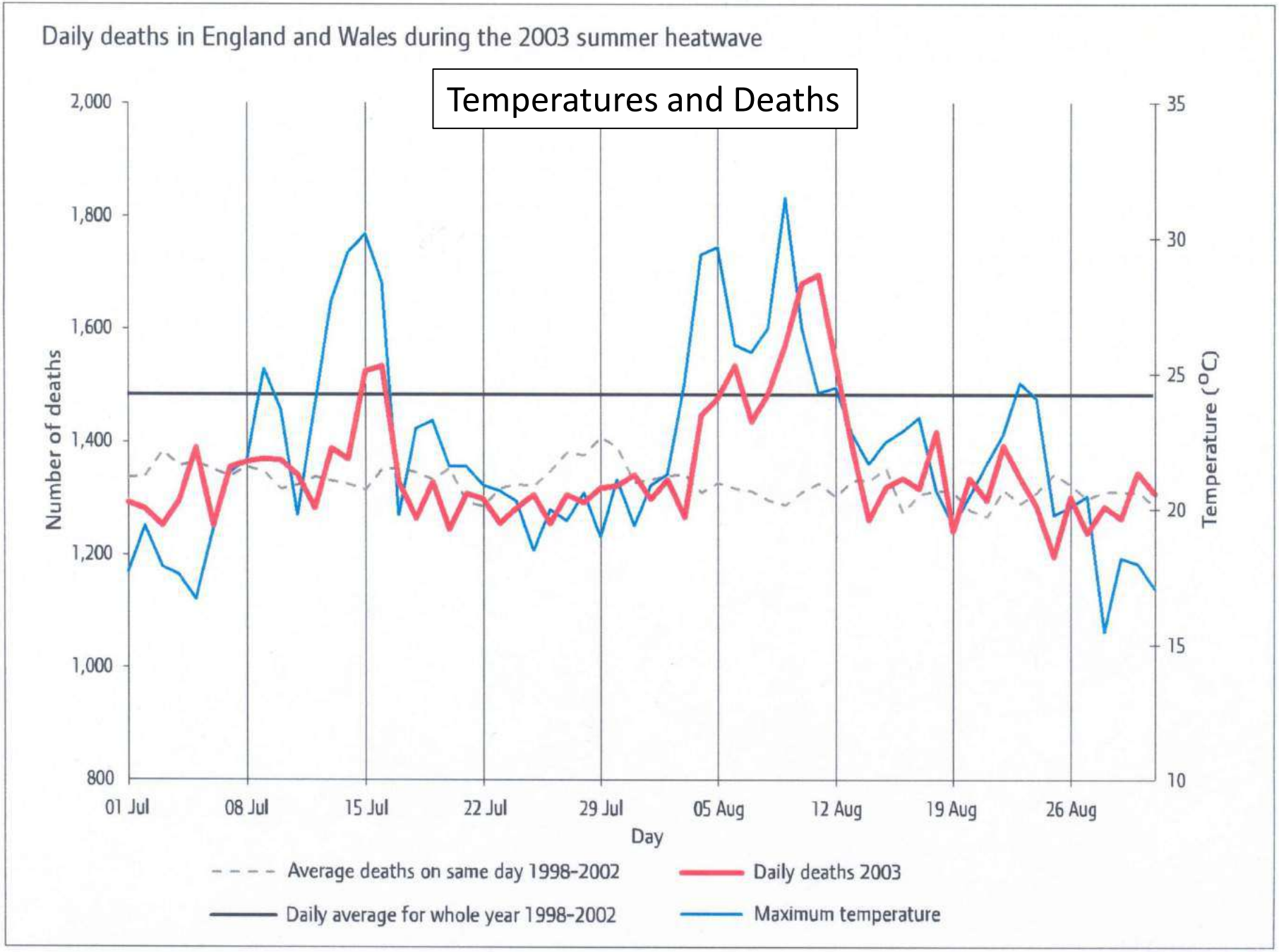



*Catalpa bignonioides* ‘Nana’ – but right for here?


Horizontal or ‘Table’ trees in a smaller spaces?

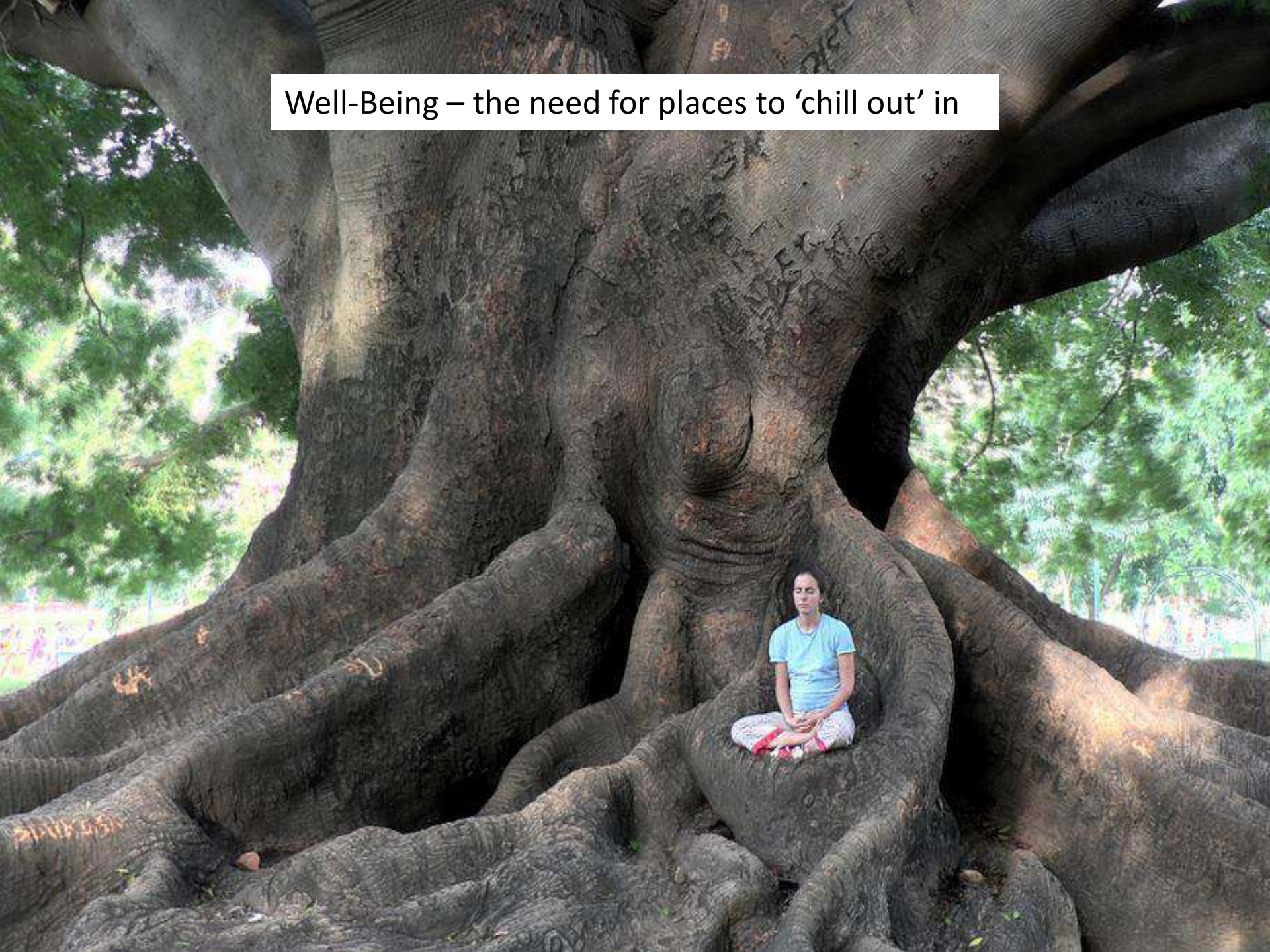
# The Urban Heat Island Effect
# +
# Climate Change




Daily deaths in England and Wales during the 2003 summer heatwave
Temperatures and Deaths
Number of deaths
2,000
1,800
1,600
1,400
1,200
1,000
800
Temperature (°C)
35
30
25
20
15
10
01 Jul
08 Jul
15 Jul
22 Jul
29 Jul
05 Aug
12 Aug
19 Aug
26 Aug
Day
Average deaths on same day 1998–2002
Daily deaths 2003
Daily average for whole year 1998–2002
Maximum temperature


Green Space = ’green happiness’ and better Well-Being..


Including for Elderly people
Elderly people
Enmore Green
THE SHIP INN
R855 YVU


Well-Being – the need for places to ‘chill out’ in

# Wildlife and Habitat Values

Golden Oriole

Violet Click Beetle

Brown Long-Eared Bat

# Trees and Culture

[More prevalent in other countries?]


Feudal family towers
Tradition
Competition
Lucca, Italy

# ‘Honour Avenues’, ‘Town Trees’, ‘Gateway Trees’ & ‘Signature Trees’

Pollarded Limes in French village square


‘Welcome’ Tree Planting – you are arriving home!!
Gateway Trees

# Village Arboretum de Vernet-les-Bain, France

Started in the 1960s and in 1996 officially titled the "village arboretum", with a statement of faith that provides (among other things) that for every child born in the town, the parents will plant that child's tree.

Commemorative ‘Avenues of Honour’ – Big in Australia, Canada and the USA


“Forest Bathing” or, *shinrin-yoku* 森林浴 in Japanese
Which means bathing in the forest atmosphere or taking in the forest through our senses.


*Komorebi* 木漏れ日 – ‘sunlight through trees’


*Hanami* 花見 “flower viewing”: Japanese Cherry Blossom Viewing Picnic
Celebrating the arrival of spring – 1000 year-old tradition

# Some Threats to Trees

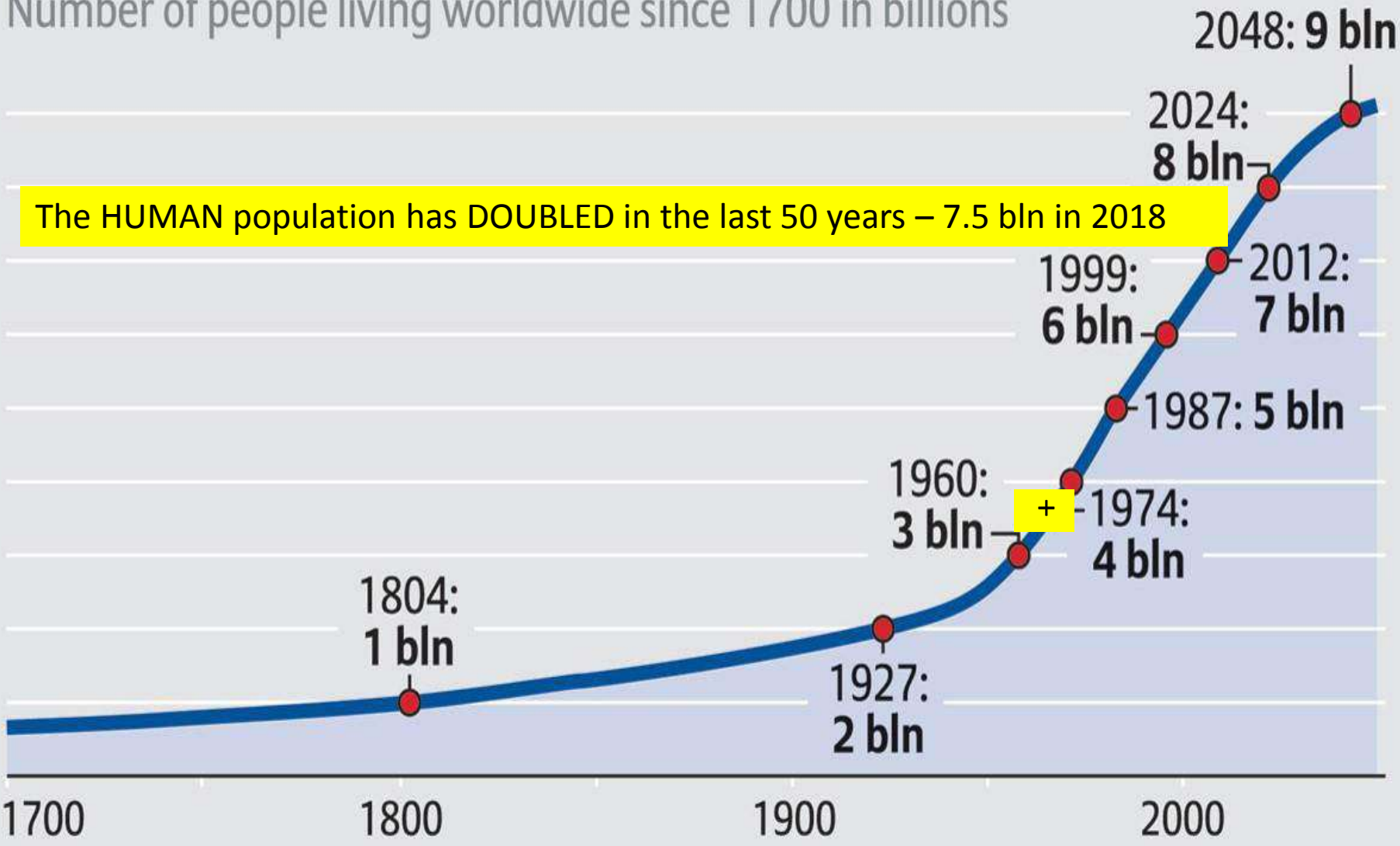
And a few solutions


*Homo sapiens*
Are a significant threat

# POPULATION OF THE EARTH

Allianz

Number of people living worldwide since 1700 in billions




The HUMAN population has DOUBLED in the last 50 years – 7.5 bln in 2018

Source: United Nations World Population Prospects, Deutsche Stiftung Weltbevölkerung

For further information please visit: www.knowledge.allianz.com


58% of humans now live in towns and cities


In Sussex alone - 60,000 houses must be built over the next 15 years

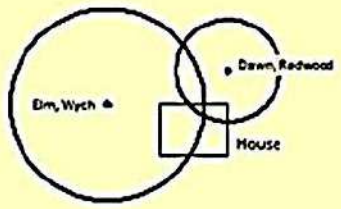

Are we building the tree-less slums of tomorrow?


A problem for not just trees…
DEVELOPMENT
SITE WITH
PERMISSION FOR
39 DWELLINGS

| GENERAL DATA | | |
|---|---|---|
| | *Climate zone:* | *Postcode:* |
| Site location: | Oxford | OX |
| Foundation type: | Strip foundation | |
| Volume change potential of soil: | Medium | |
| Specify Plasticity Index if known: | 35 % | |

| SUMMARY OF RESULTS | | | |
|---|---|---|---|
| Tree species: | Distance to found.: | Mature height: | Foundation depth: |
| Elm, Wych | 6.00 m | 18.00 m | 2.39 m |
| Dawn, Redwood | 4.00 m | 16.00 m | 1.15 m |

SITE LAYOUT DIAGRAM



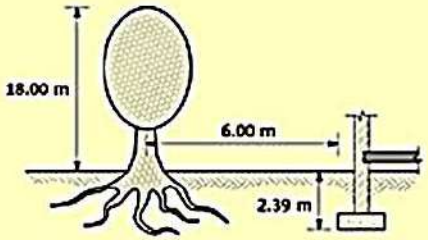

*Building size and tree locations are indicative only.*

FIRST TREE: DATA, CALCULATIONS AND RESULTS

| TREE DATA | |
|---|---|
| Tree status: | Retained or to be planted |
| Name of the species: | Elm, Wych |
| Latin name of the species: | Ulmus glabra |
| Distance to foundation: | 6.00 m |

| CALCULATIONS | |
|---|---|
| Tree group: | Broad leafed |
| Mature tree height: | 18.00 m |
| Water demand: | High |
| Influence zone: | 22.50 m |
| Reqired foundation depth: | 2.44 m |
| Reduction in required depth: | 0.05 m |
| Final required foundation depth: | 2.39 m |

DIAGRAM



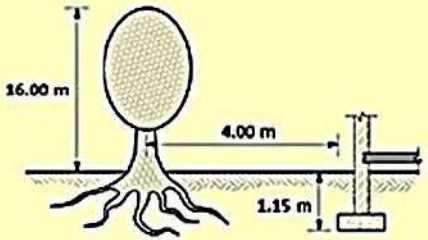

*This diagram is indicative only.*

SECOND TREE: DATA, CALCULATIONS AND RESULTS

| TREE DATA | |
|---|---|
| Tree status: | Removed or to be removed |
| Name of the species: | Dawn, Redwood |
| Latin name of the species: | Metasequoia glyptostroboides |
| Distance to foundation: | 4.00 m |
| Actual tree height: | 15.00 m |

| CALCULATIONS | |
|---|---|
| Tree group: | Coniferous |
| Mature tree height: | 16.00 m |
| Water demand: | Moderate |
| Influence zone: | 12.00 m |
| Reqired foundation depth: | 1.20 m |
| Reduction in required depth: | 0.05 m |
| Final required foundation depth: | 1.15 m |

DIAGRAM




*This diagram is indicative only.*

## NHBC Chapter 4.2
## Trees and New Houses

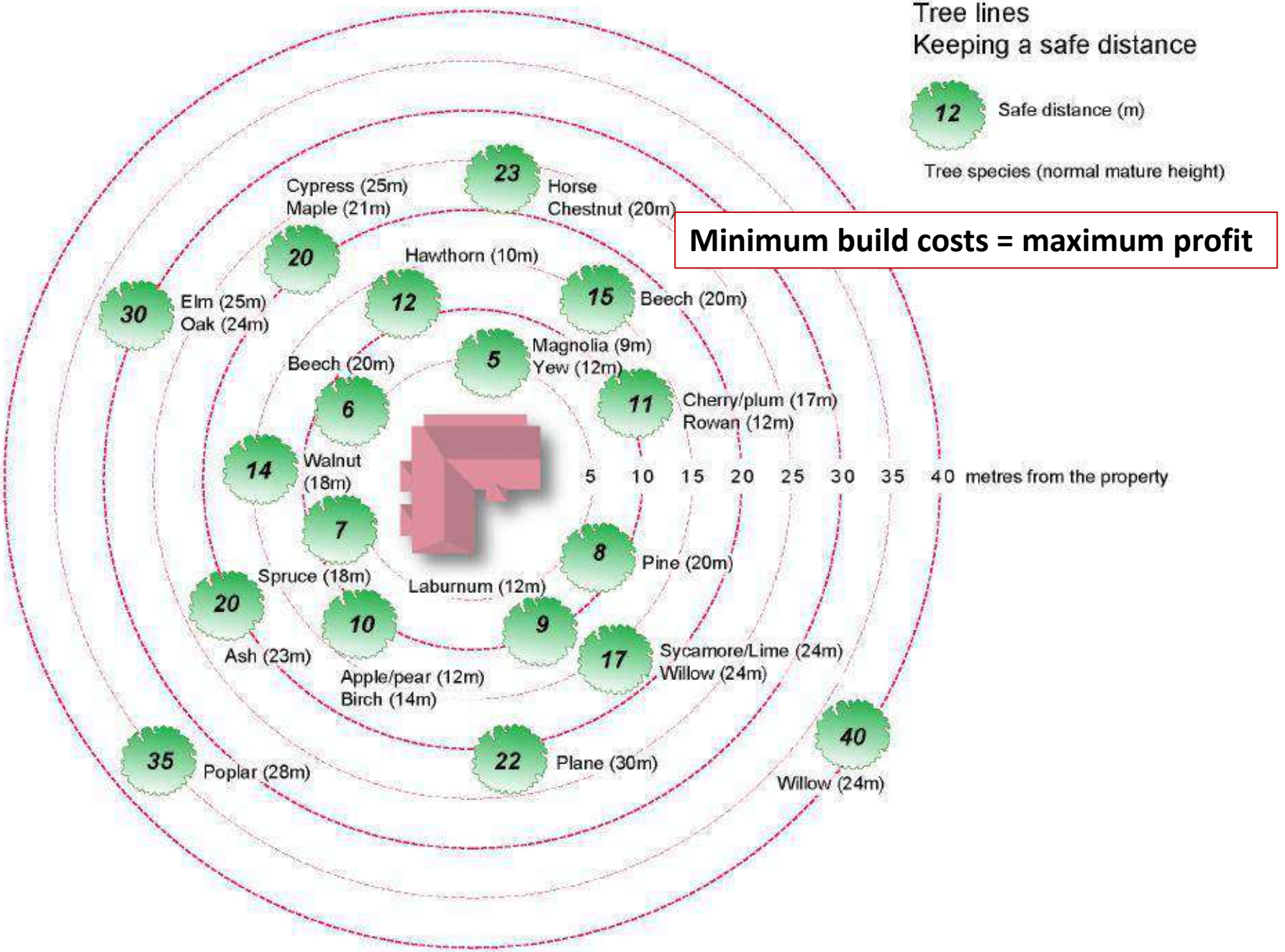
Guidelines and Certification
to protect house buyers?

Or, is it:

Allowing builders & developers to construct with minimum footings [1m in heavy clay] to make maximum profit?

By:

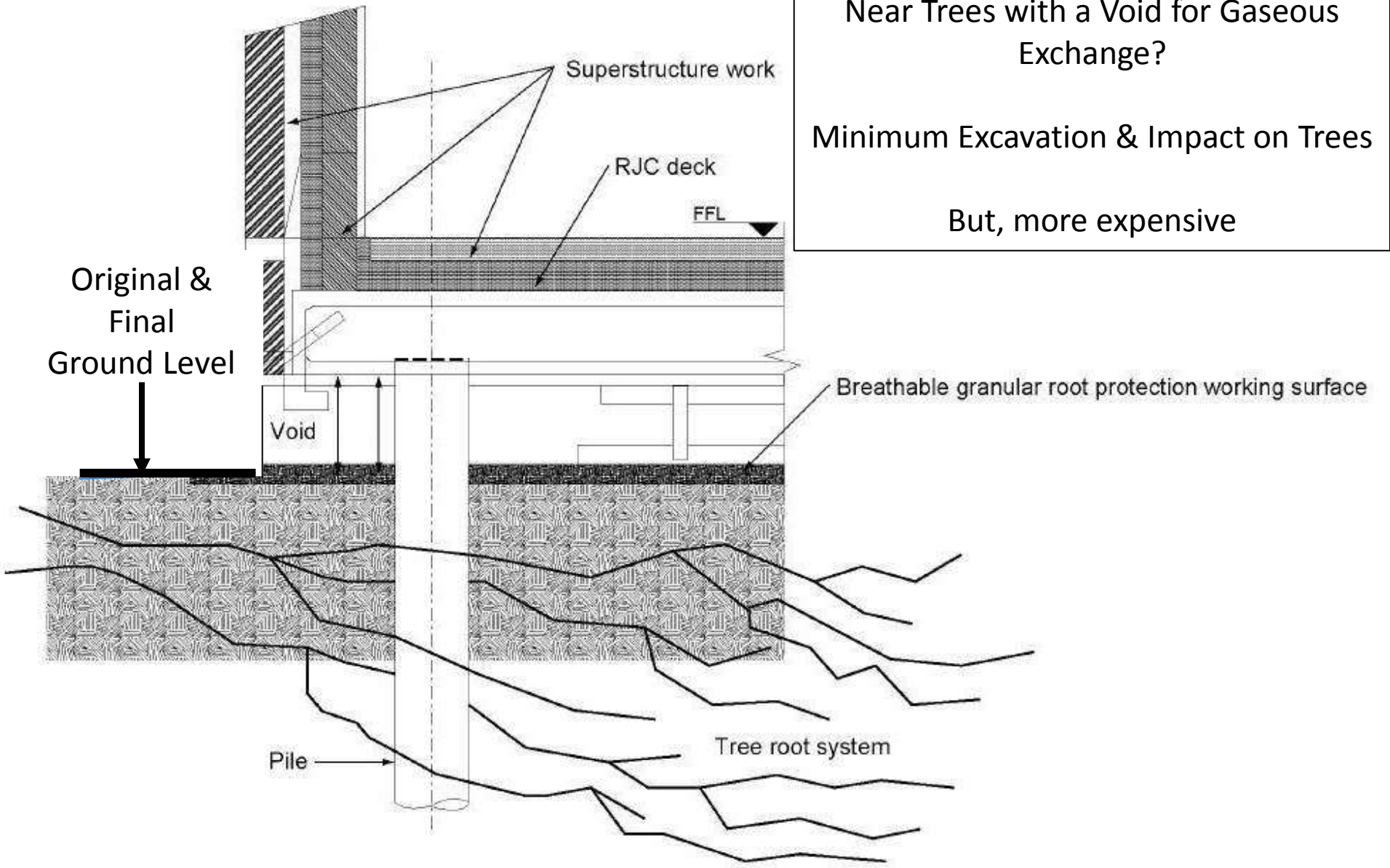
Dictating to their landscape architects what tree and hedge species they can use within 40m of the new house!


Tree lines
Keeping a safe distance
12
Safe distance (m)
Tree species (normal mature height)
Minimum build costs = maximum profit
23
Horse Chestnut (20m)
Cypress (25m)
Maple (21m)
20
Hawthorn (10m)
30
Elm (25m)
Oak (24m)
12
15
Beech (20m)
Beech (20m)
5
Magnolia (9m)
Yew (12m)
6
11
Cherry/plum (17m)
Rowan (12m)
14
Walnut (18m)
5 10 15 20 25 30 35 40 metres from the property
7
8
Pine (20m)
Spruce (18m)
Laburnum (12m)
20
10
9
Ash (23m)
Apple/pear (12m)
Birch (14m)
17
Sycamore/Lime (24m)
Willow (24m)
35
Poplar (28m)
22
Plane (30m)
40
Willow (24m)

Suspended Pile and Beam foundations Near Trees with a Void for Gaseous Exchange?

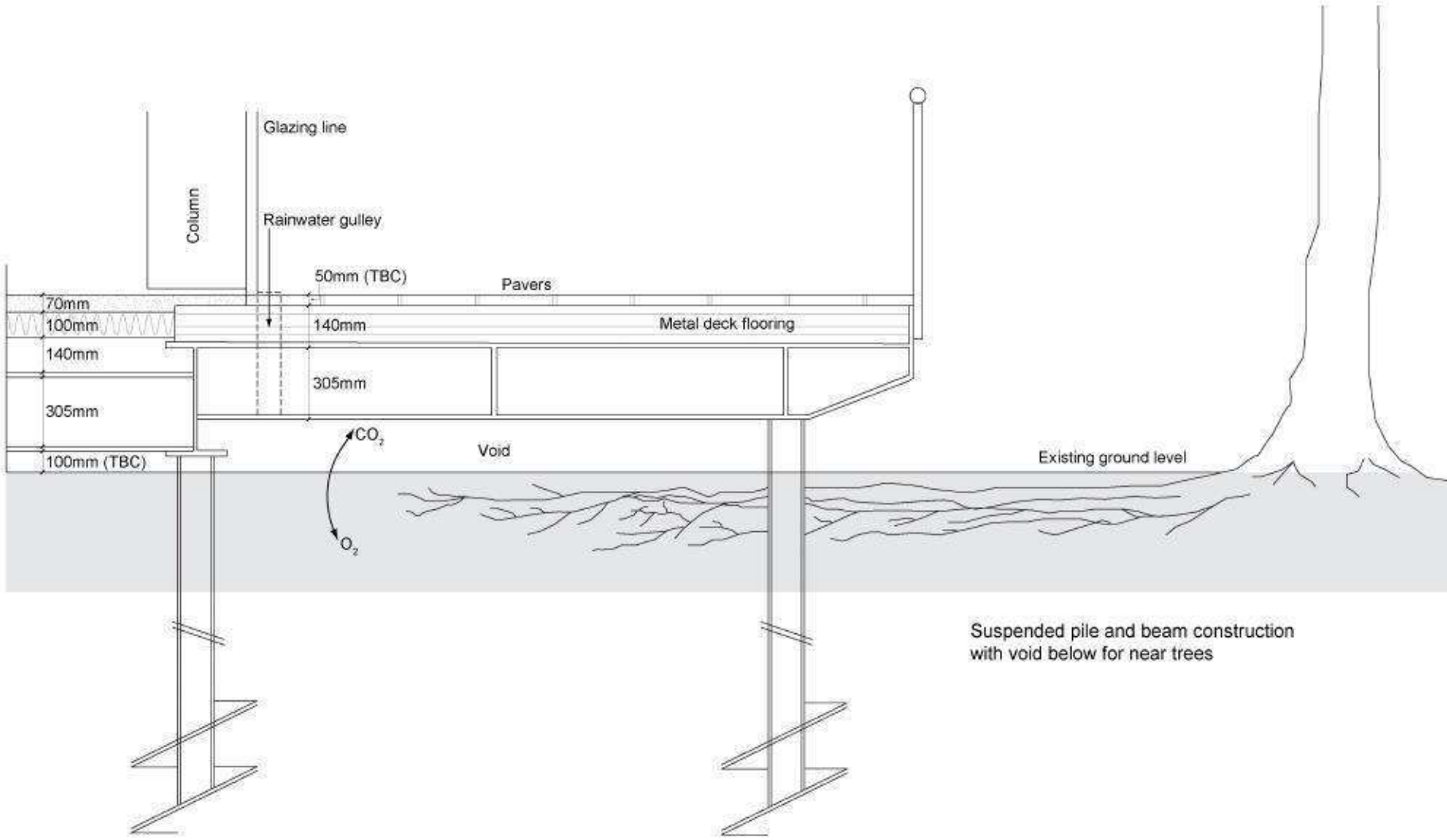
Minimum Excavation & Impact on Trees

But, more expensive




School classroom in a woodland built on piles

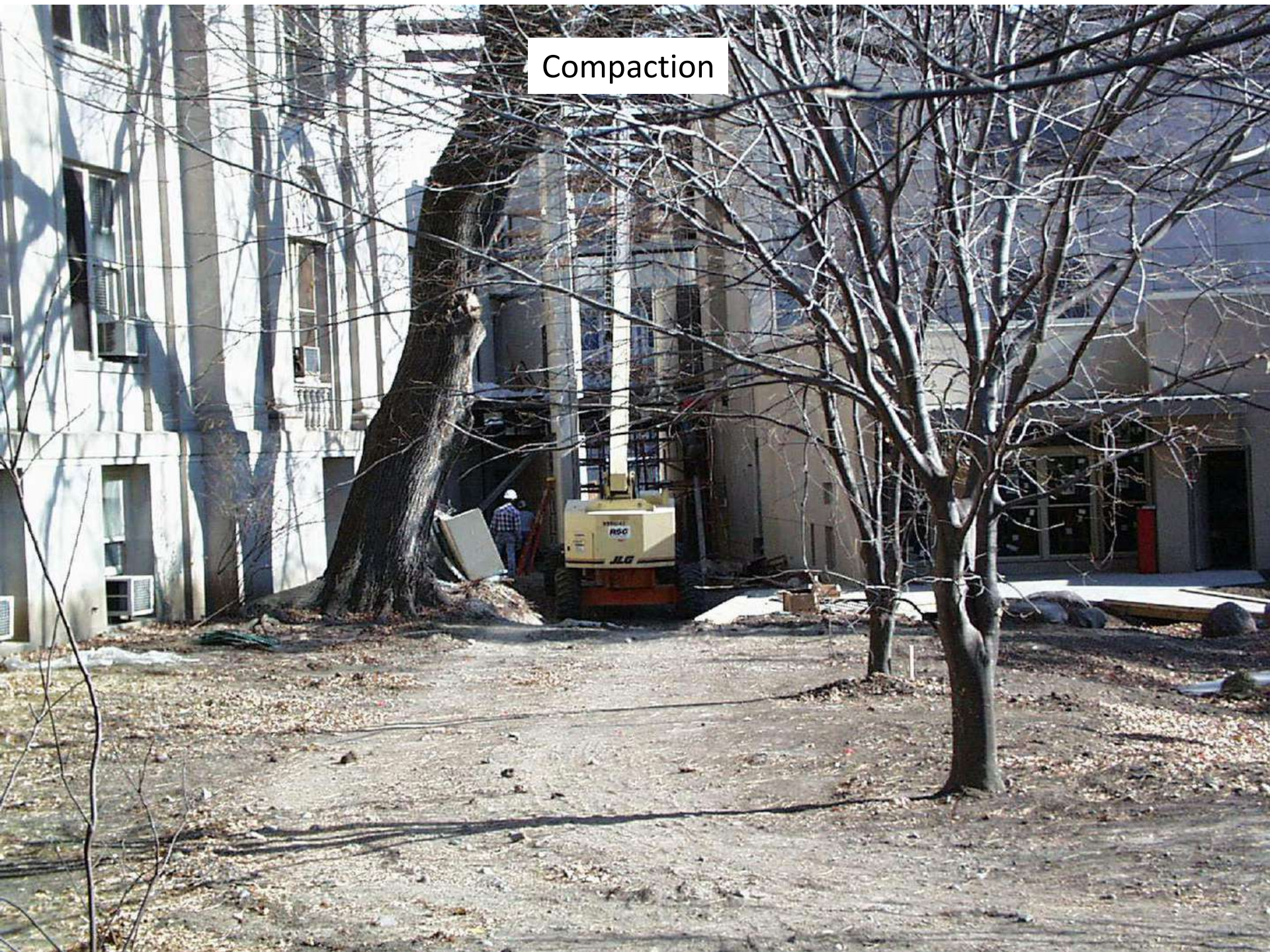
# Similar - cantilevered construction near trees for terraces & decks



**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**


Near Borde Hill, West Sussex
January 2018 – Approved by the local planners


Compaction


Bonfires and Compaction
Paris, France

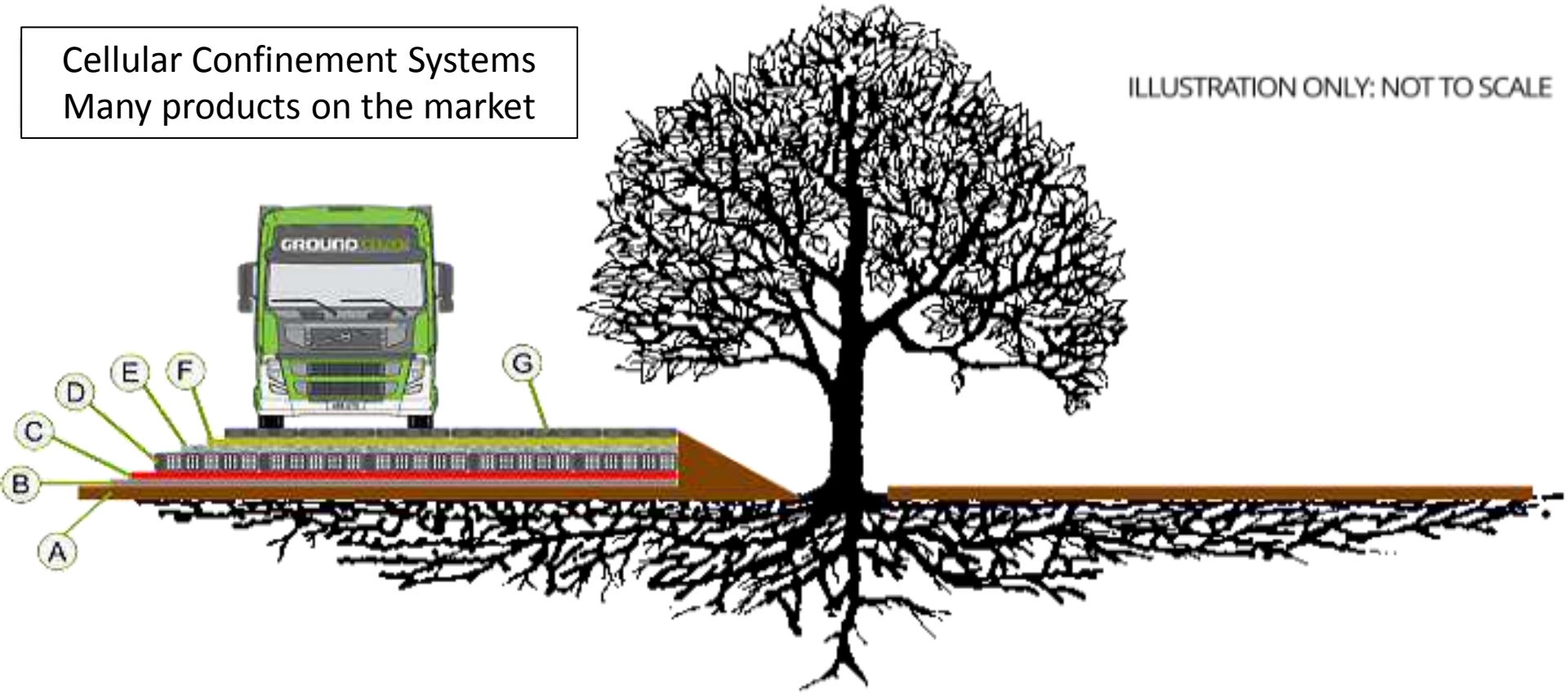
## Cellular Confinement Systems

No dig construction near trees etc.

- Minimal excavation – a surface scrape
- Porous / permeable surface and sub-base
- No root severance
- No compaction
- Allows gaseous exchange: o2 in and co2 out

Cellular Confinement Systems
Many products on the market

ILLUSTRATION ONLY: NOT TO SCALE




A SUB GRADE - EXISTING SOIL OR BEDDING LAYER

B GEOTEXTILE - GEOTRAX TS1000
*(If a heavy grade geotextile is required, please contact us as other grades are also available)*

C OPTIONAL GEOGRID - GEOTRAX GX 20/20 OR GX 30/30

D GEOTRAX GC 75/100/150/200

E 25-50MM WEARING LAYER OVER THE CELLS (FROM INFILL MATERIAL)

F GEOTEXTILE LAYER (FOR PERMANENT USE WITH ITEM 'G')

G CELLULAR PAVERS (PERMANENT USE) CELLPAVE 40, 65 OR HD


Raising of Soil Levels near trees


Tree Protection on your sites?
What happened before you arrived?

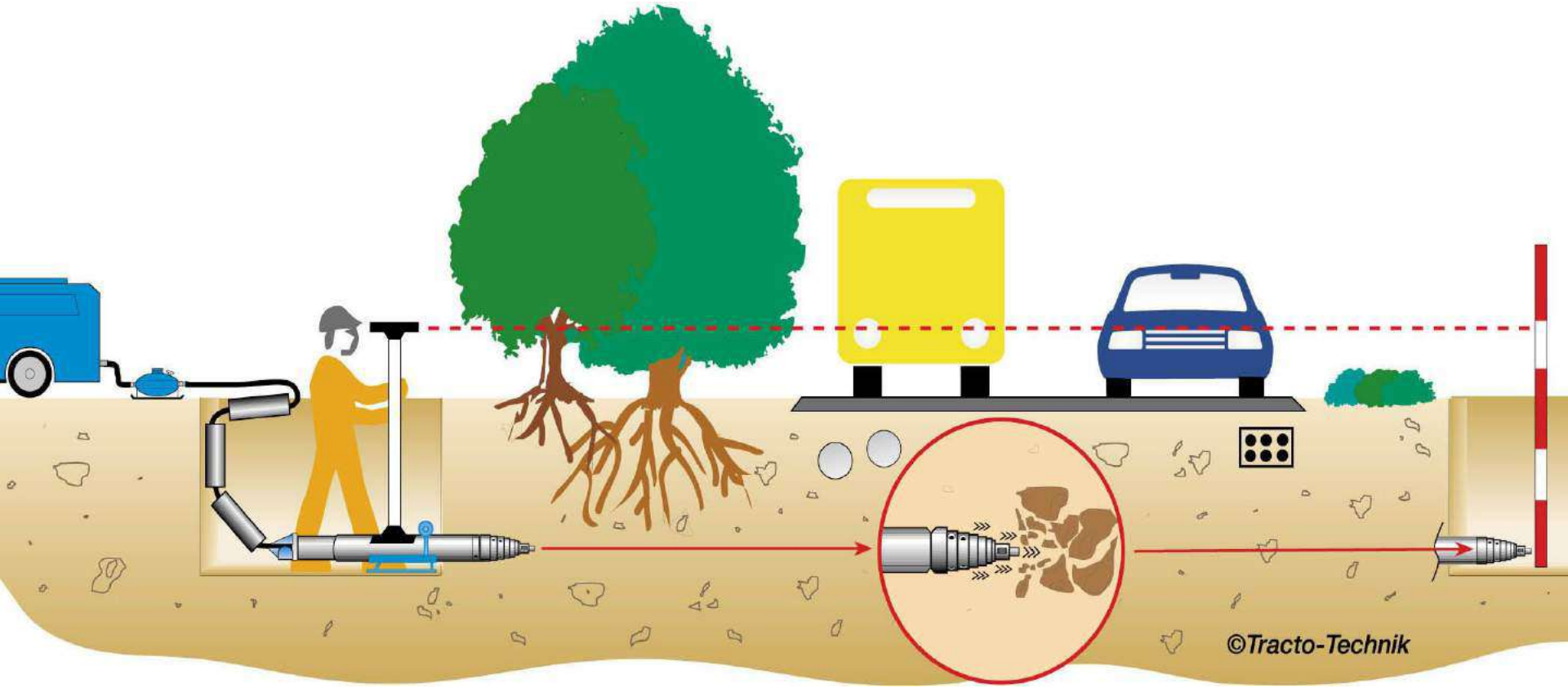
Statutory undertakers


Trenching
Monitor your contractors and sub-contractors
0800 1389101

Excavation using an air spade

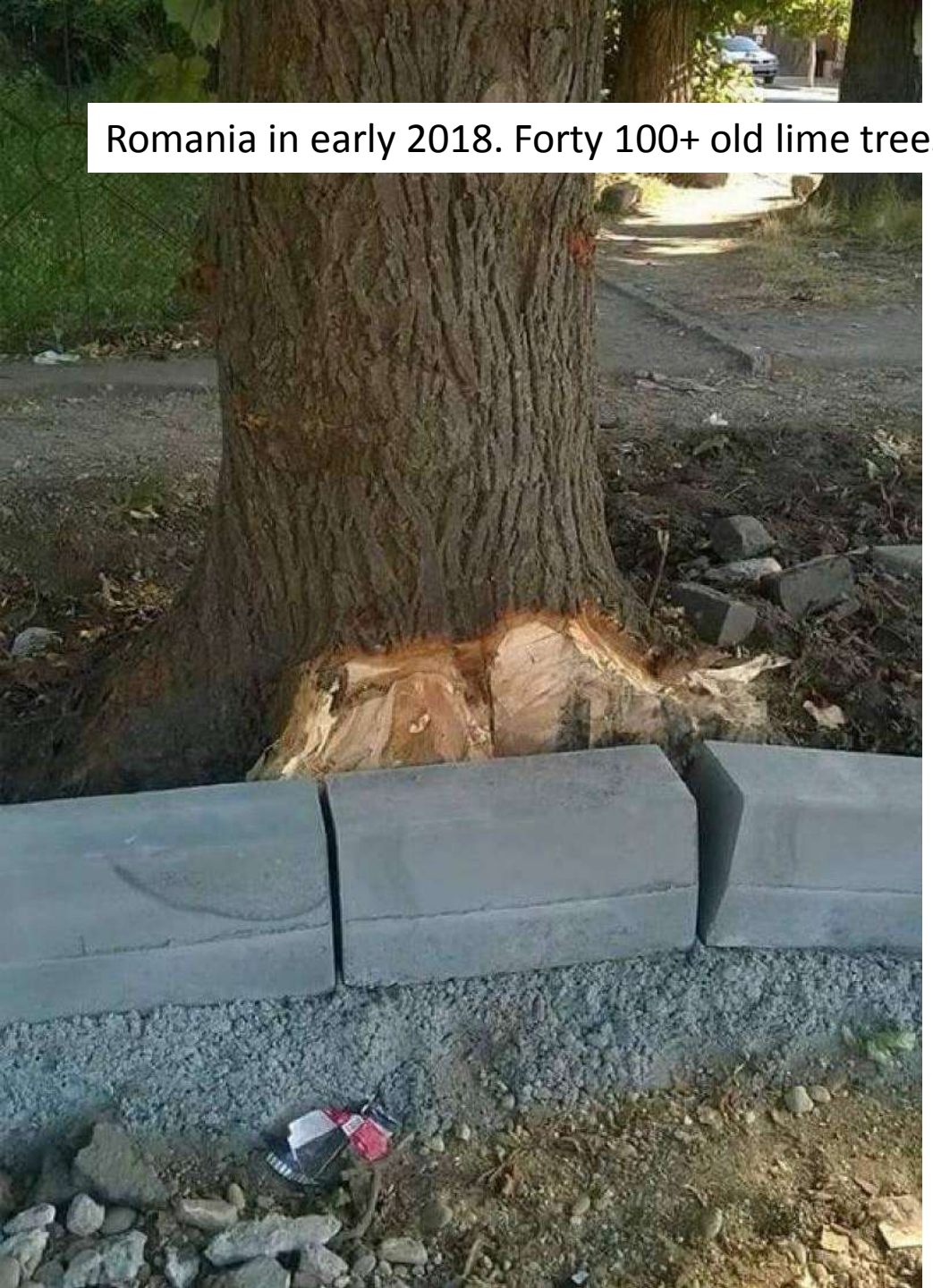
Excavation by hand, air spade and mini digger

Underground Moling Systems for installing services without trenching




Vandalism

Romania in early 2018. Forty 100+ old lime trees ‘pruned’ to accommodate new kerbing



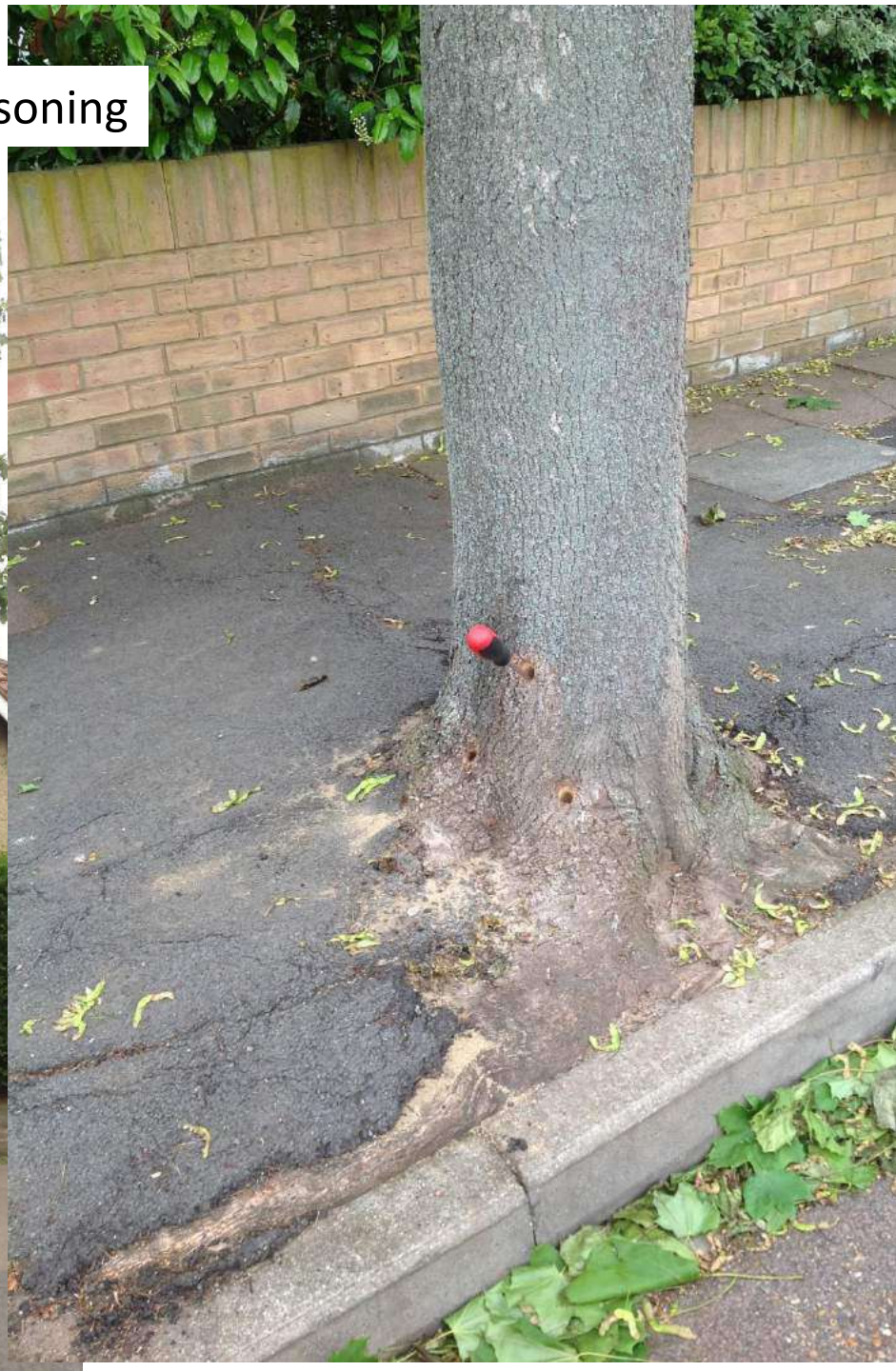

Ring-barking of oaks for development


CCTV cameras and lighting – including  for domestic gardens


Tree Houses?


Differing Opinions

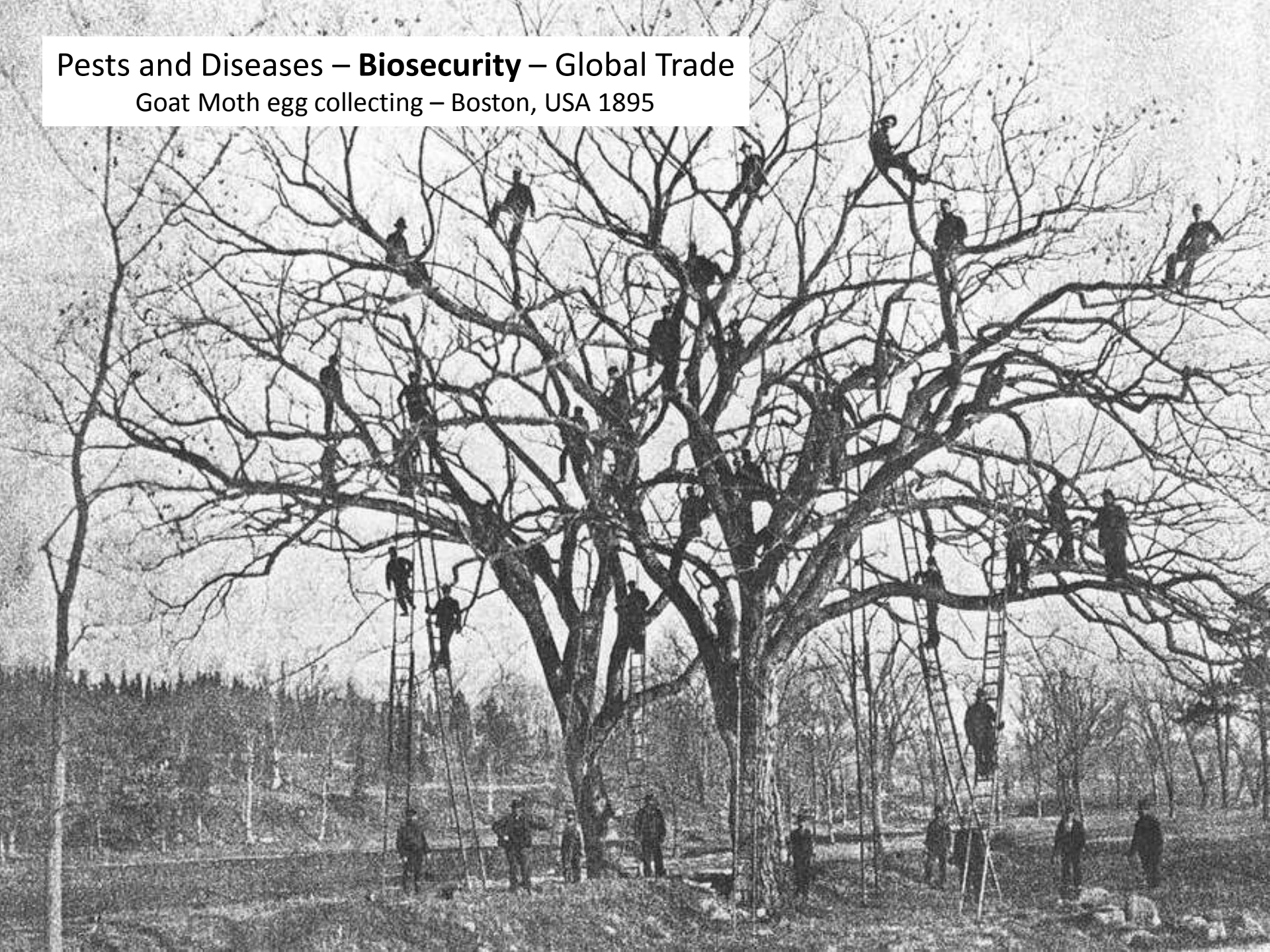
Poisoning

Anti–bird spikes fixed to trees in Bristol

Pests and Diseases – **Biosecurity** – Global Trade

Goat Moth egg collecting – Boston, USA 1895



# New Pests and Diseases already in the UK:

Oak *Processionary Moth* (*Thaumetopoea processionea*)

**Uncontrolled in Holland at present**

Ash Dieback (*Chalara fraxinea*)

Horse Chestnut Leaf Miner (*Cameraria ohridella*)

# Heading this way – already here?

Asian Long Horned Beetle
*Anoplophora glabripennis*

Emerald Ash Borer
*Agrilus planipennis*

Canker Stain of Plane
*Ceratocystis fimbriata f. platani*

Pine Processionary Moth

*Thaumetopoea pityocampa*

Pine Processionary moth - *Thaumetopoea pityocampa*

This is a killer

## PPM now established in:

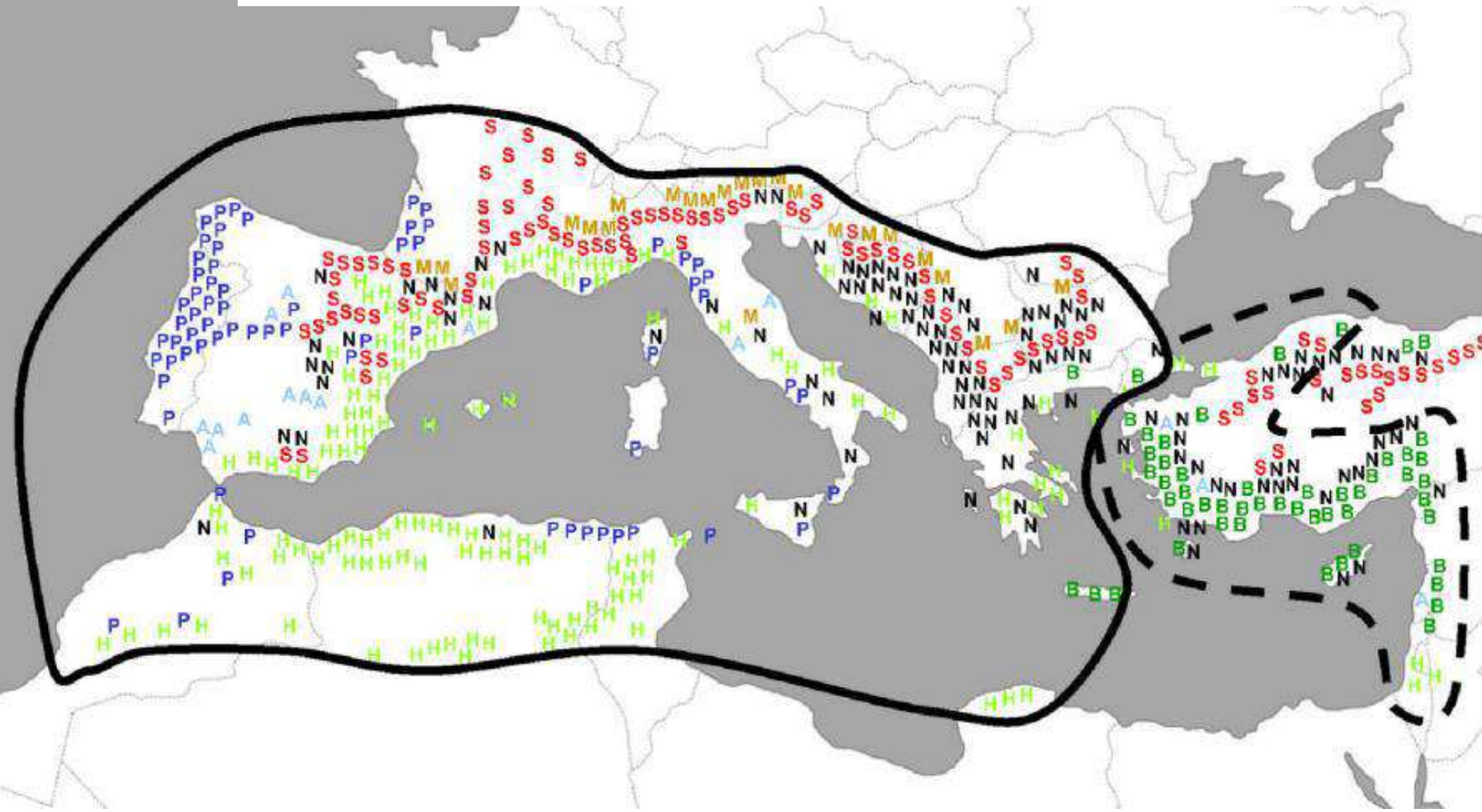
- Albania
- Algeria
- Austria
- Bulgaria
- Croatia
- Cyprus
- France (including Corsica)
- Greece (including Crete)
- Hungary
- Italy (including Sardinia and Sicily)
- Libya
- Macedonia
- Montenegro
- Morocco
- Portugal
- Serbia
- Slovenia
- Spain (including the Balearic Islands)
- Switzerland
- Syria
- Tunisia.

## Susceptible Species

Pine trees particularly susceptible:

Austrian pine (*Pinus nigra*)
Aleppo pine (*P. halepensis*)
Canary Island pine (*P. canariensis*)
Lodgepole pine (*P. contorta*)
Maritime pine (*P. pinaster*)
Monterey pine (*P. radiata*)
**Scots pine (*P. sylvestris*)**
Stone pine (*P. pinea*)

Other recorded hosts include:
Atlas cedar (*Cedrus atlantica*)
European larch (*Larix decidua*)




2009 - Ranges of the Pine Processionary moths *Thaumetopoea pityocampa*, solid line; *Thaumetopoea wilkinsoni*, dashed line;
*A = Pinus pinea, B = P. brutia, H = P. halepensis*, M = *P. mugo*, N = *P. nigra*, P = *P. pinaster*,
**S = *P. sylvestris.*** Each letter refers to a land unit where the indicated pine species is dominant but not necessarily exclusive.

# Biodiversity

At the Arboricultural Association Annual Conference September 2014

"*Urban tree diversity for resilient and attractive cities*"

by

Cecil Konijnendijk van den Bosch

Sweden

SLU Landscape - cecil.konijnendijk@sl

## "The Curse of Symmetry"

## We should no longer plant monocultures?


The “Curse of Biodiversity”?
Muddled ‘Stamp Collections’?

We shouldn’t plant grids and blocks like this any more?


Single species avenues have a wow factor
Jacaranda avenue in S. Africa


People notice bold plantings - that provide a strong visual effect


Creating unity in plantings is now a dirty word?

Also, can we afford to <u>just</u> plant British natives and accept the ‘rising tyranny of ecology’?
We only have 35 woody native plant species – plus a few rare/endangered types

Do we have to plant Native trees all the time and everywhere?

**Beware of the 'Native Tree Taliban'**

# This is the real problem:

## Over reliance on too few species

Tree populations in three Scandinavian capitals

From Sjöman et al. (2012)

**Stockholm**: Tilia: 31.8 %
Acer: 21.0 %
Sorbus: 11.7 % = 64.5%

**Oslo**: Tilia: 27.1 %
Acer: 23.7 %
Betula: 11.7 % = 62.5%

**Helsinki**: Tilia: 44.7 %
Acer: 12.7 %
Betula: 11.1 % = 68.5%

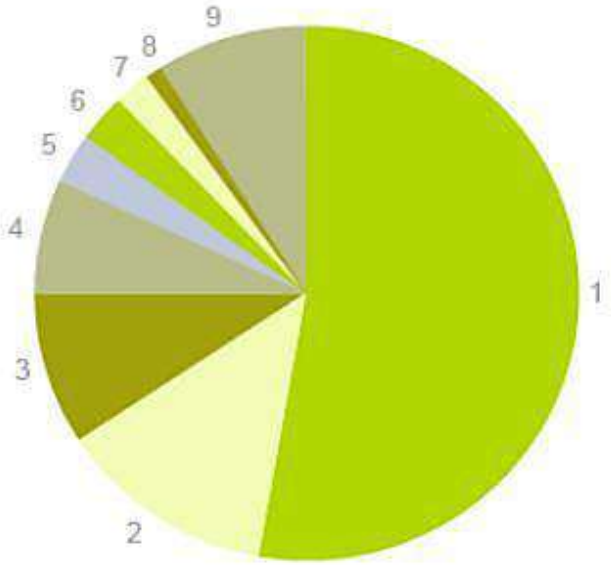
Example: Lyon, France

In 1994 75% of Greater Lyon's city street trees belong to just 3 species

In Greater Lyon, 254 different tree species grow in hard landscapes (+69% compared to 10 years ago)

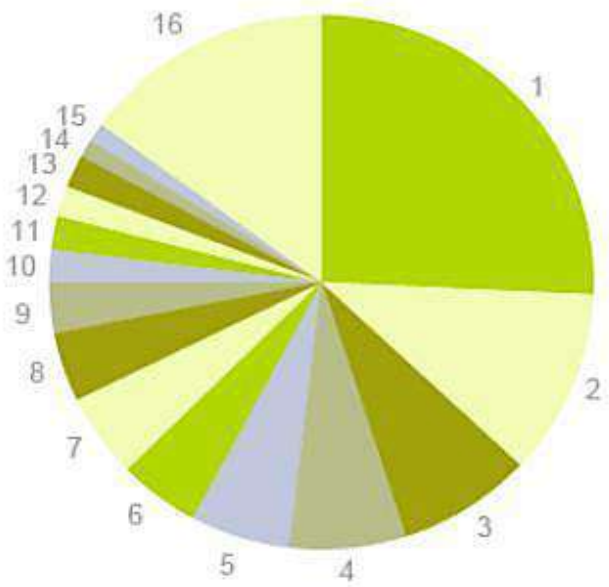
Increase the range of plants and we can still plant single species blocks and avenues

Species distribution in 1994 (%)




| | | |
|---|---|---|
| 1 | Platanus | 53 |
| 2 | Acer | 13 |
| 3 | Tilia | 9 |
| 4 | Robinia | 7 |
| 5 | Aesculus | 3 |
| 6 | Prunus | 3 |
| 7 | Celtis | 2 |
| 8 | Populus | 1 |
| 9 | Other | 9 |

Species distribution in 2013 (%)




| | | | | | |
|---|---|---|---|---|---|
| 1 | Platanus | 26 | 9 | Sophora | 3 |
| 2 | Acer | 11 | 10 | Corylus | 2 |
| 3 | Tilia | 8 | 11 | Gleditsia | 2 |
| 4 | Celtis | 7 | 12 | Aesculus | 2 |
| 5 | Fraxinus | 6 | 13 | Ulmus | 2 |
| 6 | Quercus | 5 | 14 | Malus | 1 |
| 7 | Prunus | 5 | 15 | Zelkova | 1 |
| 8 | Pirus | 4 | 16 | Other | 15 |

"TREES FOR URBAN PLANTING: DIVERSITY UNIFORMITY, AND COMMON SENSE"

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U.S. National Arboretum
Agricultural Research Service
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*"A broader diversity of trees is needed in our urban landscapes to guard against the possibility of large-scale devastation by both native and introduced insect and disease pests. Urban foresters and municipal arborists should use the following guidelines for tree diversity within their areas of jurisdiction":*

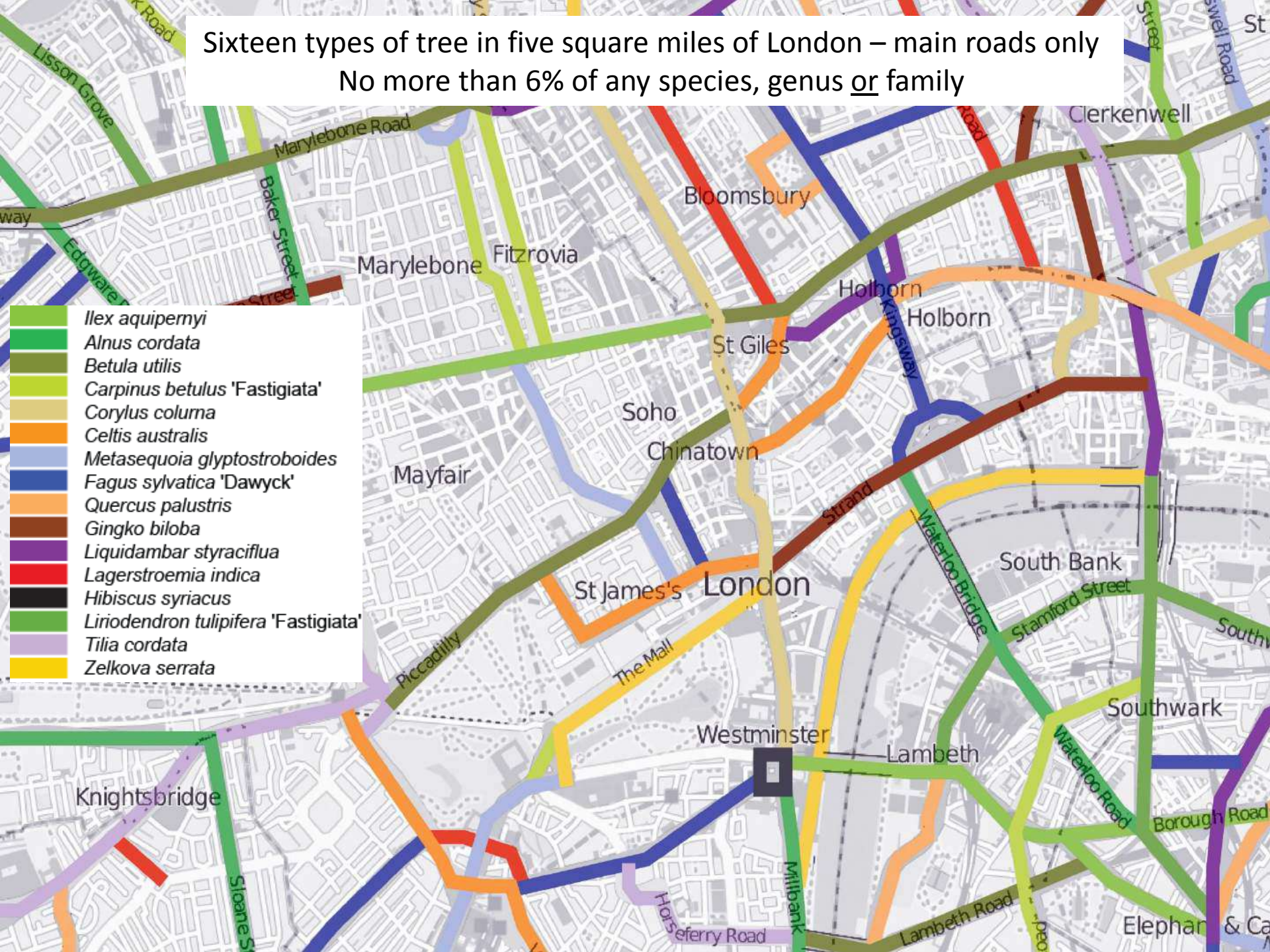
- Plant no more than 10% of any species
- Plant no more than 20% of any genus
- Plant no more than 30% of any family

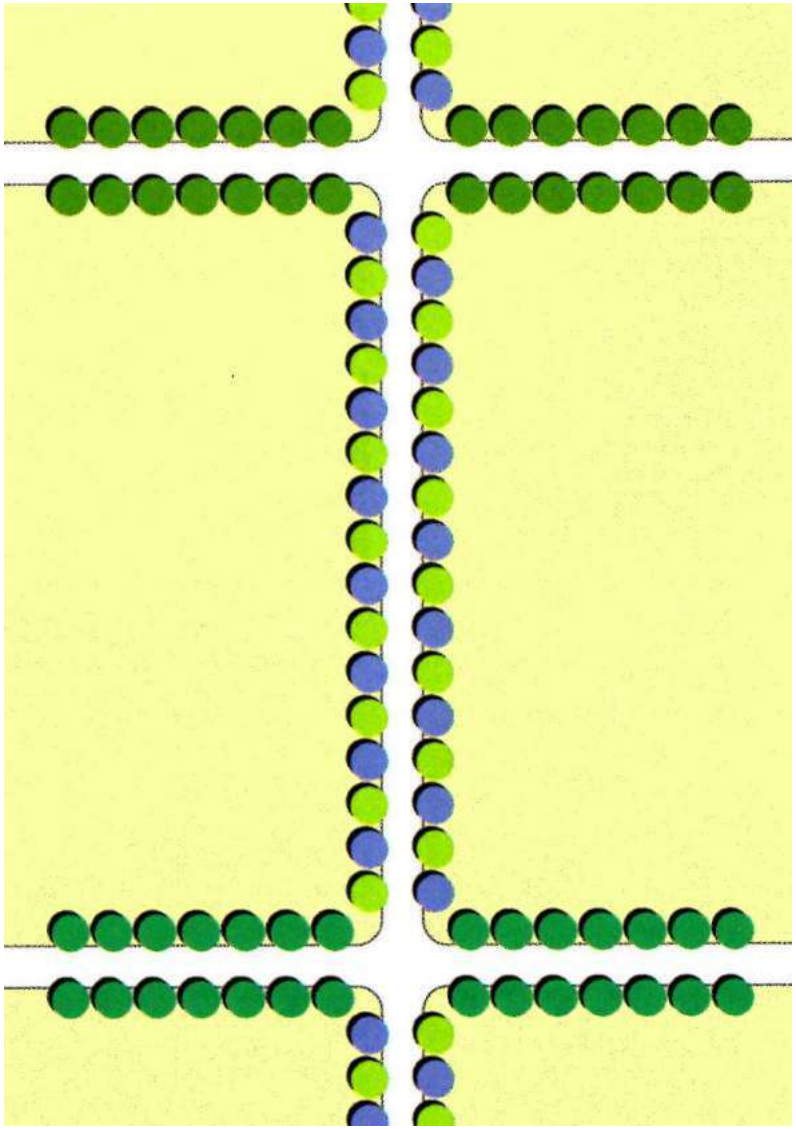
*From: Santamour, F.S. 1990 in ' Trees for the Nineties: Landscape Tree Selection [Proceedings from MTIA – 7th conference Illinois]*

# Maintaining Biodiversity among Street Trees - yet keeping single species avenues
## 19 Families = 5%; 33 Genera = 3%; 33 Species/Cultivars = 3%

| | |
|---|---|
| Aquifoliaceae | *Ilex aquipernyi* |
| Betulaceae | *Alnus cordata*<br>*Betula utilis*<br>*Carpinus betulus* 'Fastigiata'<br>*Corylus colurna* |
| Cannabaceae | *Celtis australis* |
| Cupressaceae | *Metasequoia glyptostroboides* |
| Fagaceae | *Fagus sylvatica* 'Dawyck'<br>*Quercus palustris* |
| Gingkoacaeae | *Gingko biloba* |
| Hamamelidaceae | *Liquidambar styraciflua* |
| Lythraceae | *Lagerstroemia indica* |
| Malvaceae | *Hibiscus syriacus*<br>*Tilia cordata* |
| Magnoliaceae | *Liriodendron tulipifera* 'Fastigiata'<br>*Magnolia kobus* |
| Meliaceae | *Melia azedarach* |
| Moraceae | *Broussonetia papyrifera* |
| Oleaceae | *Fraxinus ornus* 'Obelisk'<br>*Ligustrum lucidum* |
| Fabaceae | *Styphnolobium japonicum*<br>*Gleditsia triacanthos* 'Skyline' |
| Platanaceae | *Platanus orientalis* |
| Rosaceae **18%** | *Amelanchier arborea* 'Robin Hill'<br>*Crataegus* x *prunifolia*<br>*Malus* 'John Downie'<br>*Prunus* 'Okame'<br>*Pyrus calleryana* 'Chanticleer'<br>*Sorbus aria* 'Majestica' |
| Salicaceae | *Salix alba* 'Liempde' |
| Sapindaceae | *Acer buergerianum*<br>*Koelreuteria paniculata* 'Fastigiata' |
| Ulmaceae | *Zelkova serrata* |

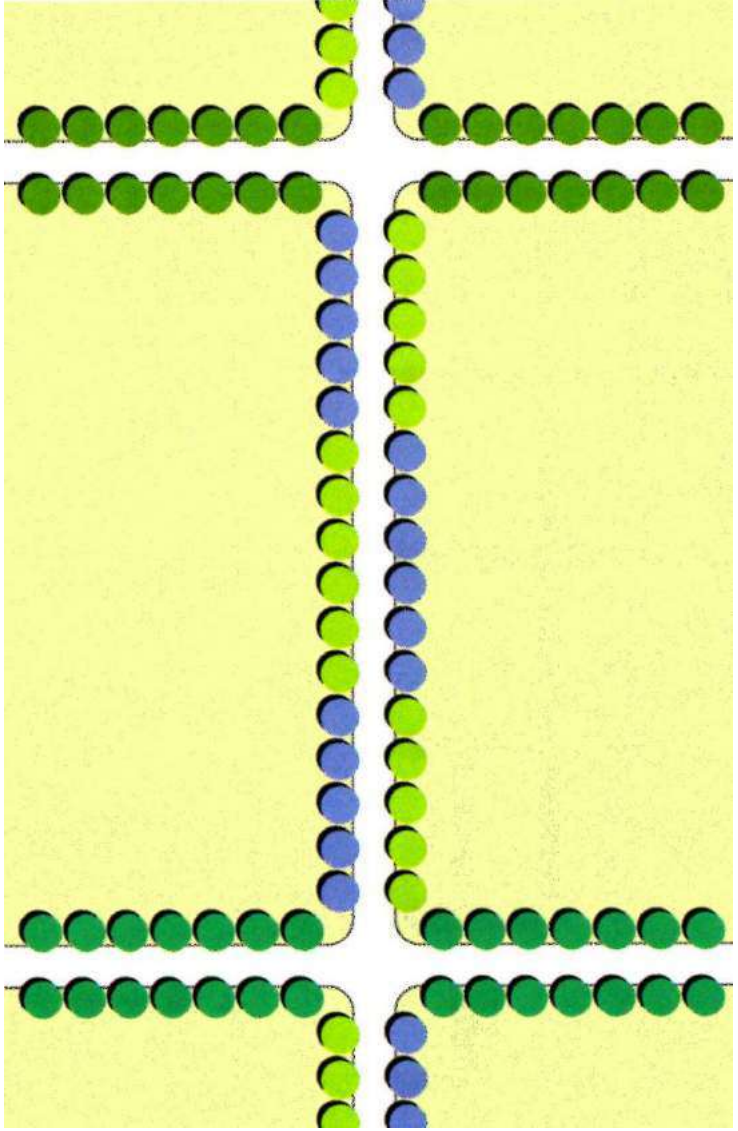
Sixteen types of tree in five square miles of London – main roads only
No more than 6% of any species, genus or family





Repetition using two species alternating on opposite sides of street

*After Simons and Hauer – ISA, August 2014*



Different single-species segments on one side of street, alternating on opposite side of street


9/11 Memorial Site – New York
Only, Swamp white oak planted – *Quercus bicolor*