



**Estates
Grounds Maintenance**

Landscape Design Guidance Notes

Document: Landscape Design Guidance Notes

Produced by: Grounds Maintenance

Version	Issue Date	Drafted	Approved
A	01/06/21	RT	SJB/JP
B (Minor Updates)	25/01/24	RT	
C			

1.0 General Information and Guidelines

1.1 Scope of the document:

The Estates Grounds Maintenance team are responsible for grounds maintenance for the University of Reading. Grounds Maintenance are not a typical client they have considerable local site knowledge and a wide range of industry experience.

This document developed by Grounds Maintenance is to be used as a design tool to develop landscape plans to ensure the University's requirements for soft landscaping are met and maintenance legacy issues are avoided. It should be read in conjunction with the Estates Soft landscaping Specification

1.2 Principle Designer and the role of Grounds Maintenance:

It is the responsibility of the principle designer to ensure the landscape is:

- Safe by design,
- Functional,
- Complying with any relevant legislation,
- Maintainable with current resource
- Does no harm to existing trees, landscape or habitats
- Built to the specification.

The role of Grounds maintenance, as a major stakeholder, is to comment on design proposals and raise concerns regarding specification compliance.

1.3 Points of Contact:

- 1) Head of Grounds Maintenance (HofGM): Rupert Taylor r.taylor@reading.ac.uk
- 2) The Deputy Head of Grounds Maintenance: Lucy Jellis l.j.jellis@reading.ac.uk

2.0 Guiding principles

2.1 Safety: The project will be responsible for ensuring that the finished landscaping can be maintained in a safe manner in accordance with the CDM regulations.

2.2 Banks swales and slopes with grass cover: must be designed in order that they can be accessed with ride on machinery and will be graded to a maximum slope of 15° to the horizontal. Engineering solutions including retaining walls or terracing or no maintenance solutions will be used to manage the risk of severe slopes.

2.3 Soil: To be retained and stored on site where possible

2.4 Schemes to enhance biodiversity: to be appropriate to the site and sustainable

2.5 Species used for planting: Ideally attractive to wild life, Long lived, robust, requires basic maintenance, consideration to academic year with regard to season of interest.

2.6 Do no harm to retained trees: It is not possible to establish meadows or plantings within the root protection areas (RPA's) of retained trees without doing damage. Should ground protection be allowed within RPA's any remedial works required e.g. re-establishment of grass will require a no dig solution.

2.7 Do no harm to existing landscape: Should retained landscaping be within the site compound then it must be adequately protected and provision for maintenance made.

2.8 Park History: Whiteknights was once a famous landscape garden and still has exotic trees dating back to this time and maintaining a diverse range of tree species is desirable.

3.0 Signage, lighting, CCTV and other street furniture

Key objectives & considerations:

- **Items to be positioned to avoid maintenance problems**
- **Street furniture to be placed within a hard landscaping detail in lawn areas**

3.1 Planning:

Signage, CCTV, lighting and street furniture to ensure positions do not restrict maintenance. Tree root protection areas are to be avoided.

3.2 Positioning:

The creation of areas inaccessible to ride on machinery must be avoided. Appropriate soft or hard landscaping solutions to be used. Signage, lighting and other street furniture must not block sight lines or be positioned within areas of vigorous soft landscaping which will require continual pruning.

3.3 Street lighting:

Street lights must not be positioned within the canopies of existing trees with cable runs planned to avoid tree RPA's. New tree planting should not share the same space as street lighting. Hinged street lights should not be positioned so they hinge towards new plantings or developing trees

3.4 CCTV:

CCTV must not be positioned within the canopies of existing trees with cable runs planned to avoid tree RPA's. New tree planting should not share the same space as CCTV

3.5 Installation within turf areas:

Signage and other street furniture within in turf areas are a maintenance constraint and are likely to be damage by mowing operations.

4.0. Hard landscaping around car parks, buildings and fixed structures

4.1 Car parking spaces:

Car parking spaces should include an 800mm over hang from the kerb this area to have a hard landscaping detail with soft landscaping beyond where appropriate. It is recommended to reduce the parking space length by the 800mm of the overhang. Space must be provided for drivers to exit their cars on ends of rows and therefore no planting and a hard landscaping detail is recommended.

4.2 Buildings and fixed Structures:

300mm wide grip with concrete kerb path edging solid or loose fill material to depth of 100mm.

4.3 Grasscrete type cellular grass growing systems:

Due to the poor performance of previously installed systems Grounds maintenance would not support their use. Where the system allows it is to be installed ready filled with growing grass then this may be considered appropriate.

5.0 Planting design general considerations

5.1 The Grounds Maintenance Team is well aware of the potential conflicts that tree and other plantings can provoke, these can be avoided by careful site and species selection.

5.2 Species selection general considerations

5.2.1 Bio hazards: There are species that are toxic if ingested or their sap can cause contact allergic reactions to skin and eyes however the likelihood of serious poisoning occurring is extremely unlikely. The Genus *Rhus* and *Euphorbia* should not be used for general planting. Trees

with thorns, those that bear fruit or encourage honey dew should be avoided in hard landscape areas.

5.2.2 Ultimate size: Right plant right space. Planting not to interfere with windows, site lines or other infrastructure.

5.2.3 Soil and site conditions: Right plant right space. Species to be suitable for onsite soil (or imported soil) and environmental conditions.

5.2.4 Biotic agents: It will be assumed that tree species associated with significant pest or disease will be avoided these include Aesculus hippocastanum, Platanus, Fraxinus and Oak (in areas of high occupancy only) due to Oak Processionary Moth.

5.2.5 Drought Tolerance: Summer droughts are likely to continue to be a problem for plant establishment. Provision for irrigation should be considered at the design stage. Drought tolerant species should be selected where appropriate.

5.2.6 Plant longevity: Short lived or less robust species should be avoided especially in high traffic areas.

5.2.7 Plant trip hazards: The use of species next to foot paths which could become trip hazards to be avoided e.g. *Phormium*, *Hedera*.

5.3 Tree siting additional considerations: Trees planted in inappropriate places can lead to different types of damage in the short or long-term future.

5.3.1 Direct Damage

By roots, e.g. the lifting of paving slabs or damage to lightly loaded structures e.g. boundary walls from expanding roots or trunk or direct contact of expanding crown to building.

Consideration should also be given to the trip hazard potential of expanding roots and future maintenance problems e.g. Cherry trees planted in a lawn.

In areas of hard landscaping the risk of damage can be reduced if trees are grown in a planting strip with exposed soil rather than planting pits. The use of root deflectors can dramatically reduce distortion of pavements. Tree grills should be specified where pedestrian damage to the rooting area is likely. The use of below ground cell systems within hard landscaping allow the successful establishment of trees while retaining sufficient load bearing properties Sufficient space should be allowed for trunk and root expansion.

Damage to drains and underground services

Water leaking from damaged drains, sewers or water mains encourages localized root growth. Roots are then likely to enter through the defect and proliferate, causing blockage and enlarging of the initial defect. Trees planted over an existing drain or service run may make use of the backfill as a rooting medium, this could result indirect pressure or leverage forces been applied to the service

Recommended minimum distance between new planting and drains to avoid direct damage

Drains & underground services	Diameter of tree stem at 1.5m above ground level at maturity		
	<30cm	30-60cm	>60cm
<1m Deep Minimum distance from tree	0.5m	1.5m	3.0m
>1m Deep Minimum distance from tree	-	1.0m	2.0m

B.S. 5837 (2012) Trees in relation to design, demolition and construction Table A1 gives a more detailed account of minimum planting distances between trees and structures.

5.3.2 Indirect action

On sites with shrinkable clay soils consideration should be given to the water demand of individual species and an appropriate planting distance should be kept between trees and existing buildings. On new developments it might be appropriate to increase the foundation depth when trees are to be planted close by and so the advice of a structural engineer should be sought. NHBC Standard Buildings near Trees, Chapter 4.2 gives advice on the avoidance of indirect damage by trees to structures

High water demand species include:

Eucalyptus, *Populus*, *Quercus*, *Crataegus*, *Salix*, *Sorbus* (simple leaved), *Cupressus*, *Chamaecyparis*, *x Cupressocyparis*, *Sequoiadendron*

5.4 Susceptibility to breakage: The incidence of mechanical failure differs between tree species and sometimes between cultivars within the same species. Species that might be considered as landscape trees which have commonly failed at Whiteknights and therefore not used include:

Cedrus atlantica 'Glauca Group' and *C. deodara*, *Acer saccharinum*, *Fraxinus* 'Raywood'

6. Preferred Species: The following lists give a range of trees and plants which have been successful on University of Reading sites. Design should not be restricted to these species but their usage in the appropriate conditions are likely to be favoured. Tree planting mixes should not comprise of more than 10% of any one species 20% of any genus and no more than 30% of any family

6.1 Invasive species: The University seeks to avoid using invasive species or potentially invasive species. Although there is no active programme to eradicate such species which are established in the landscape certain species should be avoided. These include *Ailanthus altissima*, *Cotoneaster* sp. *Prunus laurocerasus*, *Rhododendron luteum*, *Robinia pseudoacacia*, *Rosa rugosa*, Bamboo Species and cultivars

6.2 Trees Species Desirable for Structure Planting

Based on the highest percentage of recorded species on the University trees still considered viable for planting

Species	Common Name
<i>Acer campestre</i>	Field Maple
<i>Acer Platanoides</i>	Norway Maple
<i>Acer pseudoplatanus</i>	Sycamore
<i>Alnus glutinosa</i>	Common Alder
<i>Betula pendula</i>	Silver Birch
<i>Carpinus betulus</i>	Common Hornbeam
<i>Castanea sativa</i>	Sweet Chestnut
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Common Hawthorn
<i>Fagus sylvatica</i>	Common Beech
<i>Ilex aquifolium</i>	Common Holly
<i>Malus sylvestris</i>	Crab Apple
<i>Pinus radiata</i>	Monterey Pine
<i>Prunus avium</i>	Wild Cherry
<i>Prunus padus</i>	Bird Cherry
<i>Prunus spinosa</i>	Blackthorn
<i>Quercus robur</i>	Common Oak
<i>Sorbus aria</i>	White beam
<i>Sorbus aucuparia</i>	Rowan
<i>Taxus baccata</i>	Common Yew

<i>Tilia cordata</i>	Small leaved Lime
<i>Tilia x europaea</i>	Common Lime
<i>Tilia platyphyllos</i>	Large leaved Lime

6.3 Tree Species Desirable for Specimen Planting: The list is based on current successful species and availability within the nursery trade and could include available cultivars with reference to 6.4.

Species (Plus associated cultivars where appropriate, Proposals to Head of Grounds Maintenance)	Common Name
<i>Abies grandis</i>	Grand Fir
<i>Abies nordmanniana</i>	Caucasian Fir
<i>Abies procera</i>	Noble Fir
<i>Acer campestre</i>	Field Maple
<i>Acer davidii</i>	Snake bark maple
<i>Acer platanoides</i>	Norway Maple
<i>Acer pseudoplatanus</i>	Sycamore
<i>Aesculus x carnea</i>	Red Horse Chestnut
<i>Aesculus indica</i>	Indian Horse Chestnut
<i>Alnus cordata</i>	Italian Alder
<i>Betula albo-sinensis</i>	Chinese Birch
<i>Betula ermanii</i>	Erman's Birch
<i>Betula papyrifera</i>	Paper Birch
<i>Betula pendula</i>	Silver Birch
<i>Calocedrus decurrens</i>	Incense Cedar
<i>Carpinus betulus</i>	Common Hornbeam
<i>Castanea sativa</i>	Sweet Chestnut
<i>Cedrus atlantica</i>	Atlas Cedar
<i>Cedrus libani</i>	Cedar of Lebanon
<i>Celtis australis</i>	Nettle Tree
<i>Celtis occidentalis</i>	Hackberry
<i>Cercis siliquastrum</i>	Judas Tree
<i>Corylus colurna</i>	Turkish Hazel
<i>Fagus sylvatica</i>	Beech
<i>Ginkgo biloba</i>	Maidenhair Tree
<i>Gleditsia tricanthos</i>	Honey Locust
<i>Gymnocladus dioica</i>	Kentucky Coffee Tree
<i>Ilex x altaclerensis</i>	Highclere Holly
<i>Ilex aquifolium</i>	Common Holly
<i>Juglans regia</i>	Common Walnut
<i>Juglans nigra</i>	Black Walnut
<i>Koelreuteria paniculata</i>	Golden Rain Tree
<i>Ligustrum lucidum</i>	Chinese Privet
<i>Malus baccata</i>	Siberian Crab
<i>Malus Hupehensis</i>	Hupeh Crab
<i>Malus x robusta</i>	Crab Apple
<i>Metasequoia glyptostroboides</i>	Dawn Redwood
<i>Morus nigra</i>	Black Mulberry
<i>Nyssa sylvatica</i>	Tupelo
<i>Ostrya carpinifolia</i>	Hop Hornbeam
<i>Picea omorika</i>	Serbian Spruce
<i>Pinus sylvestris</i>	Scots Pine
<i>Prunus avium</i>	Wild Cherry
<i>Prunus padus</i>	Bird Cherry

<i>Prunus sargentii</i>	Japanese Cherry
<i>Prunus 'Tai Haku'</i>	The Great White Cherry
<i>Pterocarya fraxinifolia</i>	Caucasian Wing Nut
<i>Quercus castaneifolia</i>	Chestnut Leaved Oak
<i>Quercus coccinea</i>	Scarlet Oak
<i>Quercus frainetto</i>	Hungarian Oak
<i>Quercus x hispanica</i>	Lucombe Oak
<i>Quercus ilex</i>	Holm Oak
<i>Quercus imbricaria</i>	Shingle Oak
<i>Quercus nigra</i>	Black Oak
<i>Quercus palustris</i>	Pin Oak
<i>Quercus suber</i>	Cork Oak
<i>Quercus x turneri</i>	Turner's Oak
<i>Sorbus alnifolia</i>	Korean Mountain Ash
<i>Sorbus intermedia</i>	Swedish Whitebeam
<i>Sorbus thibetica</i>	Tibetan Whitebeam
<i>Sorbus torminalis</i>	Wild Service tree
<i>Taxus baccata</i>	Yew
<i>Tilia americana</i>	American Lime
<i>Tilia henryana</i>	Henry's Lime
<i>Tilia cordata</i>	Small leaved Lime
<i>Tilia x europaea</i>	Common Lime
<i>Tilia mongolica</i>	Mongolian Lime
<i>Tilia mongolica x cordata 'Harvest Gold'</i>	Golden Lime
<i>Tilia oliveri</i>	Chinese White Lime
<i>Tilia platyphyllos</i>	Large leaved Lime
<i>Tilia tomentosa</i>	Silver Lime
<i>Ulmus 'New Horizon'</i>	Elm
<i>Zelkova serrata</i>	Japanese Zelkova

6.4 Clonal Material: Tree cultivars provide uniformity within landscape schemes and avenues but should be used with restraint in general planting to ensure biological diversity which may give greater resilience to disease. Flowering trees and shrubs: Single flowered specimens which give opportunities for pollinators and the formation of fruit are preferred.

6.5 Shrub species for Structure planting, thickets and native mixed hedges

Species	Common name
<i>Cornus sanguinea</i>	Dog Wood
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Crataegus oxycarpa</i>	Midland thorn
<i>Euonymus europaeus</i>	Spindle Tree
<i>Frangula alnus</i>	Alder Buckthorn
<i>Ilex aquifolium</i>	Holly
<i>Juniperus communis</i>	Juniper
<i>Ligustrum vulgare</i>	Privet
<i>Lonicera periclymenum</i>	Honey Suckle
<i>Prunus spinosa</i>	Blackthorn
<i>Rhamnus cathartica</i>	Purging Buckthorn
<i>Rosa arvensis</i>	Field Rose
<i>Rosa canina</i>	Dog Rose
<i>Salix alba</i>	White Willow

Salix cinerea	Grey Willow
Salix pentandra	Bay Willow
Salix viminalis	Osier
Sambucus nigra	Elder
Taxus baccata	Yew
Viburnum lantana	Wayfaring tree
Viburnum opulus	Guilder Rose

6.6 Shrubs and Other plants for landscape use

Species (Plus associated cultivars where appropriate, Proposals to Head of Grounds Maintenance)	Common Name
Abelia x grandiflora	Glossy Abelia
Acer palmatum	Japanese Maple
Acer Japonicum	Japanese Maple
Acer tataricum subsp. ginnala	Amur Maple
Aesculus parviflora	Bottle brush Buckeye
Amelanchier lamarckii	Snowy Mespilus
Aralia elata	Japanese Angelica tree
Aucuba Japonica + Cvs	Japanese Laurel
Brachyglottis 'Sunshine'	
Ceanothus 'Blue Cushion'	Californian Lilac
Choisya 'Aztec Pearl'	Mexican Orange Blossom
Cistus laurifolius	Sun Rose
Cistus populifolius	Sun Rose
Cornus alba	Dog wood
Cornus mas	Cornelian Cherry
Cornus sanguinea 'Midwinter Fire'	Dog wood
Cornus sericea 'Flaviramea'	Dog wood
Elaeagnus x ebbingei	Oleaster
Epimedium x versicolor 'Sulphureum'	Barrenwort
Escallonia CVs	
Euonymus alatus	Winged Spindle
Euonymus europaeus 'Red Cascade'	Spindle Tree
Euonymus fortunei Cvs	Fortune's Spindle
Garrya elliptica	Silk Tassel Bush
Griselinia littoralis	New Zealand Broad leaf
Hypericum 'Hidcote'	St John's Wort
Ilex crenata	Japanese Holly
Kolkwitzia amabilis 'Pink Cloud'	Beauty Bush
Ligustrum lucidum	Chinese Privet
Lonicera nitida	Shrubby Honeysuckle
Lonicera pileata	Shrubby Honeysuckle
Lonicera x purpusii 'Winter beauty'	Shrubby Honeysuckle
Mahonia japonica	Japanese Mahonia
Mahonia x media	Oregon grape Hybrid
Miscanthus sinensis	Chinese Silver Grass
Myrtus communis	Myrtle
Olearia x haastii	Daisy Bush
Olearia macrodonata	Daisy Bush
Osmanthus delavayi	Delavay Osmanthus
Osmanthus x burkwoodii	Burkwood Osmanthus
Phillyrea angustifolia	Narrow leaved Mock Privet
Prunus lusitanica	Portuguese laurel

Sambucus nigra CVs.	Elder
Sarcococca confusa	Winter Box
Sarcococca hookeriana var. humilis	Winter Box
Salix daphnoides	Violet Willow
Salix exigua	Coyote Willow
Viburnum betulifolium	Birchleaf Viburnum
Viburnum x bodnatense 'Dawn'	Arrowwood
Viburnum x burkwoodii	Burkwood Viburnum
Viburnum davidii	David Viburnum
Viburnum plicatum	Japanese Snowball

6.7 Shrubs to control access but not for general use

Berberis darwinii	Darwin's Barberry
Berberis julianae	Wintergreen Barberry
Berberis x steophylla	Golden Barberry
Chaenomeles speciosa	Chinese quince
Chaenomeles x superba	Japanese quince
Crataegus x persimilis 'Prunifolia'	Cockspur Thorn
Pyracantha Cvs.	Fire Thorn

7 Tree stock:

7.1 Containerised stock: to be specified for planting schemes supplied in Air or light pots to be specified within 45L-100L range

7.2 Root Balled trees: not to be specified due to the previous poor performance of such material thought to be as a result of poor handling, inability to remove wrappings and deep planting (as unable to see root collar)

7.3 Bare root trees: Not to be specified unless small sized 30-125cm for hedging and copse like planting

7.4 Tree size: Ideally within the following stem size, 12-14cm, 14-16cm Tree height not to be used as a singular determining sizing factor

7.5 Form: Standard or feathered. Due to the increased risk of inclusions and structural weakness multi-stem trees not to be specified should this effect be required it can be achieved by group or 'Bundle' planting of individual trees. Fastigate trees are often selected to fit a restricted space but may have a similar spread at maturity as the type but are really difficult to prune without damaging the form e.g. Carpinus betulus 'Fastigiata' Due to the fastigate form branch unions can be more acute with a higher prevalence of branch failure e.g. Tilia cordata 'Green Spire'

8.0 Nursery Stock

8.1 Containerised stock: to be specified in 3L-10L range

9.0 Planting: Poor planting and handling is the main reason for long term instability, poor growth and ultimate death of newly planted trees and shrubs. This operation needs to be supervised by a suitably competent person from the onset of the planting operation and overseen by the principle designer. Just because a tree is alive during the defects liability period does not mean it will thrive.

10.0 Meadows/ Wild flower establishment: Site specific soil assessment and appropriate species mix selection. Low soil fertility is preferable where soil fertility is high consideration to be given to meadow turf products. Top soil stripping or inversion ploughing unlikely to be appropriate but may be considered at times.

Tall wild Flower mixtures should not be used where there is the chance of obscuring sight lines or causing obstruction for example on bends, road junctions or within 2m of paths or 1m of buildings.

11.0 Aftercare during defects liability: Maintenance specification to be made available and agreed with Grounds Maintenance at project design stage and must be output driven. Replacement of plant failures to occur at the earliest opportunity ideally within a suitable planting window. It should be noted that Grounds Maintenance will not have the resource to irrigate nursery stock should the landscape be handed over with plants or trees that do not have independence in the landscape. It is not acceptable to carry out remedial works or replacement planting at the point of hand over.