

The Draft Birmingham Design Guide

The Landscape & Green Infrastructure City Manual

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CREATING RESILIENT & ENDURING LANDSCAPE

CITY NOTE GI-1: Utilise and Protect Existing Landscape Assets

Sites can often contain existing landscape components and features that can influence the landscape design of a proposal and provide established / mature elements that can continue to contribute to the landscape character of the site and surrounding area. Such features may comprise of existing trees, shrubs and hedgerows, ponds, streams and grassland.

Existing features should be identified through the character assessment of the site; and effectively incorporated into the proposal's landscape design. Where existing features and components are to be lost as a result of development, proposal must justify this loss and provide appropriate mitigation.

Where space and assets are to be retained or utilised for open space, these areas should be protected during construction.

Soil is also a finite, non-renewable landscape resource which must be appropriately protected and managed during construction activity. To help protect this resource, the City supports the application of the guidance contained in the DEFRA '*Construction Code Of Practise for the Sustainable Use of Soils on Construction Sites*'.

www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites

CITY NOTE GI-2: Respecting Existing Character Areas

Where development is seeking to effectively integrate into an existing character area, landscape proposals should be laid out in such a way that they align with the established character, and effectively accommodate the landscape components typical of the character areas. For example:

- aligning with established front garden sizes, widths and depths;
- planting trees and/or hedgerows at street frontage;
- following established boundary treatments (hedgerows, walls, railing);
- planting landscape buffers between adjacent uses;
- integrating landscape features into surface car parks;
- use landscape features as focal points;
- planting compatible species

CITY NOTE GI-3: Giving Space to Landscape

Whether designing a landscape proposal to effectively integrate with an established landscape character, or creating a new design, proposals must not apply tokenistic landscape proposals.

Successful landscape schemes must work with the architecture to create quality places that endure. This requires proposals to devote sufficient space to its landscape scheme, to maximise green infrastructure gains and effectively deliver the landscape character designed.

In order to help achieve this, proposals must consider:

- how the landscape will establish over time;
- whether the scheme can successfully accommodate the maturing of the landscape components;
- if landscape components can successfully establish within the planting zones / areas provided;
- applying an appropriate species mix;
- how will residents, employees, users be able to use and interact with the landscape;
- potential conflict with adjacent buildings, users and vehicles
- future management

The outcome of these considerations should lead to a robust landscape scheme that can successfully mature and not a reduction in landscape quality.

If revisions to a development proposal's built form (layout, densities) are required to achieve a balanced (landscape & built form) high quality scheme, these should be applied.

This balance should be successfully achieved by all development proposals, but may be particularly important within apartments and multi-resident schemes, where private garden space may be limited; and within infrastructure projects and employment uses, where landscaping will be important to help soften these often functional and hard environments.

CITY NOTE GI-4: Create Spaces to Aid Health and Well-Being

In designing and specifying spaces and environments, landscape architects must consider how people will be able to use and engage with the landscape created. The size and role of the landscape will influence this in part, but attempts should be made to enable people to sit in and enter areas; and where appropriate, incorporate spaces where exercise, cultural and social activity could take place. Designers should gain an understanding of the local demographic and wider users, to help identify any specific requirements that should influence the overall design of spaces, such as being child orientated, have cultural or faith relevance or being steered by dementia friendly environments.

The selection of plants and trees should also consider how scents, movement and colours can add to the human experience of the landscape.

The creation of innovative public spaces can be enhanced through the commissioning of a professional artist whose creative input as part of the landscape team in the early planning stages could help to deliver greater value from a pre allocated budget.

CITY NOTE GI-5: Spaces for Children and Young People

Linked to the health and well-being function of landscapes, designers must give

specific consideration to how children and young people may wish to use spaces formally and informally. Birmingham's children and young people are one of its greatest assets and the city's landscapes must be accessible to them.

Open space provision often provides formal recreation facilities for children, but beyond these areas, landscapes and public realm designs must be informed by how the city's young people want to use and engage with these areas. Designs driven by children, acknowledging how their young, playful minds see and want to explore places can result in landscapes that delight and benefit all age groups.

Teenagers and young people often use spaces to meet, socialise and/or undertake urban sports (such as skateboarding). Whilst in many cases their use of landscapes is informal, this must not negate the need to consider, and where appropriate engage, with the city's young people in designing public landscape. Designs often seek to prevent sports such as skateboarding taking place, but they are part of the city's culture, and where appropriate designers should enable and design for urban sports taking place.

CITY NOTE GI-6: Designing Out Potential for Crime

The design of landscape and the components planted and installed into them can impact on how spaces are perceived and the way they function. As a whole, landscaping should help create safe environments, be it for users within adjacent buildings or those interacting with the landscape. This outcome must be a life-long consideration, with designs and management plans considering the maintenance and cleansing needed to retain the quality and safe functionality.

Defensible space

Landscaping at building frontage can be used to help create defensible space between public and private areas. These are particularly important where development has limited setback from pavement or public spaces. Where this occurs (subject the aligning with existing character), proposals should create low level (max 1.2 metres) enclosed spaces (ideally with a minimum 2 metre setback) that can accommodate landscaping and provide a break between public and private areas.

Public landscapes

Public areas of landscaping should be designed and sited to help support safe use and activity. The nature, role and location of a space or route may dictate specific measures or features that need to be incorporated into a landscape design. But all spaces should ensure they are effectively overlooked and have clear lines of site through them.

Where features need to be incorporated to help enhance the safety of users or buildings against potential threats or unwanted activity, measures must be effectively integrated into the design and not dominate, or negatively impact upon it. Where possible, features and furniture should serve dual functions (e.g. seating, bins, signage or trees also serving as barriers / bollards) to help reduce clutter and not comprise designs.

Allied with measures to aid safety, designs should also ensure they do not create environments or features that negatively impact on user safety. Excessive cluttering of features or furniture in the landscape, poorly specified planting, blank or poorly overlooked areas and areas of pedestrian / vehicle conflict will not be accepted by the City Council.

CITY NOTE GI-7: Landscape Components & Features

Landscape designs should effectively utilise hard and soft elements to create engaging environments that enhance place and positively contribute to the city's green infrastructure network.

Soft landscape feature (planting):

When specifying and designing the soft landscape elements of a scheme, designers must consider existing biodiversity and species, local topography, soil composition and microclimate (sunlight, shade, temperature, frost pockets, wind, rainfall) of the site and its surrounding. This will help ensure appropriate species are planted that can play an active role in enhancing green infrastructure and habitat creation (as detailed at City Note GI-21). In selecting species, landscape architects should seek to apply variety across a scheme, helping to add visual interest, give plot identity, aid resilience to disease and add seasonal variation.

Consideration should also be given to the future management of proposals, ensuring species and designs reflect that level of future maintenance that can or is likely to be committed to a scheme.

Trees – proposals should seek to accommodate a good variety of mixed tree planting (forms, ultimate sizes, foliage, berries, etc.) to add variety, create visual interest across the seasons and provide wider biodiversity gains. Where there is insufficient space for tree planting, 'tree-like' feature shrubs such as Amelanchier should be provided to help give height and stature to proposals.

Where trees are to be introduced into a predominantly hard landscaped environment, enhanced tree pits should be installed to aid growth and survival rate. Within these environments particular consideration should be given to the species specified to ensure they can be sustained within the areas proposed.

In considering the siting and species selection, designers must seek to minimise potential conflict with adjacent buildings and their users. Ensure fruit or sap dropping species are not located close to car parking; and locate trees a sufficient distance from primary living spaces, to reduce impact on natural light. By reducing the potential for future conflicts, designs will help reduce the threat of future removal.

Existing Trees – informed by a tree survey, existing trees should be retained and integrated into landscape proposals. This can help add maturity to the landscape and contribute to its variety.

More detailed guidance related to existing and the planting of new trees is detailed below.

Shrubs, hedgerows & structure planting – schemes should utilise shrubs, hedgerows and structure planting to help frame spaces; delineate boundaries; provide screening; introduce layering and variety; and help buildings tie into the ground. The intended function may influence the species mix applied to a given element, but a limited repetition of species should be avoided, unless there is clear justification for this. Solutions should always seek to apply an appropriate mix of species to help provide variety in colour, form, height, density and seasonality. Within this mix, designers should seek to incorporate native species as a primary component, particularly where sites lie close to establish areas of green infrastructure (woodlands, river or canal corridors, countryside, parks) or protected green space.

For example: where tall evergreen shrubs are required to screen built elements, mix these with native species and climbers to add seasonal change and colour variations.

Applying a mixed native species hedgerow will support native wildlife, and provide visual variation, whilst providing a robust boundary once matured. To provide short and long term gains, create a mix that includes fast growing evergreen species, with slower growing natives.

Species selection must also consider the role of the planting and/or the adjacent use. If adjacent to driveways or within a visibility splay, species must be robust and low level (no more than 60cm mature). If planting is to create a defensible area or barrier, a mix including robust, dense, evergreen species may be appropriate.

Ornamental species – Proposals should seek to incorporate ornamental species into their landscape proposals, adding further layers of interest and introducing flowering species that can add multi layers of colour and provide pollinating species to support a range of insects.

Grassed spaces – should be designed to enable maintenance and provide meaningful, robust areas that can contribute to a wider landscape proposal. Grass will not be accepted as the only means of landscaping a scheme.

HARD LANDSCAPE FEATURES

The palette of hard landscape materials applied to a proposal should effectively compliment the soft elements of a scheme, together with the architecture and materials of the surrounding buildings; ensuring a cohesive development is achieved. These hard elements can often be a dominant and permanent part of the landscape, requiring considered specification and design.

In specifying and designing the hard landscape components, developers must successfully align with the following principles:

Materials – quality, durable materials should be used to help visually soften environments; help support low vehicle speeds and support pedestrian and cyclist priority; complement the materials of surrounding buildings; and create quality environments. Spaces must not be dominated by the application of tarmac surfaces.

Where this is proposed as a dominant material, schemes must include additional quality hard and/or soft elements to reduce its visual impact.

Where proposals are to link with an established palette of quality materials, designs must adopt a complementary palette, unless there is a clear justification for moving away from the existing material mix.

Street furniture— landscape and public realm proposals must incorporate high quality, robust street furniture that aligns with the wider character of the area. Furniture should either align with an established palette or create a new site specific palette that positively adds to the design of the landscape proposal. Furniture must not clutter or dominate spaces, and not be applied as an afterthought.

Where opportunities exist, proposals should seek to integrate public art into the street furniture and/or create bespoke / artist pieces of furniture.

Designs and specifications should consider how furniture may be utilised by skateboard, scooter, roller blade, parkour and BMX users. Proposals should either accommodate these users, or apply appropriate measures to restrict them.

Where PAS 68 / IWA 14-1 barriers are desired, furniture should be successfully utilised to help integrate these requirements into a landscape design and not dominate it.

Boundary treatments - visible boundary treatments can make an important contribution to the character of an area, framing streets and spaces; and delineating public and private spaces. Within urban environments where buildings are often sited at back of pavement, the introduction of formal boundary treatments (fences, walls, railings) are unlikely to be considered acceptable. But the character of housing developments or business parks may lead to more defined boundary treatments and setbacks being acceptable.

Where treatments will be visible from the public realm, high quality treatments, such as walls, railings and hedgerows, of an appropriate height should be installed. Unless the boundary is enclosing a rear residential garden, low level (below 1.2m) treatments must be applied.

Large spans of high treatment (1.8 m+) will not generally be acceptable, but if the need is accepted, treatments must be permeable, screened by planting and of a high quality to help minimise its impact on the surrounding environment.

Where existing features make a positive contribution to the street scene, these should be retained and enhanced wherever possible, particular when a hedgerow or wall that adds to the wider character area.

If bin storage is to be designed into a boundary system, it must be an integral element that effectively disguises the bin store function.

GREEN ELEMENTS ON BUILDINGS

The integration of green elements into a building's design will enable a range of

environmental gains to be achieved to the benefit of the surrounding street-scene, users, wildlife and in certain scenarios the building itself (insulation and weather protection).

Green roofs

Green roofs offer a range of benefits to the developer and occupier of the building. They also offer the potential to create green infrastructure in environments that currently lack provision such as industrial areas and dense urban environments.

From a thermal perspective, they have the potential to aid building cooling during summer months and provide insulation during winter, reducing the energy burden during these periods. They can also contribute to a site-wide SuDs system, capturing rainwater and managing its runoff. From a user perspective, the roof can serve as garden spaces/ garden, providing health and well-being support associated with biophilic design.

There are numerous systems available often utilising similar base drainage systems, adjusted to meet the type of green roof sought and its associated planting strategy. The roofs are often categorised into 'extensive green roofs' and 'intensive green roofs'.

Extensive roofs usually utilised pre-cultivated sedum or meadow flower mats which need minimum maintenance, shallow growing medium depths and no permanent irrigation system.

Intensive roofs are often associated with roof gardens serving the occupants of a building. As such, the range of species will be more varied, potentially enhancing the biodiversity and well-being value of the space. The structural requirements of intensive roofs will be considerably greater, as will the maintenance.

Apartment and office developments are encouraged to integrate intensive green roofs into their buildings to contribute to amenity provision, the health and well-being of occupants, biodiversity enhancement and aid rain water management.

Other non-residential uses should integrate extensive roofs into their design, aiding its rain water management and contributing to the building's GI provision.

Living Walls

Living walls offer the greatest gains from a wider public GI perspective, providing opportunities to visually enhance facades (and mask blank elements) and the surrounding environment, whilst also providing a biodiversity asset and method of filtering pollutants such as nitrogen dioxide.

Living walls can be created via a wire trellis system that utilises climbing plants; or with a modular system that employs hydroponics or soil systems.

Wire systems – utilise tensioned cables attached to the building, acting as a trellis for plants to climb. Species options are limited (but can be robust) and may take years to create visual coverage, unless pre-grown systems are applied. Whilst wire systems may not provide the depth of impact provided by a soil system they may

prove a viable solution to a range of site constraints.

Hydroponic systems - utilise a man-made growing system mounted to panels that attached to the building or structure. Due to the omission of soil, the systems are lightweight, but require an effective irrigation and nutrient system to maintain the plants. Maintenance requirements can be high.

Modular soil systems – use a free-draining growing soil contained in troughs / containers built into or attached to a wall. The soil enables plants to create a deeper root system allowing them to grow in size and withstand periods without water. These are the heaviest systems, requiring structural considerations.

Pot or pocket systems – provide each plant with its own pot, effectively stacked together to create the visual 'wall'. The limited space limits plant development, requiring high maintenance / replacement, but the system can be free-standing system and deliver visual change quickly.

The most appropriate system for a proposal will need to be influenced by the characteristics of the site, structural considerations and local climate. An effective maintenance system must also be adopted.

OTHER DETAILED DESIGN CONSIDERATIONS

Services & infrastructure

In designing landscape schemes and specifying their hard and soft components, consideration needs to be given to any service easements or highway design requirements that components may restrict or impact on. These requirements should not lead to a lessening in quality, but to a considered palette that allows access, limits potential conflict and effectively integrates requirements into a design.

Topography and levels

The topography (land levels and undulations) of a site and surroundings can play an important role in defining the landscape character of an area; and must be effectively utilised by development. Changes to levels within a development site may be required to help achieve the development required, but this must also ensure proposals effectively integrate with their surroundings and not result in a substantial change in levels between sites and their surroundings.

Specific consideration must also be given to existing tree roots, with root protection areas preserved against level changes.

Where level changes are proposed, appropriate landscaping should be applied with retaining structure to help effectively manage transitions.

END OF SECTION

PROTECTING BIRMINGHAM'S TREES

Tree Assessment

Where a development site contains, or lies adjacent to existing trees, these must be assessed in accordance with BS 5837: 2012 'Trees in Relation to Design, Demolition and Construction' (or as updated/ replacement). For small scale developments (non-majors) where statutory tree protection does not exist, an alternative to the BS5837 procedure is set out at City Note GI-9.

This requires the sequential production of the following, by a qualified arboriculturist, to inform the design and layout of a proposal:

- Tree Survey (TS)
- Tree Constraints Plan (TCP)
- Arboricultural Impact Assessment (AIA)
- Arboricultural Method Statement (AMS)
- Tree Protection Plan (TPP)

The TS and TCP should be produced before a layout is designed, the AIA evolves with the design; and the AMS and TPP are undertaken once the design is finalised.

As required by paragraph 4.3 of BS 5837 proposals should undertake a soil assessment to help inform decisions relating to the Root Protection Area (RPA), Tree Protection and New Planting and Design. Where this assessment is also in relation to foundation design the arboriculturist should liaise with Structural and Geotechnical Engineers to develop foundations that satisfy engineering requirements without compromising important trees.

CITY NOTE GI-8: Tree Survey

The TS should be supported by a scaled plan based on a submitted topographical site survey plan, showing plotted positions of the surveyed trees.

The TCP should be based on the same topographical site survey plan as the plan supporting the TS. It should be annotated to depict the effects of trees in terms of:

- Root Protection Areas (RPAs);
- Current branch spread;
- Likely ultimate branch spread; and
- Shading.

Circular depictions of RPAs may not always be a true reflection of the distribution of roots in reality, therefore, polygonal depictions should be used.

Trees achieving 'A' (high quality and value) or 'B' (moderate quality and value) categorisation following a TS should be retained and a design adapted to protect them from unacceptable harm. This means that development should not incur into their RPA, or their current or likely ultimate branch spread. Where incursions are proposed, the Arboriculturist should explain how it will not result in unacceptable harm.

Informed by the TS and TCP, site layout options must consider and effectively respond to the following, ensuring harm to trees is minimised; and potential for future conflict is reduced from the outset.

Direct harm

Direct, unacceptable harm to trees will occur where they suffer damage to or pruning of roots or branches, such that they are physiologically, structurally or aesthetically damaged to an irrecoverable level. It can also occur where the functionality of soil within an RPA is compromised to an irrecoverable level by compaction, contamination and/or cultivation.

Indirect harm

Indirect, unacceptable harm to trees will occur where changes in their growing environment make them more vulnerable to structural damage.

Perceived nuisance

Large trees close to dwellings can cause symptoms of anxiety, depression, fear and claustrophobia. This should be considered by designs; ensuring buildings are not sited in positions where trees might be perceived as an unreasonable nuisance. As a minimum, this should usually mean locating buildings outside of RPAs, current and likely ultimate branch spreads, and areas of gross shading. Where honeydew is present, wider easements are recommended.

Tree removal & mitigation

Where there are justified, overriding delivery and design considerations that necessitate the removal of 'A' or 'B' category trees, the City Council may accept their loss, where appropriate mitigation can be achieved by new tree planting and/or a financial contribution, equivalent to the existing tree stock value.

Mitigating the loss of mature, high quality trees takes a generation, so should always be a last resort. To demonstrate how such losses will be mitigated, it will be necessary to show how the new trees will have access to sufficient above and below ground growing space to support their healthy, unconstrained future growth.

In all cases it should be demonstrated how the development will contribute to the enhancement or preservation of a sustainable urban forest. The best way to achieve this is to provide for a mixed age range of trees across a site.

CITY NOTE GI-9: Arboricultural Impact Assessment, Method Statement and Tree Protection Plan

Having designed a site layout (and associated infrastructure routing) informed by the TS and TCP, proposals should prepare an Arboricultural Impact Assessment to explain the direct and indirect effects of the proposed development on existing trees (as detailed in BS 5837).

In turn, this should inform the Arboricultural Method Statement (AMS) and Tree Protection Plan (TPP) detailing how the development will be implemented to avoid unacceptable harm to retained trees and areas designated for structural landscaping. In some cases, there may be no requirement for an AMS, other than a statement explaining that development will be carried out in accordance with an approved TPP.

The TPP should be superimposed on a site layout plan, based on a topographical site survey plan.

Where the implementation of development does not adhere to an approved AMS and TPP it may be subject to enforcement action, including prosecution where protected trees are damaged or destroyed.

CITY NOTE GI-10: Tree Surveys and Protection For Small Scale Developments

For small scale developments (non-major applications), where there is no statutory tree protection, the following basic principles should be considered and addressed in the application. These principles should be applied to trees within a site and/or those adjacent to it (applicants are liable for damage caused by their development):

- The Root Protection Area (RPA) of all trees in and around the site should be established to inform the layout of proposals and highlight where removals may need to be considered. The basic RPA of a tree is a radius twelve times the diameter of its trunk 1.5 metres above ground level. Within this area it can be assumed that any change in ground levels greater than 100mm are very likely to have an effect on the tree.
- In certain circumstances it can be assumed that a tree has developed roots asymmetrically. For example; if the RPA includes existing building foundations, substantial retaining walls or wide expanses of hard, impermeable surface then it is likely that the tree has avoided those areas in favour of more open ground where water and air are available. In this case it may be possible to reasonably offset the RPA.

- Buildings / elevations should be appropriately set back (at least 2 metres) from the canopy to reduce potential conflict and enable the continued growth of the tree. The canopy area of a typical tree is often similar to the extent of its RPA, but may be less for certain species, such as tall cypress that have an RPA much larger than the canopy.
- Once the constraints and extent of existing trees are properly understood, the quality of the trees should be assessed to understand which trees it may be acceptable to remove and those which must be retained. Low quality 'scrubby' trees or those with obvious significant defects should not be a constraint. Trees of apparent high quality, especially those that are publicly prominent, should be retained in a proposal.
- The combination of RPA and canopy spreads of retained trees, after any reasonable modification, become the 'Construction Exclusion Zones' which should be temporarily fenced off during construction in a way that will withstand the normal rigors of construction activity. The fencing also excludes storage from those areas and should be monitored and maintained throughout the development.

CITY NOTE GI-11: Hard Landscape, Roads and Surface Construction

Considerations

Specialist building techniques and materials may need to be applied to help ensure existing trees can be safely integrated into a development. In the majority of cases, not intruding into or over the agreed root protection area (RPA) will be one of the primary constraints. However, there may be exceptional cases where it is possible to cover elements of the RPA:

Hard landscape

By utilising appropriate materials, it may be possible to locate private roads or hard landscape over elements of an RPA, if finished levels allow. The ability to effectively achieve this will relate to site and species specific factors, requiring bespoke solutions in agreement with the City's Arboriculture Officer.

The existing ground levels and finished levels for a surface are very important considerations when designing layouts near trees. It should be noted that suspension 'webbing' that is often used as a 'no dig' solution for surfaces near retained trees has a total finished thickness of at least 250 - 300mm deep (light use with block paving.). Use of these techniques will raise the existing ground level and will need to be contained at the sides with a no dig solution. Suspension webbing cannot be an adopted surface so is only suitable for private roads/driveways. Where adopted surfaces are required, these must avoid the RPA.

Piles & foundations

In some instances foundations can be piled with rafts or cantilevered over RPAs in a way that avoids digging although this will usually bring the building closer to, or under, the canopy of a tree and the suitability of this relationship will also need to be considered.

Wherever special construction techniques are proposed or implied, details of construction methods will need to be submitted with the application and not be deferred to planning conditions.

CITY NOTE GI-12: Neighbouring Trees

Issues can arise with third party trees where they overhang boundaries. Common law enables neighbours to prune non-statutory protected overhanging trees to their boundary, without requiring any consents for the Council. However, it should be recognised that applicants are liable in law if they cause a tree to fail on neighbouring land by cutting roots and branches. In these circumstances it is strongly advised that all persons take arboricultural advice before severing the roots or branches of a neighbouring tree.

If a tree is statutory protected, permission must be sought from the Council to undertake any works to the tree, including neighbours wishing to prune to their boundary.

CITY NOTE GI-13: Pruning of Retained Tree Stock

Trees that have been identified for retention as part of a development site may require some proactive pruning works in order to minimise any health and safety risk, conflict with construction activities or prevent identifiable future issues. Where pruning works are undertaken these should not be excessive or compromise the integrity of the tree limiting its future retention lifespan and adhere to the current best practice as set out in BS 3998 Tree work – recommendations.

Where trees have been and are to be returned to the public realm, consideration needs to be given to how any tree works will affect the CAVAT valuation, where tree work is deemed to have been disproportionate to the need and this has impacted the valuation, compensation equal to the loss in value may be sought.

CITY NOTE GI-14: Development Adjacent to Woodlands

Where development adjoins woodland, an eco-zone should be allowed to develop, or planted, to provide a gradual transition between forest trees (such as Oak, Ash and Beech), woodland edge trees (such as Birch, Hawthorn, Rowan and Willows) and shrubs (such as Blackthorn, Dogwood, Elder, Hazel and Guelder Rose),

herbaceous vegetation and gardens. This will minimise the potential for conflict and help protect the woodland.

An appropriate default width for a woodland eco-zone is 15 metres wide, measured from the centre of the trunk of the largest forest tree species growing closest to the edge of the existing woodland.

Greater widths may be necessary for ecologically or structurally vulnerable woodlands. Reductions in the default width are only likely to be acceptable where assessment of the woodland demonstrates satisfactorily that the development and woodland will co-exist harmoniously.

CITY NOTE GI-15: Hedgerows

Hedgerows within and bounding a development site should be assessed in accordance with the Hedgerows Regulations 1997. The assessment may form part of an Archaeological or Ecological Impact Assessment.

Hedgerows found to be important in accordance with the Hedgerows Regulations 1997 should normally be retained and incorporated into the design of development. Where overriding design considerations necessitate the removal or translocation of important hedgerows, it must be clear within the submitted Design & Assessment Statement and/or landscape proposals, how the loss will be mitigated through new planting and/or a translocation methodology.

CITY NOTE GI-16: Canopy Coverage

Development should seek to increase tree coverage within a site, through the retention of existing trees; and the introduction of well-placed new trees within landscape proposals.

Informed by a tree coverage assessment (2016) the City Council has established the existing average canopy coverage by land uses across Birmingham, providing it with a baseline understanding of Birmingham's tree population and the important role different land uses play in sustaining this.

Land Use	Average site % data (2016)
Commercial	8
Education	16
Housing	16
Industrial	4
Leisure	31
Road (Highway)	14
Services	10
Religious	35

Across all use classes the City Council will seek to create canopy gains, with particular focus given to commercial and industrial uses, where baseline contributions are low; and where mature trees contribute significantly to the character of an area.

Assessments should be made of the % canopy coverage prior to development with a view to maintaining or increasing that coverage. Sites with 0% coverage should seek to include some tree planting, with consideration given to the city-wide average canopy coverage for the proposed use.

In assessing the level of existing canopy coverage on a site, the City realises there may be sites where self-seeded trees have increased coverage. Whilst these trees may have worth, flexibility in calculating existing canopy coverage may be given, with trees that have a trunk less than 7.5cm at chest height excluded from the calculation.

Where it has been clearly demonstrated that maintaining pre-development canopy coverage will impact on delivery and/or viability, the variance may be offset via a contribution to the Birmingham Tree Bank. Funds sought will be based on the existing tree stock value.

Where new trees are to be planted to help compensate for canopy loss, or enhance canopy coverage on a site, the focus must be on delivering long term canopy gains, through the considered placement of trees and sufficient soil volume to allow them to mature. This may lead to fewer trees planted, but a greater long-term survival rate.

In establishing canopy coverage, proposals should base estimation on existing mature species to be retained on a site and/or the expected canopy spread of a newly planting tree when mature.

END OF SECTION

TREE PLANTING IN NEW DEVELOPMENT

Designing tree planting into a development

Successful tree planting as part of development depends on:

- Co-operation between the developer and the City Council.
- Space designed specifically to support the growth of trees.
- Appropriate specifications.
- Correct implementation and aftercare.

CITY NOTE GI-17: Effectively Responding to On-Site Constraints

In order to successfully integrate new tree planting into a scheme, proposals must have a clear understanding of the existing constraints and characteristics of the site, to inform the design process.

The primary constraints will be identified by a detailed topographical survey; and a utilities survey. This should be further supplemented by an understanding of additional infrastructure and utilises needed to serve the development. In some cases physical constraints to planting will also need to be understood following consideration of:

- A Tree Constraints Plan in accordance with British Standard 5837:2012; or any Standard that replaces it;
- A Geotechnical/Geo- environmental assessment; and
- A Soil Assessment.

Having established the primary constraints within a site, planting layouts (as part of wider landscape proposals) should be designed to respond to these constraints, reducing the potential for future conflict as the trees mature and establish.

Whilst appropriate infrastructure and measures will be needed, designs should recognise that services and trees need not always be mutually exclusive. Service corridors can provide valuable rooting space and liaison between service providers, Engineers, Landscape Architects and Arboriculturists may allow for co-existence.

Highways

Highway sections should show how safe vehicle and pedestrian movement, services and trees will co-exist. Trees planted close to a highway should have sufficient space to prevent conflict with the kinematic envelope of the largest vehicle likely to use the highway. The kinematic envelope is the outline of a moving vehicle affected by tilt, slope, adverse camber etc.

Avoiding conflict with the kinematic envelope does not mean that all trees planted close to roads must be small or columnar, since large, spreading trees can develop up and above the highway, whereas smaller trees may grow directly into the highway. Careful species selection, and where necessary, provision for formative pruning, can help to prevent conflict.

Climate

Localised climate and the effect development may have on this should be considered by planting proposals. The orientation of the site, allied with the siting and scale of development may lead to micro-climates which may influence where trees should be planted; and the level of resulting benefit achieved by them.

Primary considerations should be shadow paths of proposed buildings and wind tunnels generated by the proposal. Trees will provide the most benefits in terms of air cooling when planted in full / partial sun. Areas of permanent shade could be reserved for services corridors freeing up those sunnier locations for planting.

BRE Digest 209 and Forestry Commission Research Note 012 provide guidance on design to maximise the microclimatic benefits trees provide.

Long term benefits – long-living trees

The City Council wants to ensure newly planted trees have the potential to establish and mature with a development. To help achieve this, it favours schemes that seek to introduce a smaller number of well-spaced, long-living, large species trees in wide, continuous, soft landscaping; rather than a larger numbers of small, short-living trees in narrow planters, hard landscape, or leftover space.

Where planting is restricted to hard landscape, openings of minimum 1.5m x 1.5m should be provided. The larger the opening the better trees will grow.

Groupings

Trees planted in companionship are likely to grow better than those in isolation. Canopy and under-storey planting that is appropriately spaced to avoid mutual suppression, represents the optimal layout to avoid the development of structural weaknesses.

Wherever possible, tree-lined avenues should be provided, with staggered rather than linear layouts, where this would lead to streetscape or microclimate benefits.

Staggered planting using build-outs, central reservations and roundabouts can help to avoid wind tunnel effects, and can allow the planting of large trees where verges are otherwise too constrained.

CITY NOTE GI-18: Root Available Soil Volume

Root Available Soil Volume (RASV) is the volume available to roots due to its physical accessibility and suitable conditions of aeration, irrigation and fertility.

Target, minimum RASV should be provided as follows:

- **30m³** for individually planted large-medium trees
- **20m³** per large-medium tree when planted as a group of two or more with shared RASV
- **10m³** for individually planted small trees of approximately 6m height and 3m diameter branch spread after 25 years
- **5m³** per small tree when planted as a group of two or more with shared RASV

Rather than depicting a planting hole and opening, landscaping drawings must show the RASV for each tree or planting situation, in plan-view and with sections expanded to show not only the treatment of the planting hole and opening, but also the soil and any openings surrounding the planting hole.

Various products, including structural soils, tree sands, and void forming soil crates and rafts, can extend RASV beneath engineered surfaces. These products should only be specified where RASV is unavailable and they can provide a link between soft landscape and hard landscape tree pits.

Where proposed, specifications should be submitted, demonstrating how RASV will be provided for, including plan view drawings and details of irrigation, aeration, drainage and load capacity.

Structural soils and tree sands typically require large volumes of stone or sand to give them physical strength, can often impact on its 'nutritious' value compared with 'natural' soils. Consequently, when specifying RASV, it will be necessary to have regard to the particular product being used, since 5m³ of structural soil is not equivalent to the same volume of 'natural' soil.

The use of site-won or imported soils to backfill crates or rafts is supported in principle, but the fitness for purpose of the soils should first be demonstrated following physical and chemical analysis by a Soil Scientist, and their placement overseen by a Soil Scientist, or other suitably qualified landscape professional.

The pH of tree sands, structural soils and soils to back-fill crates/rafts must be known and appropriate to the tree species planted.

Adequate soil aeration is essential to the effective functioning of tree sands, structural soils and soil crates/rafts and it should be clear how this will be provided for. Voids and pipe and vent systems can help in this regard, but there should be a sufficient number and extent, and provision to prevent them becoming blocked. A minimum of two aeration inlets per tree, or per 5m³ of soil, is considered appropriate.

Subject to engineering advice, bespoke designs can extend RASV. For example, root paths and trenches are drained subgrade tunnels containing soil compacted to a level that does not prevent root growth, bridged by reinforced concrete or similar.

CITY NOTE GI-19: Tree Pit Openings

The tree pit openings must effectively balance the visual / material desires of the public realm and maintenance, with the need to support healthy tree growth. Where an appropriate balance cannot be achieved, functionality in terms of long-term tree growth should be placed above aesthetics, and it should be clear why a particular treatment is proposed. To aid this approach, the City does not support the use of grilles, unless there is a clear justification for their use.

The London Tree Officers Association produced a guide 'Surface Materials Around Trees In Hard Landscapes' to inform suitable choices and functionality; which developers should use to inform the most appropriate pit opening for their site.

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BIRMINGHAM'S BIODIVERSITY & GEODIVERSITY

Birmingham's ecological network supports a diverse range of notable biological and geological assets, including:

Designated Sites

Nationally designated sites of importance – Sites of Special Scientific Interest (SSSIs) and Local Nature Reserves (LNRs); and
Non-statutory Local Sites- Sites of Importance for Nature Conservation (SINCs) and Sites of Local Importance for Nature Conservation (SLINCs).

The location of designated sites (and Potential Sites of Importance) can be viewed via the City Council's website:

https://localview.birmingham.gov.uk/Planning/Sites/Public_Access/

Important habitats and geological features

Nationally important habitat types listed in Section 41 (S.41) of the Natural Environment and Rural Communities (NERC) Act 2006
Local priorities identified in Birmingham and Black Country Biodiversity Action Plan (BBCBAP)
www.bbcwildlife.org.uk/sites/default/files/bbcbapfinal2010.pdf

Important Species

Species protected by national and European legislation (including eleven bat species, badger, otter, water vole, black redstart, peregrine, kingfisher, great crested newt and slow worm).

Priority species (ie listed in S.41 of the NERC Act or identified in BBCBAP) which are rare or in decline, (including hedgehog, house sparrow, common toad and a number of butterflies, moths and other invertebrates).

**EcoRecord (the ecological database for Birmingham and the Black Country) holds lists of other notable species found in the city, which includes Red and Amber List Birds of Conservation Concern.*

CITY NOTE GI-20: Ecological & Geological Surveys

Ecological and/or Geological Reports

Ecological and/or geological reports should:

1. clearly describe the extent and location of designated sites, important habitats, geological features, and the status and distribution of important species;
2. assess the likely impacts of development on these receptors, following standard methodologies, such as CIEEM's guidance on Ecological Impact Assessment (EclA);
3. an explanation of the measures taken to avoid adverse impacts (eg alternative designs and locations). Where adverse impacts cannot be

- avoided, a mitigation strategy should be submitted, which clearly sets out how adverse impacts will be mitigated or reduced;
4. details of compensation to be provided where impacts cannot be avoided or mitigated; and
 5. proposals for biodiversity/geodiversity enhancements.

Ecological and/or geological surveys

Preliminary Ecological Appraisal

A Preliminary Ecological Appraisal (sometimes called an extended Phase 1 habitat survey) should include a site visit to identify the geological assets, plant communities and habitats present; and assessing their potential to support legally protected and other important species. Ecological and geological records for the site and surrounding area (obtained from EcoRecord and other appropriate sources) should be used in combination with information obtained from the site visit to identify any further survey needs. Although some species records are available from the National Biodiversity Network (NBN), these data are supplementary to, and not a substitute for, records from EcoRecord. Reliance solely on NBN data (<https://nbnatlas.org/>) will not be accepted.

Detailed species surveys

Where there is a reasonable likelihood of a protected species being present and affected by development, detailed surveys should be carried out to confirm its presence or likely absence.

Ecological surveys must be undertaken by suitably qualified, licensed and experienced persons.

Any reports concluding that a species is not present must be able to demonstrate that an adequate level of survey effort has been completed in accordance with published guidance on survey methods. Areas identified as being of botanical or geological interest should also be re-surveyed in detail to confirm their extent and conservation value; in some cases, a Local Sites assessment may also be required. These detailed surveys should be completed prior to the planning application being determined.

All surveys should follow published good practice guidelines. If it is necessary to vary from accepted survey methods, the reason should be clearly explained (and its impact on the reliability of the results) and agreed with the City Council before the planning application is submitted. Surveys should be as up-to-date as possible, preferably from the most recent survey season. Those more than two years old are unlikely to be considered valid.

Most ecological surveys can only be completed at specific times of the year (as detailed within Survey Calendar), so it is important that these are built into the development schedule at an early stage in the process to reduce the risk of delay or objection. The City Ecologists should be contacted for further advice on this.

Geodiversity

Important elements of Birmingham's geodiversity can be found in designated nature conservation sites in the north, west and south-west of the city, including Sutton Park SSSI, Land at Queslett SINC, Rubery Cutting and Leach Green Quarries SINC and LNR and Rubery Hill SINC. They are also present within flood plains and terraces of the rivers Tame, Cole and Rea and their tributaries; where the watercourses flow through green spaces such as Perry Hall playing fields, Woodgate Valley Country Park and The Shire Country Park.

Where development is proposed in these identified locations, a geological survey and assessment will be required to understand the potential impact on the site's geodiversity interest. Geodiversity aspects may also be covered in EIAs, relating to ground conditions.

Potential Impact on Sites of Special Scientific Interest (SSSI)

Where development proposals could impact on Sutton Park SSSI or Edgbaston Pool SSSI, Natural England should be consulted as early as possible in the development process. Natural England guidance on SSSI Impact Risk Zones (IRZs) may also be of assistance in determining types of development which may impact on these two SSSIs. Where legally protected species could be affected, applicants are encouraged to consult Natural England's standing advice for protected species; pre-application advice relating to development proposals affecting European Protected Species (all bat species, great crested newt, otter), is also available via Natural England's Pre-Submission Screening (PSS) Service.

CITY NOTE GI-21: Ecological & Geological Impact Mitigation

Consideration should also be given to potential impacts beyond the site, where the proposed development could have an adverse impact by causing environmental change such as hydrological change, pollution, isolation or severance of ecological connectivity. The distance from the site at which such impacts may occur will vary dependent on the nature of development, its zone of influence and the sensitivity of habitats and species in the surrounding landscape.

The mitigation hierarchy is a sequential process: each step should be considered in turn and incorporated into the scheme design before the next step in the hierarchy is considered. The overall aim of a development proposal should be to ensure, as a minimum, no net loss of biodiversity or geodiversity; and preferably, to deliver a net gain.

The mitigation hierarchy seeks to:

1. avoid impacts;
2. then mitigate unavoidable impacts; and
3. as a last resort, compensate for unavoidable residual impacts that remain after avoidance and mitigation measures.

Avoidance

The primary objective should be to avoid adverse impacts, by ensuring important habitats or features are retained, or by scheduling works to avoid sensitive periods when important species are present or breeding. Avoidance is often the cheapest and most effective way of reducing potential impacts, but it requires biodiversity and geodiversity to be considered at the very earliest stages of design.

Mitigation

Where adverse impacts cannot be avoided, steps should then be taken to minimise their intensity, duration and/or extent. Mitigation measures minimise the negative impact of a development proposal during or after its completion, for example by adopting construction methods to reduce pollution to watercourses, retaining geodiversity on-site, or designing new lighting to minimise disturbance to nocturnal wildlife. Mitigation should be proportionate to the level of impacts anticipated and should include clear, site-specific prescriptions, not generic or indicative measures. All mitigation measures will be secured through planning conditions or obligations.

Compensation

Compensation should only be considered in exceptional circumstances, and as a last resort. It should only be used to address any residual impacts that cannot be avoided or mitigated. Compensatory measures, which can be delivered on-site or off-site, must take account of the quality and extent of the asset being lost or damaged, and the risks associated with habitat creation or restoration. Given these sensitivities, areas of compensatory habitat will need to be greater than the area to be lost, to take account of failure risk or other factors. Wherever possible, compensatory measures should be in place and assessed as being successfully established (therefore allowing species to colonise from the area to be lost) before losses of biodiversity assets occur. Developers will also need to put in place measures to secure the ongoing management of the compensatory habitat or feature. It is beyond the scope of this guidance to define how the required compensation should be calculated. Bespoke, site specific solutions will be required that respond appropriately to the habitat affected, with compensation measures informed by expert ecological advice. Compensation will only be acceptable where independent ecological advice indicates there is a high likelihood of success.

CITY NOTE GI-22: Creating Biodiversity and Geodiversity Enhancements

Biodiversity enhancements should be provided in the context of the strategic framework of the Birmingham and Black Country NIA Ecological Strategy. Development should deliver enhancements which add to existing Core Ecological Areas, Ecological Linking Areas or create new habitat resources in Ecological Opportunity Areas. These enhancements can be achieved through a range of resources, which should incorporate the following where appropriate:

- Public open space should include semi-natural habitats. Larger spaces are easier and cost-effective to manage than smaller ones. They will also deliver greater biodiversity and amenity benefits.
- Green infrastructure should be designed to deliver multiple benefits. For example, sustainable drainage systems (SuDS) should create new habitats which benefit wildlife as well as providing flood attenuation or reducing

surface water runoff. Pedestrian and cycle routes should include planting that provides habitat resources for pollinating insects.

- Biodiversity features should be incorporated into the design of new buildings wherever possible, for example:
 - Living roofs and/or living walls. These benefit urban wildlife while reducing storm water runoff providing insulation for buildings and helping to reduce the cost of cooling in summer.
 - Nest units for bird species typically associated with built structures, such as swift and house sparrow, can be incorporated directly into the building fabric.
 - Bat access tiles in roofs, bat bricks, tubes or cavities in walls.
- Where possible and practical, native species should be used in landscaping schemes. Species should be appropriate to the local context. The use of locally sourced seed and plants is encouraged (see Flora Locale www.floralocale.org/HomePage).
- Ornamental planting should include a high proportion of species and varieties that support butterflies, moths, bees and other pollinating insects. Landscaping schemes should include plants that flower at different times throughout the year so as to extend the period during which foraging resources for pollinators are available. The RHS “Perfect for Pollinators” lists are a good starting point for selecting pollinator-friendly plants.
- Tree species should be considered within the context of existing ecological conditions and those associated with predicted changes in climate. Further advice about selecting climate resilience tree species is available from Forest Research (www.forestresearch.gov.uk)

Many geologically important sites are being successfully conserved on an individual basis, as part of the ongoing management of the city’s suite of designated nature conservation sites. However, conservation and enhancement of geodiversity in the wider landscape is also vital, reflecting its importance as a valuable environmental asset.

Geological features can be enhanced by:

- recording of temporary exposures;
- preservation of site investigation and borehole samples and records;
- stabilisation and consolidation of rock features;
- creation of new rock exposures;
- management of vegetation to improve the visibility of existing rock exposures;
- provision of site interpretation;
- provision of safe access to view exposures and other geological features; and
- re-use of locally quarried building materials where these cannot be retained *in-situ*.

CITY NOTE GI-23: Management Plans & Monitoring

The City Council may use planning conditions or obligations to require plans for the long-term management of habitats, species and other biodiversity and geological

features. The management plan should identify the features that will be managed to maintain or enhance the site's biodiversity or geodiversity value. The management plan should set out objectives for the habitats or features to be managed, with detailed management specifications and a monitoring programme of at least ten years. The organisation(s) responsible for implementation of the plan should be identified, as well as the funding and legal mechanisms by which implementation will be secured by the developer and the organisation(s) responsible for delivery. Wherever possible, management of habitats and features should be co-ordinated with other site management requirements. It is likely to prove more efficient and cost-effective to integrate management of habitat and landscape features, as there will often be considerable overlap in aims, objectives and management actions.

Monitoring is an important element of post-development aftercare. Monitoring provides objective data to assess the overall net effect of development on biodiversity and geodiversity and the scale of losses/gains in habitats and other features. Such information is important in providing evidence of the effectiveness of mitigation and compensation measures, which will help to guide future decision-making. Monitoring also provides evidence of compliance with planning conditions/obligations and/or protected species licensing requirements imposed by Natural England. In this latter situation, the period of monitoring will be defined as part of the protected species licence conditions.

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