Green Infrastructure

Vision

Promote the development of an integrated GI network for South Dublin County working with and enhancing existing biodiversity and natural heritage, improving our resilience to climate change and enabling the role of GI in delivering sustainable communities to provide environmental, economic and social benefits.

4.0 Introduction

This chapter of the Development Plan, alongside the associated maps, sets out the Green Infrastructure Strategy for the County. The EU defines Green Infrastructure (GI) as:

" a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation."

It comprises the interconnected network of natural, semi-natural and artificial habitats, green spaces and ecological assets that traverse our urban and rural areas. A healthy and well-connected GI network provides a range of social, economic and ecological benefits. Protecting natural features and combating habitat fragmentation improves biodiversity, filters pollutants and helps to improve air and water quality as well as preventing flooding by helping to control surface water runoff. From a placemaking perspective, it is an asset that can raise the profile of the County, influence business decisions to invest and encourage people to live and work in the County. As an integral component of building well designed and sustainable communities it is key to the success of the overall concept of connected, compact growth avoiding the damage created to the environment and climate through urban sprawl and facilitating improved physical and mental wellbeing. In this way GI is a holistic approach to land use planning which balances spatial, social and economic development in a way that enhances the natural environment.

4.0.1 GI and Climate Action

Since the publication of the previous County Development Plan 2016-2022, the wider legislative and policy landscape underpinning GI planning has evolved. It is acknowledged that we are living in an era of damaging climate change and biodiversity loss. In acknowledgement of this, the government has declared a climate and biodiversity emergency and has increased our targets towards a carbon neutral economy.

The likely impacts of climate change in South Dublin County include increased flooding risk, increased frequency of summer drought conditions as well as deteriorating air and water quality and biodiversity loss.

GI is now considered to be essential to the success of climate change mitigation and adaptation measures through nature-based solutions. While recognising that future development will result in higher energy demands, the potential for the environment to act as a balance to climate change is now central to the national and regional policy approach to climate change. GI includes urban and rural components, some natural, some man made. Through evaporation, cooling and shading it also assists in the management of temperature. The integration of GI into new development and retrofitting in existing areas contributes to sustainable development, placemaking and the success of the compact growth approach.

Balance is the key to the success of the GI based approach to climate action. Increased densities should be delivered in tandem with sustainable GI and other mitigation measures such as increased use of renewable technologies (See Chapter 10: *Energy*).

4.0.2 Planning Policy Context

Development Plan policies and objectives must be consistent with national and regional planning policy as set out in the National Planning Framework (NPF) and Regional Spatial and Economic Strategy (RSES). A number of policies and objectives in these documents are particularly relevant to the role of GI in national and regional policy:

- **National Policy Objective (NPO) 58** requires that '*Integrated planning for GI and ecosystem services will be incorporated into the preparation of statutory land use plans*'.

The NPF also states that GI planning will inform the preparation of regional and metropolitan strategies and city and county development plans by:

- Assisting in accommodating growth and expansion, while retaining the intrinsic value of natural places and natural assets;
- Providing increased certainty in planning by proactively addressing relevant environmental issues;
- Encouraging more collaborative approaches to plan-making by enabling examination of the interactions between future development requirements and the capacity of receiving areas; and
- Ensuring that sufficient and well-planned green spaces, commensurate in scale to long-term development requirements, are designated in statutory plans.

Under GI-Biodiversity-Landscape, the NPF notes that: *'It is also important to consider the interrelationships between biodiversity, natural heritage, landscape and our green spaces'.*

- **NPO 59** requires that Local Authorities *'Enhance the conservation status and improve the management of protected areas and protected species';*

- **NPO 60** requires that policy *'Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in manner appropriate to their significance';*

- **NPO 62** requires that policy *'Identify and strengthen the value of greenbelts and green spaces at a regional and city scale, to enable enhanced connectivity to wider strategic networks, prevent coalescence of settlements and to allow for the long-term strategic expansion of urban areas'.*

The RSES also provides clear guidance for Local Authorities on climate action and GI. The RSES provides for 'Enhanced GI' as a key Regional Strategic Outcome:

→ **RSO 10: Enhanced GI** *'Identify, protect and enhance GI and ecosystem services in the Region and promote the sustainable management of strategic natural assets such as our coastlines, farmlands, peatlands, uplands woodlands and wetlands* (NSO 8, 9)'.

The Dublin Metropolitan Area Strategic Plan (MASP) included in the RSES identifies key GI assets within the Dublin Metropolitan Area, several of which are located in South Dublin County. These include the Dublin / Wicklow Mountains, River Dodder, the Liffey Valley Special Amenity Area and Tymon Park, all of which are incorporated into the GI Strategy.

The Climate Strategy of the optimum development scenario for the RSES states that it is policy to *'support achievement of our national climate obligations, and also to develop regional GI and ecosystem services together with site-based alternatives for adaptation / mitigation of impacts in strategic development locations'.* It further states that Local Authorities should follow the ecosystem services approach integrating biodiversity protection, water management and climate action. It requires Local Authorities to ensure the protection of GI assets through the development management process and to facilitate the interconnection of GI assets across the region. Local Authorities are asked to consider opportunities for carbon sequestration (capturing and storing carbon) and integration of natural and built heritage when considering development.

→ **RPO 7.12** *'Local Authorities shall promote an Ecosystem Services Approach in the preparation of statutory land use plans'.*

→ **RPO 7.16** *'Support the implementation of the Habitats Directive in achieving an improvement in the conservation status of protected species and habitats in the region and ensure alignment between the core objectives of the EU birds and Habitats Directives and local authority development plans'*

→ **RPO 7.17** *'Facilitate cross boundary co-ordination between local authorities and the relevant agencies in the Region to provide clear governance arrangements and co-ordination mechanisms to support the development of ecological networks and enhanced connectivity between protected sites while also addressing the need for management of alien invasive species and the conservation of native species'.*

There are many other relevant national and regional policy objectives. These are referenced by number within individual Development Plan policies and objectives in this chapter and are set out in full at Appendix 7.

4.1 Methodology

An iterative approach was employed in the formulation of this strategy, with policy proposals and objectives based on a detailed assessment of the existing GI network in the County. The County's parks, open spaces, rivers, waterbodies, habitats, natura sites, landscape character types (see Chapter 3: *Natural, Cultural and Built Heritage*)

and other green and blue assets were mapped in detail. The blueprint of the existing GI network in the County has emerged from this process (See Figure 4.3). Analysis of the potential of the existing elements and assets have led to the identification of key GI assets along with the development of a vision and spatial framework for GI in the County. This highlights existing strengths and opportunities to further expand and enhance the County's GI network. The GI framework is based on the identification of a network of core areas, stepping stones and local and strategic corridors. A detailed analysis of the quality and potential opportunities presented by these assets, produced a suite of objectives, which when delivered will see the emergence of a robust GI infrastructure.

The Strategy will serve the County and the region for generations to come, and in the longer term fulfil the requirements of national and regional policy. Six strategic GI corridors and associated objectives are set out in this chapter. A further eleven local corridors, which link to and enhance the primary corridors, together with objectives for the protection and future enhancement of these corridors - is set out in Appendix 4: *Green Infrastructure, Local Objectives and Case Studies.*

Policy GI1: Overarching
Protect, enhance and further develop a multifunctional GI network, using an ecosystem services approach, protecting, enhancing and further developing the identified interconnected network of parks, open spaces, natural features, protected areas, and rivers and streams that provide a shared space for amenity and recreation, biodiversity protection, water quality, flood management and adaptation to climate change.
GI1 Objective 1: To establish a coherent, integrated and evolving GI Network across South Dublin County with parks, open spaces, hedgerows, trees including public street trees and native mini woodlands (Miyawaki-Style), grasslands, protected areas and rivers and streams and other green and blue assets forming strategic links and to integrate and incorporate the objectives of the GI Strategy throughout all relevant land use plans and development in the County.
GI1 Objective 2: To implement and monitor the South Dublin County GI Strategy during the lifetime of this plan and develop a fit for purpose GI scoring for the County which will support ongoing identification, protection, enhancement and management of GI in the County and which will enable the assessment and monitoring of GI interventions in the County.
GI1 Objective 3: To facilitate the development and enhancement of sensitive access to and connectivity between areas of interest for residents, wildlife and biodiversity, and other distinctive landscapes as focal features for linkages between natural, semi natural and formalised green spaces where feasible and ensuring that there is no adverse impact (directly, indirectly or cumulatively) on the conservation objectives of Natura 2000 sites and protected habitats outside of Natura 2000 sites.

GI1 Objective 4:
To require development to incorporate GI as an integral part of the design and layout concept for all development in the County including but not restricted to residential, commercial and mixed use through the explicit identification of GI as part of a landscape plan, identifying environmental assets and including proposals which protect, manage and enhance GI resources providing links to local and countywide GI networks.

GI1 Objective 5:
Continue to liaise with adjoining local authorities to ensure the protection and enhancement of cross county GI corridors.

GI1 Objective 6:
To collaborate with Kildare County Council to identify a common approach to a greenbelt / green spaces between the growing settlements within South Dublin and Kildare County Councils within the lifetime of the Development Plan and to advise the councillors of any such collaboration and proposed study or approach.

GI1 Objective 7:
To develop linked corridors of small urban 'Miyawaki' native mini-woodlands, a minimum of 100 sq m in size, to capture carbon and encourage biodiversity in suitable existing built-up areas, in low grade parkland, and other areas of zoned lands where deemed suitable and appropriate.

GI1 Objective 8:
To increase over the lifetime of this plan the percentage of land in the County, including residential, managed for biodiversity including supporting the delivery of the objectives of the County Pollinator Plan and to continue to investigate the potential for the use of low-mow methods during the lifetime of the Plan.

4.2 Strategic Themes

GI planning is a positive and proactive approach to land use planning that aims to secure the delivery of a broad range of ecosystem services. It is multifunctional and can deliver multiple and mutual environmental, social and economic benefits. The GI policies for South Dublin County are organised under the following five themes in order to reflect this broad range of ecosystem services and benefits it provides. These themes are mutually supporting, with specific policies helping to contribute to a stronger and more resilient county-wide GI Network.

Key Themes:

1. Biodiversity	2. Sustainable Water Management	3. Climate Resilience	4. Recreation and Amenity (Human Health and Wellbeing)	5. Landscape, Natural, Cultural and Built Heritage

4.2.1. Biodiversity

Biodiversity encompasses all of the different kinds of life on earth and the various ways these lifeforms interact with each other and their environment. The complex interactions that occur between different species and organisms are essential to support and sustain human life. Clean air and water, food, medicine and other natural resources that are essential to everyday life are all dependent on the protection and development of healthy, biodiverse habitats and ecosystems. Healthy biodiversity is at the core of the ecosystem services approach to development. Ecosystems and biodiversity help mitigate climate change impacts, by absorbing excess flood water or buffering us against extreme weather events. Forests, peatlands and other habitats are major stores of carbon. Protecting them can also help us limit atmospheric greenhouse gas concentrations. This Plan adopts a proactive approach to the preservation and enhancement of biodiversity in South Dublin County by promoting the protection of existing and the restoration of degraded habitats in the County and combating habitat fragmentation through the recognition within the GI strategy of the contribution of biodiversity to the enhancement of existing and creation of new linkages and corridors as part of the County's GI network.

"Biodiversity is the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes genetic diversity within species, between species and of ecosystems." United Nations Convention on Biological Diversity.

From the foothills of the Dublin Mountains to the Liffey Valley and the local and regional parks in between, South Dublin County contains a wide range of biodiversity-rich areas. Several of these habitats are protected at the European level under the Birds and Habitats Directives and are designated as part of the Europe-wide Natura 2000 network. The three Natura 2000 sites in South Dublin County are Glenasmole Valley SAC, and the Dublin / Wicklow Mountains SAC and SPA (refer to Chapter 3: *Natural, Cultural and Built Heritage*).

Seven sites of special ecological interest in the County are designated as proposed Natural Heritage Areas, including the Dodder Valley, Liffey Valley and Lugmore Glen. The Plan promotes the full utilisation of local planning powers to minimise the risk of degradation to these areas. The regional and local parks and public open spaces within the County serve as home to various native plant, animal and bird species and are important areas of biodiversity in their own right. The Plan aims to enhance the biodiversity of these existing public open spaces and promote the development of new local parks and spaces, to protect and promote biodiversity across the County.

Native pollinator species, such as the bumblebee and honeybee perform a vital role in

preserving Ireland's biodiversity by pollinating crops, plants and flowers. The All-Ireland Pollinator Plan aims to provide for the protection of pollinators, many of which have suffered decline in recent years due to habitat fragmentation and the use of pesticides. The National Plan contains a variety of measures aimed at supporting pollinator species, such as reducing use of pesticides, creating wildflower meadows and reducing the frequency of mowing on publicly owned green spaces. The Council has incorporated these suggestions into this GI Strategy to help protect South Dublin County's biodiversity.

Policy GI2: Biodiversity
Strengthen the existing Green Infrastructure (GI) network and ensure all new developments contribute towards GI, in order to protect and enhance biodiversity across the County as part of South Dublin County Council's commitment to the *National Biodiversity Action Plan* 2021-2025 and the South Dublin County Council *Biodiversity Action Plan,* 2020-2026, the *National Planning Framework (NPF)* and the *Eastern and Midlands Region Spatial and Economic Strategy (RSES)*.
GI2 Objective 1: To reduce fragmentation and enhance South Dublin County's GI network by strengthening ecological links between urban areas, Natura 2000 sites, proposed Natural Heritage Areas, parks and open spaces and the wider regional network by connecting all new developments into the wider GI Network.
GI2 Objective 2: To protect and enhance the biodiversity and ecological value of the existing GI network by protecting where feasible (and mitigating where removal is unavoidable) existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design and construction process, such proactive approach to include provision to inspect development sites post construction to ensure hedgerow coverage has been protected as per the plan.
GI2 Objective 3: To retrospectively repair habitat fragmentation and provide for regeneration of flora and fauna where weaknesses are identified in the network through the implementation of new GI interventions.
GI2 Objective 4: To integrate GI, and include areas to be managed for biodiversity, as an essential component of all new developments in accordance with the requirements set out in Chapter 12: *Implementation and Monitorin*g and the policies and objectives of this chapter.

GI2 Objective 5:
To protect and enhance the County's hedgerow network, in particular hedgerows that form townland, parish and barony boundaries recognising their historic and cultural importance in addition to their ecological importance and increase hedgerow coverage using locally native species including a commitment for no net loss of hedgerows on any development site and to take a proactive approach to protection and enforcement.

GI2 Objective 6:
To continue to support and expand the County Pollinator Plan through the management and monitoring of the County's pollinator protection sites as part of the Council's commitment to the provisions of the *National Pollinator Plan* 2021-2025.

GI2 Objective 7:
To enhance the biodiversity value of publicly owned hard infrastructure areas by incorporating the planting of new trees, grasses and other species, thereby integrating this infrastructure into the overall GI network.

GI2 Objective 8:
To take all possible steps to mitigate the impacts on biodiversity of increased recreation within the GI network, bearing in mind the effects of scramblers, dogs, drones, littering and illegal dumping.

GI2 Objective 9:
To examine where appropriate the full potential of landfill sites and quarries as well as existing underutilised perimeter and border park spaces through the augmentation of wild grasses and other naturally occurring vegetation that enhance local area biodiversity and habitats in support of the National Pollinator Plan and to consider wildflower meadows where beneficial to biodiversity.

GI2 Objective 10:
To enhance biodiversity and the health of pollinator species by banning the use of glyphosphate in or close to public parks, public playgrounds, community gardens / allotments and within residential estates, whether by directly employed Local Authority staff or private contractors.

4.2.2. Sustainable Water Management

The County's watercourses form a major and unique element of the GI network. They are vitally important biodiversity corridors for a range of protected species. The considered management and enhancement of watercourses and wetland areas can provide effective measures to help manage flooding and improve the quality of water.

The EU *Floods Directive* and the recommendations of the 2004 *National Flood Policy Review Report* are driving forces behind flood management in Ireland. The *Planning System and Flood Risk Management Guidelines for Planning Authorities*, DECLG and OPW (2009) and DECLG Circular P12 / 2014 address the interface between flood risk management and the planning system. The guidelines state that the steps in the

Development Plan process and its Strategic Environmental Assessment need to be supported by an appropriate analysis of flood risk.

A Strategic Flood Risk Assessment (SFRA) of the County has been prepared to support the Strategic Environmental Assessment of the County Development Plan. The assessment was carried out in accordance with the requirements of the Flood Risk Management Guidelines. The SFRA Report is a separate document to be read in parallel with this Plan and Chapter 11: *Infrastructure and Environmental Services*, Policy IE 4 Flood Risk.

Riparian Corridors

Riparian Corridors are the focal point for much of the world's freshwater. These areas are seen to be important in terms of biogeochemical processing and subsequent ecosystem service provision. They have a proven role in controlling the movement and processing of waterborne pollutants. The relationship between riparian areas and nutrient processing is widely known, by acting as buffers between upland areas and open water, they help treat pollutants. Riparian vegetation acts with flow, sediment and topography to influence channel form, instream habitat, nutrient dynamics, temperature and flow patterns.

Therefore, removal of upland and riparian vegetation through agriculture and urbanisation disrupts land-water linkages leading to reductions in water quality, simplification of stream channels, less stable thermal and flow regimes, and ultimately, reduced ecosystem integrity. Riparian vegetation is a key source of beneficial in-stream nutrients and carbon, provides shade aiding thermally sensitive species, for example salmonids, and directly influences channel morphology (bank stabilisation, source of large woody debris).

Designating and maintaining riparian corridors along the major watercourses and their tributaries is key to maximising ecosystem services provided by the watercourses. Vegetative riparian buffers provide for ecosystem services in the following ways:

- Interception and reduction of potential pollutants from both agricultural and urban sources;
- Attenuating flood waters;
- Bank stabilisation;
- Reducing runoff volumes;
- Habitat provision and refuge;
- Ecological corridors;
- Vegetal debris that falls into the watercourse is an important source of nutrients for instream biota;
- Thermal shading of watercourse;
- Amenity value.

Policy GI3: Sustainable Water Management
Protect and enhance the natural, historical, amenity and biodiversity value of the County's watercourses. Require the long-term management and protection of these watercourses as significant elements of the County's and Region's Green Infrastructure Network and liaise with relevant Prescribed Bodies where appropriate. Accommodate flood waters as far as possible during extreme flooding events and enhance biodiversity and amenity through the designation of riparian corridors and the application of appropriate restrictions to development within these corridors.
GI3 Objective 1: To ensure that hydromorphical assessments are undertaken where proposed development is within lands which are partially or wholly within the Riparian Corridors identified as part of this Development Plan.
GI3 Objective 2: To require development proposals that are within riparian corridors to demonstrate how the integrity of the riparian corridor can be maintained and enhanced having regard to flood risk management, biodiversity, ecosystem service provision, water quality and hydromorphology.
GI3 Objective 3: To promote and protect native riparian vegetation along all watercourses and ensure that a minimum 10m vegetated riparian buffer from the top of the riverbank is maintained / reinstated along all watercourses within any development site.
GI3 Objective 4: To uncover existing culverts where appropriate and in accordance with relevant river catchment proposals to restore the watercourse to acceptable ecological standards for biodiversity wherever possible improving habitat connection and strengthening the County's GI network.

Sustainable Drainage Systems (SuDS)

Natural features and open spaces such as parks or forests help retain and store stormwater, slowing its infiltration into the water system and filtering pollutants. However, due to reduced open space provision and higher rates of impermeable paving, urban areas can often experience challenges around surface water management. Water is directed to grey infrastructure drainage systems that can become overwhelmed during periods of heavy rainfall, leading to flooding. Pollutants from the urban environment also flow into the water system unmitigated, potentially reducing overall water quality. The implementation of Sustainable Drainage Systems (SuDS) is a nature-based solution to water management that aims to address these issues in a sustainable manner, by utilising and mimicking natural infiltration processes from the environment.

The SuDS philosophy is to mimic the natural hydrological cycle by promoting;

infiltration, evaporation, evapotranspiration, the harvesting of rainwater at source and the temporary storage of water (ponding), through the construction of a combination or series of components to form a 'management train'. The three 'pillars' of sustainable stormwater management practice are generally accepted as:

(i) Reducing the rate and quantity of stormwater discharge;
(ii) Improve the quality of stormwater discharges and receiving water bodies; and
(iii) Provide amenity and biodiversity value. Consideration of the sensitivity of the surrounding environment and downstream water quality is fundamental to the successful implementation of SuDS systems, particularly as we face into the uncertainties of a changing climate.

Guidance on the design, criteria and implementation of SuDS was produced under the Greater Dublin Strategic Drainage Study (GDSDS). South Dublin County Council's SuDS Guidance document will further inform developers and stakeholders in the implementation of SuDS. SuDS measures suitable for the public realm and communal areas include ponds and wetlands, bioswales and urban trees. Through careful design such features can help enhance the streetscape. Localised site-specific measures include the provision of green roofs / walls, filter strips, rain gardens, water butts and the incorporation of permeable paving where appropriate (see Appendix 4 and Chapter 11: *Infrastructure and Environmental Services* and Chapter 12: *Implementation and Monitoring*).

Policy GI4: Sustainable Drainage Systems
Require the provision of Sustainable Drainage Systems (SuDS) in the County and maximise the amenity and biodiversity value of these systems.
GI4 Objective 1: To limit surface water run-off from new developments through the use of Sustainable Drainage Systems (SuDS) using surface water and nature-based solutions and ensure that SuDS is integrated into all new development in the County and designed in accordance with South Dublin County Council's *Sustainable Drainage Explanatory Design and Evaluation Guide,* 2022.
GI4 Objective 2: To incorporate a SuDS management train during the design stage whereby surface water is managed locally in small sub-catchments rather than being conveyed to and managed in large systems further down the catchment.
GI4 Objective 3: To require multifunctional open space provision within new developments to include provision for ecology and sustainable water management.
GI4 Objective 4: To require that all SuDS measures are completed to a taking in charge standard.
GI4 Objective 5: To promote SuDS features as part of the greening of urban and rural streets to restrict or delay runoff from streets entering the storm drainage network.

GI4 Objective 6:
To maintain and enhance existing surface water drainage systems in the County and promote and facilitate the development of Sustainable Drainage Systems (SuDS), including integrated constructed wetlands, at a local, district and County level, to control surface water outfall and protect water quality.

4.2.3 Climate Resilience

'Resilience' is the ability to react and recover from external shocks and disruptions, as well as the foresight to anticipate and proactively prepare for future challenges. Climate change is recognised as a global source of disruption, one that will influence Ireland's spatial and economic growth and development over the next several decades. The Plan rises to this challenge and promotes a GI approach which frontloads South Dublin County's response to ensure a county which is resilient to current and future climate change impacts.

The impacts of a changing climate include fluctuations in seasonal temperatures, greater rainfall intensity and more frequent storm events, leading to an increased likelihood of flooding. Urban areas are particularly susceptible to these impacts. Built-up, three dimensional landscapes absorb and retain larger amounts of sunlight, contributing to higher localised temperatures compared to rural areas. This is known as the 'Urban Heat Island' effect, and can lead to higher cooling costs for buildings, as well as cause discomfort for residents and visitors. Urban areas are also more susceptible to intense rainfall and storm events which can overwhelm stormwater drainage systems.

GI will play a key role in combating climate change and mitigating against its impacts. The County's trees, forest and park areas provide valuable carbon sequestration services, absorbing CO2 from the atmosphere and storing it in the soil. In urban areas tree planting and other local GI interventions provide cooling and shade, ensuring a liveable and comfortable environment for residents and visitors. GI planting and SuDS can also play a significant role in stormwater runoff.

Urban Greening
Interventions which raise the quality of and modify the quantity and accessibility of urban green spaces are described as Urban Greening. Urban Greening can be achieved by establishing new urban spaces or by changing the characteristics of existing ones. The process can refer to a broad spectrum of measures which can be implemented at different scales in private or public spaces. These can include, pocket parks, urban gardens, green roofs / walls, recreational and urban / community gardening, natural (SuDS) and may include facilitated access to urban woodlands, forests and natural wildlife areas. Urban greening helps combat air and noise pollution, soaks up rainwater that may otherwise create flooding, creates a habitat for local wildlife, and has shown to lift morale in the people who see it, calming traffic and there is some evidence that it can lessen urban crime. This process is implemented through the application of a Green Space Factor.

Green Space Factor (GSF)

The quantity and quality of green infrastructure provided by new development will be improved by the implementation of a Green Space Factor (GSF) for South Dublin. The GSF is a measurement that describes the quantity and quality of landscaping and GI across a defined spatial area. This measurement comprises a ratio that compares the amount of green space to the amount of impermeable 'grey' space in a subject site. As a planning tool, this ratio is used to assess both the existing green cover within a site and the impact of new development, based on the quantity and quality of new green space provided. Greening factors have been adopted and implemented across the UK, Europe and the United States to help ensure that new development makes a positive contribution to the local environment. By ensuring that new development meets minimum standards for the provision of GI the GSF aims to secure a positive contribution to biodiversity, amenity, air quality, stormwater management, temperature regulation and other ecosystem services. The GSF prioritises the retention of existing GI features within a subject site, in order to support the protection of the County's existing GI network. At the same time, the GSF will ensure that new development incorporates new landscaping and GI features, contributing to the enhancement of the overall GI network. Chapter 12, section 12.4.2 provides further detail on the requirements for the GSF as part of planning applications.

A **Green roof** is one which is planted with different types of vegetation, which can include grasses, flora, herbs and vegetables. Green roofs can be incorporated into new developments and retroactively installed on older buildings in order to secure a variety of benefits. They can contribute to climate change resilience, helping to improve air quality and temperature while also retaining and filtering stormwater to alleviate pressure on drainage infrastructure. Depending on the mix of plants used green roofs can also help contribute to local biodiversity, as well as provide new public and private amenity spaces and increase property values. **Green walls** can provide similar benefits and contribute to urban design and placemaking.

Tree Planting

The value of trees in delivering carbon sequestration is undisputed. Tree canopy cover in the County has been assessed based on data provided by UCD, see Figure 4.1. It is highly desirable that the extent of this canopy should be extended during the lifetime of the Development Plan. Where considered appropriate, objectives supporting additional planting are included in Appendix 12: *Our Neighbourhoods*.

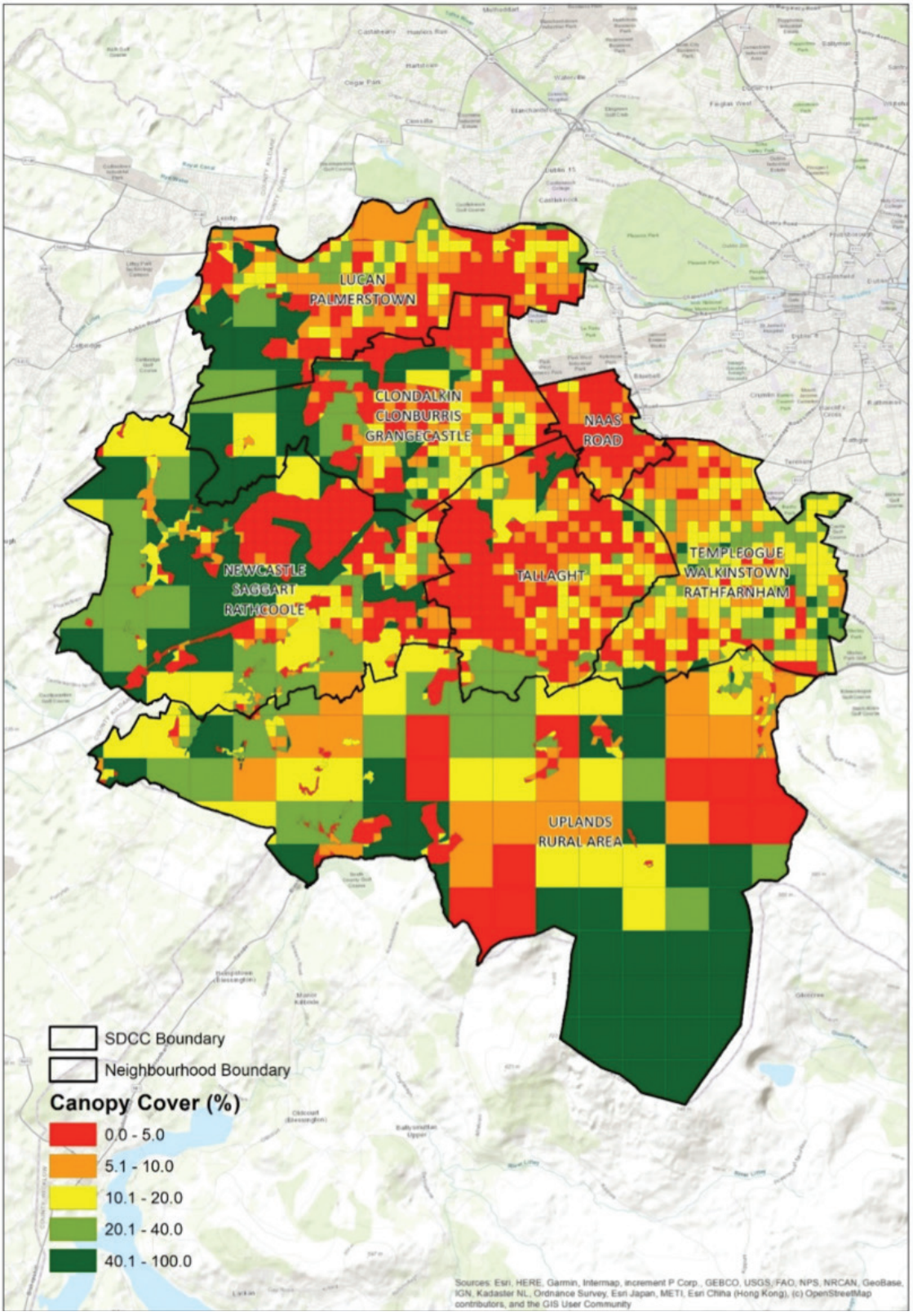

Figure 4.1: Tree Canopy Cover South Dublin County Council (Source: Department of Geography, UCD 2017)

Policy GI5: Climate Resilience

Strengthen the County's GI in both urban and rural areas to improve resilience against future shocks and disruptions arising from a changing climate.

GI5 Objective 1:
To protect and enhance the rich biodiversity and ecosystems in accordance with the ecosystem services approach to development enabling mitigation of climate change impacts, by absorbing excess flood water, providing a buffer against extreme weather events, absorbing carbon emissions and filtering pollution.

GI5 Objective 2:
To protect and enhance the natural regime of the watercourses of the County to more efficiently capture their flood resilience value.

GI5 Objective 3:
To ensure compliance with the *South Dublin Climate Change Action Plan* and the provisions of the Council's Tree Management Strategy.

- → Increase the County's tree canopy cover by promoting annual planting, maintenance preservation and enhancement of trees, woodlands and hedgerows within the County using locally native species and supporting their integration into new development.
- → Identify suitable sites for new urban trees including Miyawaki style mini woodlands, where feasible.
- → Support the implementation of a co-ordinated regional approach to the maintenance of trees and support the work of the Regional Steering Group on Tree Management to which South Dublin County Council is a participant.
- → Promote the establishment of tree trails in public parks across the County.
- → Promote the planting of new woodlands and forestry within appropriate open space and park locations within the County.
- → To plant "pocket forests" in tracts of open grassland to act as an oasis for biodiversity.
- → To recognise the value of mature trees in terms of carbon sequestration and amenity over saplings.

GI5 Objective 4:
To implement the Green Space Factor (GSF) for all qualifying development comprising 2 or more residential units and any development with a floor area in excess of 500 sq m. Developers will be required to demonstrate how they can achieve a minimum Green Space Factor (GSF) scoring requirement based on best international standards and the unique features of the County's GI network. Compliance will be demonstrated through the submission of a Green Space Factor (GSF) Worksheet (see Chapter 12: *Implementation and Monitorin*g, Section 12.4.2).

GI5 Objective 5:
To promote positive land and soil protection measures to avoid degradation or loss of natural soil resources, to minimise sealing of soils and to remediate contaminated land.

GI5 Objective 6:
To provide more tree cover across the county, in particular to areas that are lacking trees, with an emphasis on planting native Irish trees as appropriate.

GI5 Objective 7:
To require the provision of green roofs and green walls, providing benefits for biodiversity and as an integrated part of Sustainable Drainage Systems (SuDS) and Green Infrastructure, in apartment, commercial, leisure and educational buildings, wherever possible and develop an evidence base for specific green roof requirements as part of the Council's ongoing SuDS strategy development.

GI5 Objective 8:
To complete a flood risk assessment for Saggart with a view to restoring and protecting existing biodiversity, ecosystems and drain systems.

4.2.4 Recreation and Amenity (Human Health and Wellbeing)

There is a clear understanding that access to nature and the outdoors has a positive impact on human health and wellbeing. This comes at the same time as an increased awareness of the impact of air pollution on human health, which can lead to a myriad of negative outcomes. A GI approach to planning maximises the benefits to humans from healthy functioning ecosystems. To remain healthy and to continue to offer benefit to humans, the integrity and biodiversity value of ecosystems must be protected.

South Dublin's GI network makes a vital contribution to the mental and physical health of our communities. The County's hierarchy of publicly owned and managed parks and open spaces are important recreational destinations for residents and visitors at the local, neighbourhood and regional level. The Dublin Mountains, within the Wicklow Mountains National Park, are a significant recreational attraction and are popular destinations for hiking, climbing and bike riding. Many of these open spaces serve as important hotspots for biodiversity, and the trees, forestry and woodlands they contain filter carbon and other pollutants, contributing to air quality. Over the period of this plan the Council will preserve these existing recreational opportunities and support new projects and innovations, such as the Dodder Greenway, that will further enhance and diversify the ways in which residents and visitors can access and enjoy nature in the County.

A collaborative project with Dún Laoghaire-Rathdown County Council, Dublin City Council and the National Transport Authority, the Dodder Greenway will be over 17km long, providing an integrated pedestrian and cycle route from the quays in Dublin City Centre to Glenasmole in the foothills of the Dublin Mountains. This significant infrastructure will be integrated within the existing park system in order to provide safe and attractive access throughout to open space throughout the County. A

similarly forward-looking approach will be used to identify and promote new opportunities to improve the amenity and function of the County's GI network.

The Council will support Coillte's Dublin Mountains Conversion Plan that seeks to convert commercial forests in the Dublin Mountains to native and mixed woodlands to improve their biodiversity value and recreational amenity. There is also an opportunity to examine the various sports and leisure facilities that are located throughout the County, including playing pitches, skateparks and water sports, to review and assess how appropriate GI interventions can further improve their function and accessibility.

Innovative design solutions can help integrate traditionally hard-landscaped recreational facilities, such as playgrounds and skateparks, into the local GI network. Doing so can diversify the uses of these spaces, while also contributing to stormwater management. Weaver Park in Dublin City's Liberties area combines the provision of a skatepark with lawns and tree planting to create a multifunctional outdoor space that can host active and passive recreational uses, as well as markets or outdoor exhibitions. As a European example, the Lemvig Skatepark in Denmark transforms the idea of a mono-functional skate park into a multifunctional recreational space. The paved skate area is interspersed with grassy planted areas, as well as a small basketball court and sandpit, providing discrete yet interconnected spaces where families and visitors of all ages can play and relax.

The Council manages **allotments** at Tymon Park in Tallaght, Corkagh Park in Clondalkin, Friarstown in Bohernabreena and Mill Lane in Palmerstown. Residents can pay to rent these allotments to grow their own fruits and vegetables, providing access to healthy affordable food. Allotment growing also provides an opportunity for healthy physical recreation and social engagement, and also can play an important role in improving local biodiversity. The Council will continue to protect and promote existing allotments and provide for new allotments in accordance with a review of the provision and management of allotments across the County.

Policy GI6: Human Health and Wellbeing
Improve the accessibility and recreational amenity of the County's GI in order to enhance human health and wellbeing while protecting the natural environment within which the recreation occurs.
GI6 Objective 1: To support a hierarchy of accessible open spaces and recreational facilities, appropriate for neighbourhood size and catchment area, which are adaptable and capable of accommodating multiple uses (See Chapter 8: *Community and Open Space*).
GI6 Objective 2: To maximise the leisure and amenity resource offered by the County's parks through the promotion of Management Plans that provide for the continued improvement of the park setting, biodiversity and recreational facilities.
GI6 Objective 3: To provide accessible, attractive and safe routes linking settlements to the GI network of the County.
GI6 Objective 4: To ensure that all new residential development provides access to multifunctional green open space, in accordance with the provisions of Chapter 8: *Community and Open Space* of this Development Plan and South Dublin County's Parks and Open Space Strategy.
GI6 Objective 5: To support the provision of new walkways and cycleways in suitable locations to improve the recreational amenity of GI corridors in a manner that does not compromise the ecological functions of the corridors.
GI6 Objective 6: To minimise the environmental impact of external lighting within the GI network to achieve a sustainable balance between the recreational needs of an area, the safety of walking and cycling routes and the protection of light sensitive species such as bats (See Chapter 3: *Natural, Cultural and Built Heritage* and Chapter 12: *Implementation and Monitoring*).
GI6 Objective 7: To enhance publicly owned open spaces with further appropriate GI including nature-based interventions to improve and diversify the services they provide.
GI6 Objective 8: To support, in agreement with the delivery authority, the provision of outdoor public water drinking fountains along all new and future dedicated cycleways, promoting reusables and actively incentivising transition from single use plastic.
GI6 Objective 9: To investigate the potential to plant hedgerows along roads to help mitigate noise and air pollution, and to increase visual amenity and enhance biodiversity.

GI6 Objective 10:
To continue to protect and promote existing allotments and provide for new allotments where feasible in accordance with a review of the provision and management of allotments across the County.

GI6 Objective 11:
To support appropriate human engagement including the sensory experience of rivers and waterways, through access to viewing points and fishing spots, having regard to the primary need for environmental and biodiversity protection.

4.2.5 Landscape, Natural, Cultural and Built Heritage

Natural, cultural and built heritage is concerned with the range of natural and man-made assets of heritage value in the County. These include areas of importance for biodiversity, such as watercourses, woodlands and cultural assets such as important monuments, buildings and landscapes.

Natural heritage plays an important role in defining the character of South Dublin. The County contains a diverse range of landscapes that are both important ecological habitats as well as areas of natural beauty. The foothills of the Dublin Mountains, the river valleys of the Dodder and the Liffey and the Grand Canal are part of South Dublin's natural, cultural and built context and contribute to the County's setting and character, as well providing important recreational uses for residents (See *Landscape Character Assessment*, Appendix 9 and Chapter 3: *Natural, Cultural and Built Heritage*). The County's heritage also presents an opportunity to attract more visitors and tourists to the area on account of its amenity and beauty. The GI Strategy recognises the plurality of the values and aims to provide for the protection of South Dublin's heritage while ensuring its sustainable management and utilisation.

Natural, cultural and built heritage also contributes to placemaking at the local level. People have a cultural and emotional attachment to their natural environment. It helps us interpret and connect with our communities and contributes to a sense of place and community cohesion. Local heritage features, such as a small park, a collection of trees or even a line of hedgerow may not immediately appear to be important in the context of the wider County, yet such features help define our communities and peoples experience within them. South Dublin's GI network is greater than the sum of its parts and local heritage contributes to a healthy County-wide GI network in which residents will be invested.

A key challenge for the Plan is to balance the protection of our heritage and landscapes with the management of change in a manner that enhances rather than diminishes heritage and landscape features, structures, buildings, sites and places of special interest.

Policy GI7: Landscape, Natural, Cultural and Built Heritage
Protect, conserve and enhance landscape, natural, cultural and built heritage features, and support the objectives and actions of the County Heritage Plan.
GI7 Objective 1: To protect, conserve and enhance natural, built and cultural heritage features and restrict development that would have a negative impact on these assets in accordance with the provisions of Chapter 3: *Natural, Cultural and Built Heritage* of this Development Plan.
GI7 Objective 2: To protect and enhance the landscape character of the County by ensuring that development retains, protects and, where necessary, enhances the appearance and character of the landscape, in accordance with the provisions of South Dublin's Landscape Character Assessment and the provisions of Chapter 3: *Natural, Cultural and Built Heritage* of this Development Plan.
GI7 Objective 3: To work in collaboration with the owners of lands along the perimeter of Rathcoole Woodlands for its protection and that of the wildlife using it and the ecological services it provides.
GI7 Objective 4: To develop Rathcoole Woodlands as part of a wider nature / walking trail from Saggart to Lugg Woods subject to the protection of its biodiversity, wildlife and ecological value which is of primary importance.
GI7 SLO 1: The current green wildlife corridor between Saggart and Rathcoole be maintained and the need to preserve this wildlife corridor be incorporated into the design and development plans for Rathcoole Park.
GI7 SLO 2: To ensure the adequate protection and augmentation of the identified Alluvial Rathcoole Woodlands within the zoning RU, and in recognising their value as green infrastructure and the potential linkages to Lugg Woods and Slade Valley and other amenity areas, provide for sensitive passive amenity uses which have regard to their Annex 1 status.

4.3 Defining the Spatial Framework

The Council's GI network has been identified and mapped as part of the development of this strategy. This mapping exercise has identified a spatial framework for the County's GI comprising a diverse range of habitat and landscape types, from river valleys and major parks to private gardens and urban green spaces and including Natura 2000 sites and proposed NHAs. Other data sets have also informed the strategy, including flood maps and riparian corridors. There are variations in the distribution and quality of GI across the County. However, the County's GI assets come together to create a complex, integrated network of components whose total value is greater than the sum of their parts.

4.3.1 Components of the GI Network

GI networks are spatially defined in terms of several common components. Core Areas serve as anchors within a GI network. They are the point of origin and destination for wildlife and are sites at which essential ecological processes occur. Corridors represent the physical links that tie the network of Core Areas together. They typically align with water courses or linear open spaces and allow for the migration of species between Core habitats. Stepping Stones are smaller areas of green space. They provide alternative routes for the movement of species within the overall network and contribute to local biodiversity. The spatial arrangement of these different components and their relationship to one another comprises a spatial GI network. In the context of South Dublin County these Core Areas and Corridors provide connections not just within the County itself but also to the adjoining Local Authorities of Dublin City Council, Fingal County Council, Wicklow County Council, Kildare County Council and Dún Laoghaire–Rathdown County Council.

The key components and features of the County's spatial GI framework are detailed below:

- **Major Core Areas** within the County include the Dublin Mountains, within the Wicklow Mountains National Park, and the parks located along the Liffey Valley providing strong GI links with adjoining counties. Other **Core Areas** include major parks and public green spaces, such as Waterstown Park and Lucan Demesne within the Liffey Valley, and Tymon Park and Corkagh Park. The Liffey Valley Special Amenity Order Area extends protection within the Liffey Valley from Chapelizod to Lucan. These core areas are important centres of biodiversity in their own right and also serve as important recreational assets for South Dublin residents and visitors;

- A network of overlapping and multi-functional GI **Corridors** connects the County's core areas with the Dublin Mountains (Dublin and Wicklow), Liffey Valley, Kildare rural hinterland and the broader regional GI network. These corridors largely comprise of watercourses and their associated riparian zones, such as the River Liffey, Dodder, and Camac as well as the Grand Canal. Two additional emerging potential corridors along the urban fringe have been identified, adjoining the boundary with County Kildare (greenbelt / green space potential) and the M50

Corridor. Corridors also include the extensive network of hedgerows and trees that exist across the County. The key corridors pass through the neighbouring administrative areas of Dún Laoghaire–Rathdown, Dublin City, Fingal, Kildare and Wicklow. As such the GI Strategy will have regard to the need for cross-boundary communication and collaboration for their effective management;

→ The Strategic County GI Corridors are further supported by a number of Local GI Corridors, as demonstrated in Figure 4.4. Each strategic corridor is described separately within Table 4.1, along with associated objectives. Appendix 4 provides further detail around the Local GI Corridors;

→ The County's GI network contains a number of smaller, discrete green spaces that are dispersed throughout its built-up area. These include local-scale greens and parks and other green spaces. These spaces serve as **Stepping Stones** for species to move throughout the broader network of corridors and core areas and contribute to a range of additional local benefits around recreation and stormwater management;

→ The urban centres and suburban areas of the County contain localised GI features including urban trees, smaller open spaces and water management features such as SuDS. The GI Strategy seeks to enhance such features and ensure they are connected to the broader GI network.

This strategy seeks to ensure that all new development contributes to the overall GI network of the County. It provides measures to protect and enhance existing GI attributes in the County providing for connections to local Stepping Stones (creating Stepping Stones) and ultimately providing links to the GI Corridors and Core areas of the County and Region. This contributes to strong climate change mitigation and adaptation in South Dublin County allowing us to meet national and regional targets referenced in section 4.0.1 above.

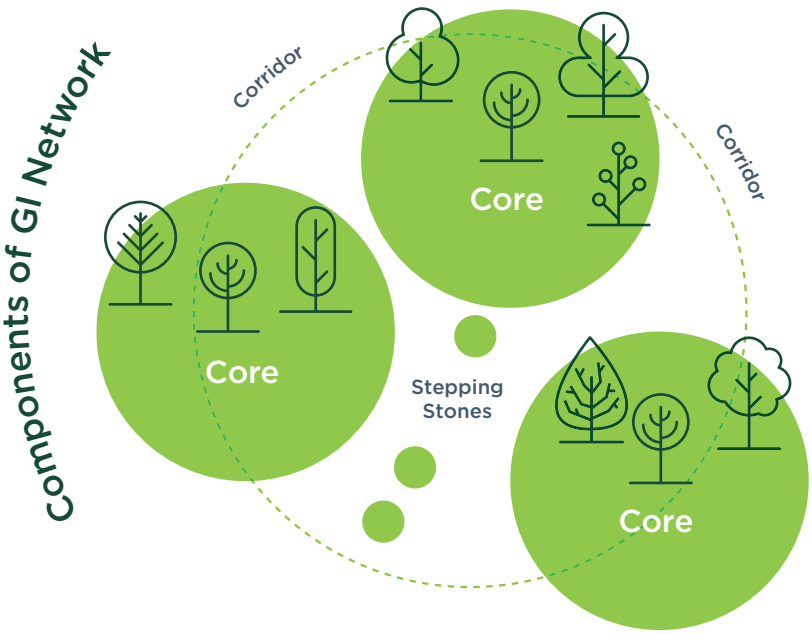

Figure 4.2: Components in a GI Network

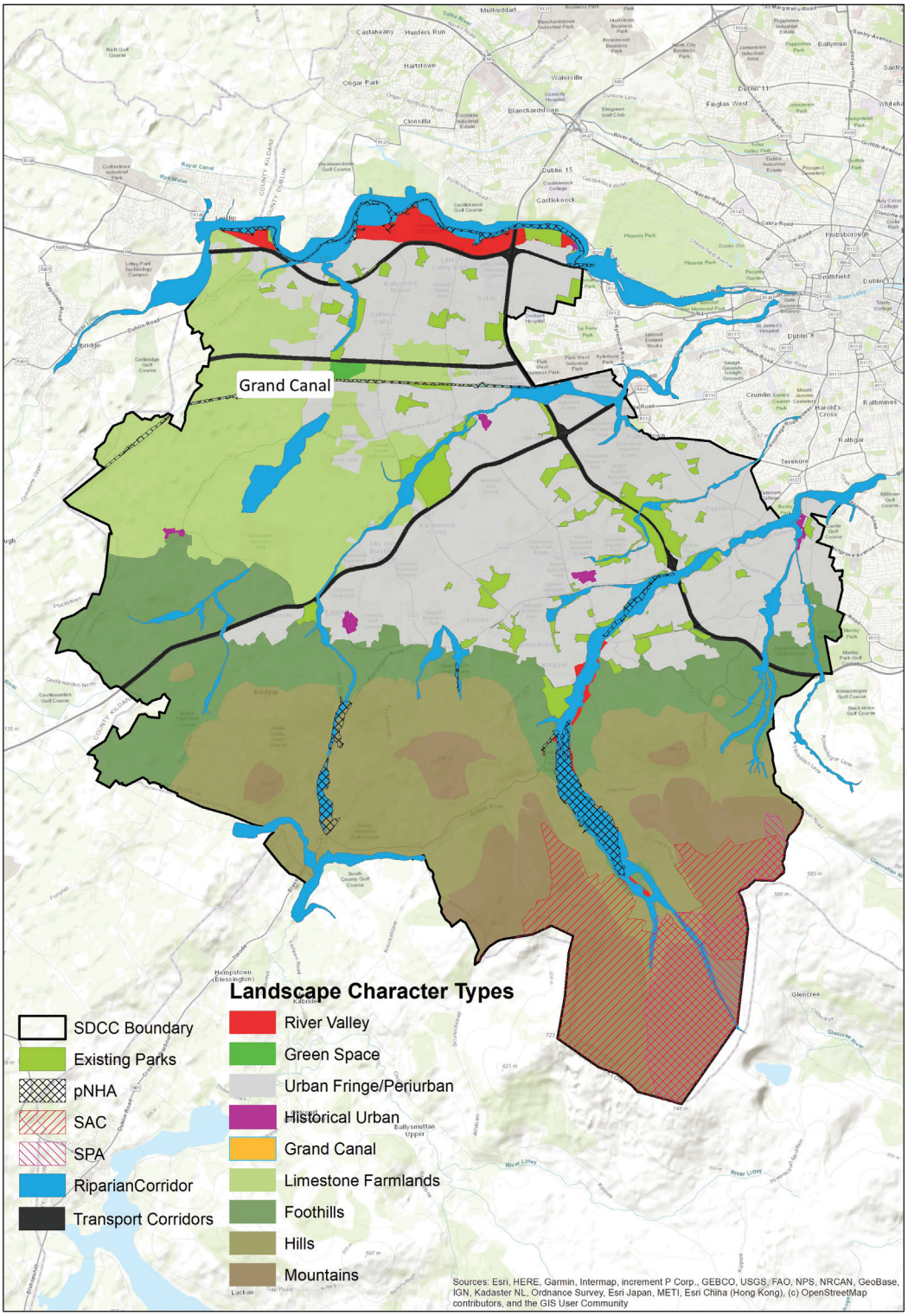

Figure 4.3: Key Elements of South Dublin County Council's GI network

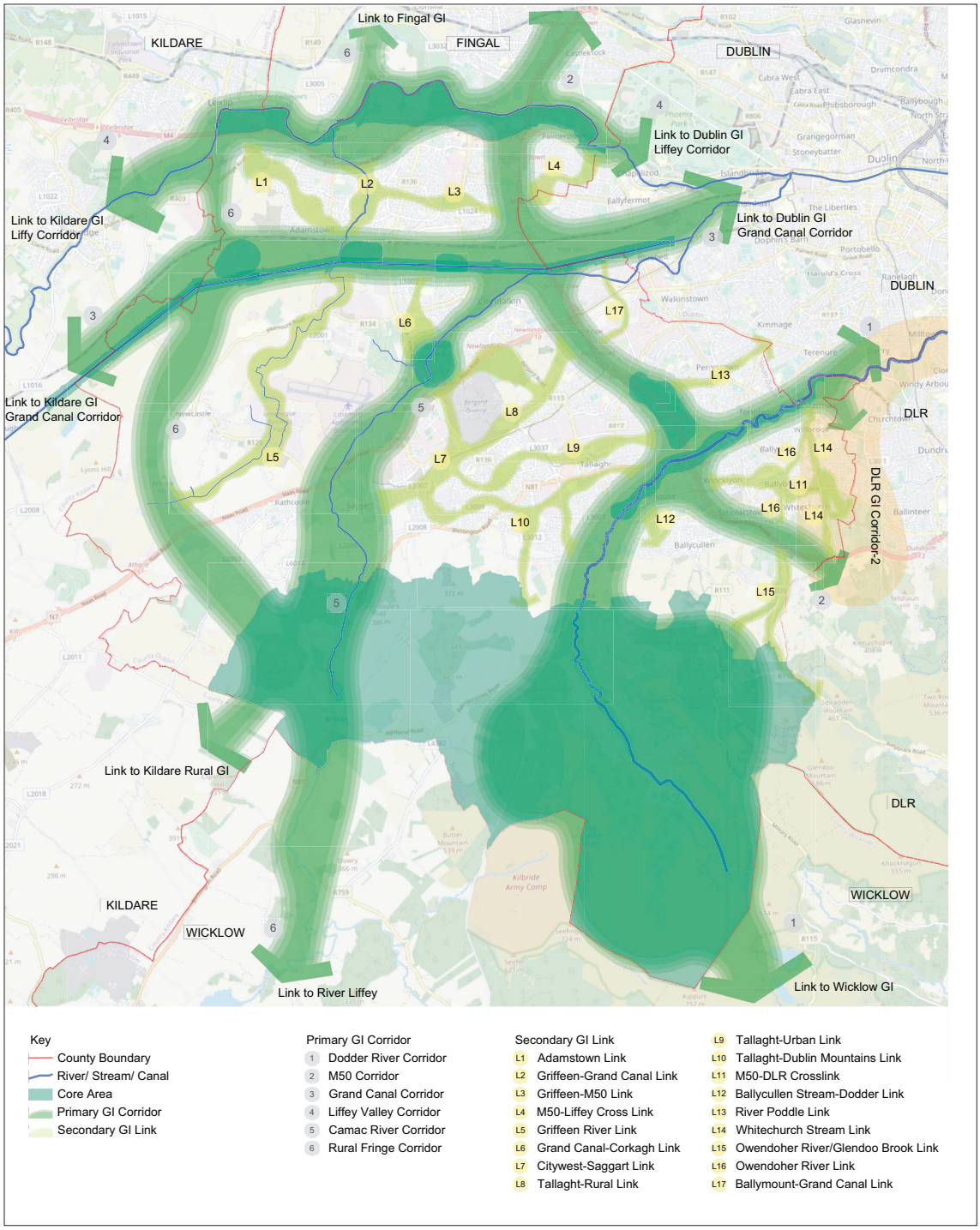

Figure 4.4: Green Infrastructure Strategy Map

4.3.2 Strategic Corridor Objectives

Objectives for each of the six strategic corridors are set out below in Table 4.1.

Table 4.1 Strategic Green Infrastructure Corridors

Strategic Corridor 1: The Dodder River
The River Dodder rises in the Dublin Mountains in the Glenasmole Valley and flows north-eastwards through the administrative areas of South Dublin County, Dún Laoghaire-Rathdown County and Dublin City before entering the sea at the Grand Canal Basin in Ringsend. As such, the Dodder presents a unique opportunity to connect South Dublin's GI network with those of its neighbours. The River Dodder has the unique characteristics of being both an urban river within a capital city and an important GI corridor for biodiversity. The Dodder is a Strategic GI corridor at the regional level passing through three urban / suburban counties and linking to several Natura 2000 sites and links to the Dublin Mountains, within the Wicklow Mountains National Park, and the Irish Sea. The Dodder River is a strong ecological corridor, containing a valuable biodiversity resource and acts as a refuge and protection of biodiversity both in general, and especially, for a wide range of protected species through the urban landscape – true 'Green Infrastructure'. In a European context, the presence of kingfishers, dippers, otters, and lamprey along an urban river like the Dodder is a very unique situation, especially for a capital city. There are substantial parks along the banks of the Dodder, providing amenity and recreation for the population of the city. The more recent development of the Dodder Greenway resulted from a collaboration between South Dublin County, Dublin City and Dún Laoghaire-Rathdown County Councils. This project will see the creation of a 17km greenway linking the quays in Dublin City Centre to the Bohernabreena Reservoir at Glenasmole. South Dublin County Council is responsible for 14km of the greenway, from Bohernabreena Reservoir to Orwell Park in Rathfarnham. The Greenway will be utilised by pedestrians and cyclists. Planning for the Greenway requires improvement of the environment through which it passes.

Overarching Objectives:

- To provide a multi-functional GI corridor crossing and connecting the mountains, urban and rural areas and linking with other regional corridors.
- To recognise, protect, and enhance the role of the River Dodder Corridor as a key route through the urban environment for biodiversity and protected species.
- To protect and enhance the River Dodder Corridor as an area of heritage, geology, special amenity and recreation.
- To monitor and address any negative impacts on biodiversity and protected species arising from amenity and greenway activities, so as to maintain the high value of the River Dodder Corridor as a Green Infrastructure link through the County and region.
- To explore opportunities to restore the quality and biodiversity of the Dodder's river-bank margins.
- To enhance and maintain ecological habitats along the river corridor to improve mobility for protected species and to support other ecosystem services such as pollinator sites, flood attenuation, and spaces for low-impact recreation.
- To continue the implementation of non-native invasive species control within the County including along the River Dodder, and to co-ordinate control measures with other stakeholders, wherever possible, to ensure a collaborative approach.
- To protect green and blue infrastructure of the Dodder River Corridor and restore the naturalness of the rivers riparian corridors through the planting of native plant species while minimising new development within the riparian corridors (Riparian Corridors are shown on the Development Plan GI Map, refer also to section 4.2.2 of this chapter).
- To protect sensitive species within the Dodder Valley and ensure new recreational development within the Dodder Valley does not have an adverse impact on nocturnal species.
- To protect and enhance the outstanding landscape character and amenity of the Dodder Valley (See Chapter 3: *Natural, Cultural and Built Heritage*).
- To restore the natural features of the River Dodder riparian corridor and promote the planting of native plant species.
- To implement the plans for the Dodder Greenway in accordance with the Part 8 for the scheme.

Core Areas and Stepping Stones	Objectives associated with the Core Areas / Stepping Stones
Core Areas: Dublin / Wicklow Mountains Bohernabreena Reservoir Glenasmole Valley **Stepping Stones:** Kiltipper Park	→ To support the implementation of the *'Dublin Mountains Forest Conversion Plan'* by Coillte Nature, in cooperation with the Dublin Mountains Partnership, in order to promote biodiversity and active and visual amenity. → To promote sensitive recreational access to Glenasmole Valley and Dublin Mountains in a manner that does not compromise its integrity as a core area of biodiversity. → To ensure that the implementation of the Dodder Greenway does not adversely impact the biodiversity, GI or amenity value of the Dodder Valley Park by implementation of the recommendations / requirements as set out in the environmental reports for the scheme. → To identify locations which have potential to provide for increased attenuation of floodwaters, or water attenuation, and manage them for this purpose. → To continue to implement the grassland, hedgerow and landscape management regimes supporting biodiversity, and the presence of ground nesting birds in particular, in Kiltipper Park.

Strategic Corridor 2: M50 Corridor

The M50 is an important piece of national transport infrastructure that links South Dublin County Council to DLR, DCC, and Fingal. While it acts to sever connectivity for biodiversity and for local communities, the GI Strategy recognises that there are opportunities for GI enhancement along the M50.

The M50 spans the biodiversity corridors of the River Liffey, the Grand Canal, the Camac, the Poddle, the Dodder, and the tributaries of the Whitechurch and Owendoher Rivers. It also spans the Dodder Valley Linear Park and bisects Tymon Park. A range of other open spaces and local and neighbourhood parks are also located along its perimeter, such as at Ballymount, Kilnamanagh, Knockmitten, and Collinstown.

An opportunity exists to identify and enhance the interconnection of the parks, green spaces and river corridors situated along the M50. Measures include providing additional north-south, pedestrian and cyclist green links (For example, at Grand Canal) as well as east-west links where possible. This will help create further GI connectivity for the benefit of biodiversity and for recreational purposes.

The M50 corridor also extends into the administrative area of Dún Laoghaire–Rathdown County Council to the south and Fingal County Council to the north. As such, there is further opportunity for cross-county extension of GI improvements into these counties to further enhance the importance of this corridor for example, the potential for GI links from the County to lands at Dunsink is one such opportunity.

Overarching Objectives:

- → To enhance connectivity between existing parks and open spaces on either side of the M50 corridor.
- → To enhance corridor links and biodiversity value through appropriate planting along both sides of the M50 Corridor, to maximise opportunities to ameliorate noise and air pollution, increase visual amenity, enhance biodiversity and provide continuous ecological corridors and green links where possible in consultation with TII / NTA.
- → To promote the connectivity of the M50 GI Corridor with Dublin's wider regional GI network, in consultation with Dún Laoghaire–Rathdown County Council and Fingal County Council.
- → To investigate the potential to implement improved pedestrian and cycling infrastructure between the Grand Canal corridor and green spaces at Knockmitten.
- → To identify and support additional north-south pedestrian and cyclist green links (for example at Grand Canal) as well as east-west links where possible.

Core Areas and Stepping Stones	Objectives associated with the Core Areas / Stepping Stones
Core Areas: Dodder Valley Park Tymon Park Grand Canal Liffey Valley (Waterstown Park) **Stepping Stones:** Ballymount Park / Newlands Farm Collinstown Park	→ To investigate EU funding mechanisms for nature-based solutions to climate change, exploring the feasibility of developing or retrofitting an eco-bridge or eco-tunnel across the M50 to provide ecological connectivity between both sides of Tymon Park for both biodiversity and for local communities. → To investigate EU funding mechanisms for nature-based solutions to climate change, exploring the feasibility of developing or retrofitting an eco-bridge or eco-tunnel across the M50 to provide ecological connectivity between Collinstown Park and Green space at Cloverhill Road. → To promote habitat improvement at Collinstown Park.

Strategic Corridor 3: Grand Canal Corridor

The Grand Canal is a key national Green Infrastructure feature, acting as a major ecological and recreational link between the River Shannon in the midlands and Dublin City where the canal enters the sea. As a proposed Natural Heritage Area, the Canal supports a range of key ecosystem services along its entire route and offers a major route for a range of protected species from Dublin's rural hinterland through the urban environment of South Dublin County.

While the Grand Canal offers significant opportunities for recreation and amenity, these provisions must be appropriate to the status of the Canal, at a time of biodiversity loss, as a key biodiversity corridor. This is particularly important when the Canal encounters the more urban environment of South Dublin County, where higher population densities and demand for recreational provision has the potential to sever and fragment the Canal's regional ecological connectivity.

The Grand Canal Corridor forms a major point of interaction with other identified Strategic Corridors in this Strategy: the M50 Corridor, the Rural / Urban Fringe corridor, and the Liffey-to-Liffey Corridor, while further local links connect it to the other areas of the Liffey Valley Corridor. There are also opportunities to connect to the Royal Canal Greenway in Fingal County Council, expanding the potential for additional GI connectivity in the Dublin region.

Overarching Objectives:

- → To protect and enhance the Grand Canal as an ecological green corridor, recognising its role as a national / regional corridor for wildlife and some ecosystem services.
- → To ensure that development along and adjacent to the Grand Canal, including the sensitive provision of amenity and recreational facilities, recognises the Canal's ecological status, avoiding areas and features of biodiversity and heritage sensitivity, and that appropriate set-back distances or buffer areas are identified and included.
- → To facilitate and enhance connectivity, both ecological and amenity, between the Grand Canal and Royal Canal Greenways.
- → To engage with stakeholders along the Grand Canal to achieve shared objectives for this GI feature, without negatively impacting on the Canal's natural ecosystem services. To improve permeability and access to the Grand Canal for residents and visitors in a manner that does not cause habitat fragmentation.
- → To ensure that the design of recreational and amenity facilities along the Grand Canal Corridor will enhance and protect the character of the landscape through which it passes (see Appendix 9: *South Dublin County Landscape Character Assessment*, for landscape character details).

Core Areas and Stepping Stones	Objectives associated with the Core Areas / Stepping Stones
Core Areas: Grand Canal pNHA **Stepping Stones:** Green spaces at Kishoge Green space at Clonburris Scrubland at Coolscuddan Open Spaces at Deansrath and Bawnogue Open Space and water body at Grange Castle Business Park	→ To preserve and enhance hedgerows to provide improved connectivity between the scrubland at Coolscuddan (north of Grangecastle West) and the Grand Canal GI Corridor. → To establish additional planted buffering along the course of the Grand Canal at Kylemore in order to mitigate the impact of industrial activities at Park West Industrial Estate and West Link Industrial Estate to the north and preserve the canals biodiversity and landscape / placemaking value. → To enhance the biodiversity within open space areas acting as stepping stones proximal to the Grand Canal Corridor.

Strategic Corridor 4: Liffey Valley Corridor

The River Liffey traverses the northern boundary of the County and is a GI corridor of regional importance. It provides a 'green lung' for Dublin City / County and is a key element of the wider regional GI network, running from its origins in the Wicklow Mountains through the plains of County Kildare and through County Dublin into Dublin City Centre where it enters the sea.

Sections of the River Liffey are designated as proposed Natural Heritage Areas, while the portion within South Dublin County and Fingal County is also subject to a Special Amenity Area Order. These designations reflect the variety of habitats and protected species supported by the River Liffey.

The majestic open parkland setting of sections of the River Liffey Valley provide opportunities to strengthen the visual and landscape amenity value of the valley and create appropriately designed pedestrian and cycle routes that can traverse the County and link with amenities in adjoining counties.

Overarching Objectives:

- → To protect and enhance the outstanding character and ecology of the Liffey Valley Corridor, recognising its value as a key regional landscape and GI feature that supports important habitats, species, and a range of ecosystem services.
- → To protect and enhance the recreation and amenity value of the Liffey Valley Corridor, recognising its environmental sensitivities.
- → To enhance connectivity with the surrounding regional GI network infrastructure.
- → To facilitate and support the development of the Liffey Valley as an interconnected network of parklands and support the development of a carefully considered greenway in collaboration with Dublin City Council, Fingal County Council, and Kildare County Council.
- → To protect green and blue infrastructure within the River Liffey corridor based on the riparian corridors outlined in the Development Plan Green Infrastructure Map.
- → To protect and enhance the outstanding landscape character and amenity of the Liffey Valley (see Appendix 9: *South Dublin County Landscape Character Assessment*, for landscape character details).

Core Areas and Stepping Stones	Objectives associated with the Core Areas / Stepping Stones
Core Areas: Areas designated SAAO and pNHA including: Lucan Demesne Italian Legation lands St. Edmondsbury lands Hermitage Golf Course lands King's Hospital lands Waterstown Park **Stepping Stones:** Lucan Heights Lucan Weir Park Vessey Park Griffeen Valley Park	→ To preserve the existing woodland, trees and hedgerows at Lucan Demesne. → To investigate the potential for enhanced connectivity between Lucan Demesne and St. Edmundsbury lands. → To investigate the potential for enhanced access to St. Edmondsbury lands from Lucan. → To preserve and enhance existing woodlands and hedgerows at St. Edmondsbury. → To maximise the recreational amenity supported by proximity to the river within Lucan Demesne. → To continue to implement the grassland, hedgerow and landscape management regimes supporting biodiversity and the presence of ground nesting birds in particular, in Waterstown Park. → To develop a plan to manage access to the Liffey Valley to the publicly owned lands to the north east of the Hermitage Clinic. → To implement sensitive planting in order to enhance the setting of recorded monuments, including the Woodville Castle site (Lucan), a Recorded Monument (no. DU017-006) to contribute to local placemaking and amenity.

Strategic Corridor 5: Camac River Corridor

This corridor generally marks the interface between the urban and rural parts of the County. It follows the route of the River Camac from its origins in the foothills of the Dublin Mountains through the urban area of Clondalkin, flowing through Corkagh Park. While urban pressures have impacted upon the Camac River, it still sustains populations of protected species and habitats, making the Camac a key GI feature.

This corridor has great potential as a regional level green infrastructure threading through the high-density urban areas. The opportunity to daylight existing culverted sections should be considered.

Development at the urban / rural interface has the potential to inadvertently sever existing connectivity, both for wildlife and for local communities. Planning carefully for the inclusion of GI principles at this interface zone is therefore critically important if rural GI is to be protected and incorporated into new communities and enterprise developments.

Overarching Objectives:

- → To avoid further fragmentation of the Green Infrastructure network at the urban fringe and strengthen existing ecological links between built-up areas along this corridor.
- → To enhance the GI network by addressing habitat quality issues along the Camac River and by identifying and including additional 'stepping stone' opportunities along the river.
- → To improve the ecological GI value and connectivity of landscape features created as part of permitted development.
- → To seek the daylighting of existing culverted sections of the Camac River Corridor.
- → To support the emerging principles of the City Edge Strategic Framework Plan and to support the naturalisation of the Camac River as part of that process.
- → To promote the completion of a Greenway linking Corkagh Park with Clondalkin Village and onwards to the Grand Canal Greenway.

Core Areas and Stepping Stones	Objectives associated with the Core Areas / Stepping Stones
Core Areas: Corkagh Park **Stepping Stones:** Slievethoul / Slade Valley Lugg Forest Rathcoole Park Open spaces at City West Open spaces at Kilcarbery Rathcoole Alluvial Woodlands within RU zoning	→ To investigate potential opportunities to link existing and proposed recreational trails at Slade Valley to the emerging Dodder Greenway in order to improve recreational access and amenity. → To investigate the potential opportunities to link woodlands at Rathcoole to existing and proposed recreational trails at Lugg Woods and Slade Valley. → To improve GI value of newly developed landscape features (such as lakes) in Citywest. → To retain the open space adjacent to Rathcoole Park, developed as part of the Mill Lands Development as an open space area and provide a link between Rathcoole and Saggart. → To support the implementation of the Slade Valley Walking Route. → To preserve and enhance the status of Corkagh Park as a regional park for biodiversity and ecosystems services (including flooding) importance. → To preserve and protect the Alluvial Woodlands at Rathcoole within the zoning RU as an environmentally sensitive area for biodiversity and ecosystems services of importance having full regard to their Annex 1 status. → To include woodlands at Rathcoole as part of a wider nature / walking trail from Saggart to Lugg Woods subject to the protection of its biodiversity, wildlife and ecological value which is of primary importance.

Strategic Corridor 6: Rural Fringe Corridor

This corridor is important for both South Dublin and the wider regional GI network, providing a link between the foothills of the Dublin Mountains and lands at Wicklow to the south, through the rural landscape that marks the western section of the County to the Grand Canal and Liffey Valley corridors and connecting with lands at Leixlip in Kildare.

This link recognises the important landscape character and rural heritage of the County's western corridor and represents the final swathe of landscape in the County that retains its lowland rural heritage, supporting both its human communities and its biodiversity. The rural landscape of fields and hedgerows offers significant north-south ecological links through the County for ecosystem services and for species such as bats, badgers, and farmland birds. It also provides a significant opportunity to retain a green buffer for biodiversity and amenity provision for people between the urban expanse of this County and the County boundary with Co. Kildare.

The corridor also sustains other cultural heritage assets, reflecting the position that South Dublin County once held in previous times as a supplier of agricultural produce to the expanding city of Dublin.

Overarching Objectives:

- → To identify measures to protect the distinctive rural landscape of the western hinterland of South Dublin County, reflecting its high value as an ecosystem services provider and a cultural heritage asset for the County and a green lung between growing settlements to the east and west.
- → To collaboratively investigate with Kildare County Council the benefits of providing a greenbelt or green space between the growing settlements within South Dublin County and Kildare County Councils within the lifetime of the Development Plan.
- → To support and facilitate the development of accessible links between the Liffey Valley and the Grand Canal corridors.
- → To protect and provide an enhanced ecological, recreation and amenity corridor linking the county's Green Infrastructure corridors on the western boundary of the county.
- → To investigate the feasibility of developing or retrofitting an eco-bridge or eco-tunnel across the N7 roadway and the M4.
- → To promote opportunities for local food production through allotments or other means as appropriate.
- → To retain the rural character of the existing roads retaining roadside hedgerows and drainage ditch networks.
- → To investigate and support the potential for a western-corridor way marked walking / cycling route utilising public roads, walkways and other accessible lands.
- → To consider the opportunities for rural hedgerow restoration including townland boundaries and other ancient field boundaries.
- → Recognise the contribution of agriculture to the production of high quality food and the protection of the natural heritage and promoting the use of environmentally friendly agricultural practices.

Core Areas and Stepping Stones	Objectives associated with the Core Areas / Stepping Stones
Core Areas: Dublin / Wicklow Mountains Grand Canal pNHA Liffey Valley **Stepping Stones:** Slievethoul / Slade Valley Airlie Park (being developed) Lucan Golf Course Hedgerows and woodlands	→ To support the implementation of the Dublin Mountains Forest Conversion Plan by Coillte Nature in order to promote biodiversity and active and visual amenity.

4.4 Climate Action Audit

Climate Action Audit

Source of Green House Gases (GHGs)	Measures to Address Climate Impacts
All development will have an impact on the environment and climate of the County. This chapter supports the role of GI in achieving EU, national and regional policy objectives on climate action and its role in achieving quality placemaking, sustainable development and long-term quality linkages for biodiversity and people across the County and region. It proposes the idea that any development small or large can contribute to and support the GI and ecosystem services of the County bringing a multitude of benefits.	Policies and objectives contained in this chapter include: → Overarching policy to protect, enhance and further develop a multifunctional GI network, using an ecosystem services approach; → Setting out of five themed policy areas reflecting the broad range of ecosystem services and benefits. These themes are mutually supporting, with specific policies helping to contribute to a stronger and more resilient county-wide GI Network. These themes are biodiversity, Sustainable Water Management, Climate Resilience, Recreation and Amenity (Human Health and Wellbeing) Landscape, Natural and Cultural Heritage; → Provides a spatial framework for GI in the County identifying strategic and local GI Corridors and delivering objectives for the protection and enhancement of these corridors; → Proposes the development of an urban greening factor for application to all development once developed.