

Making Plans for Green Infrastructure in England: Review of National Planning and Environmental Policies and Project Partners' Plans.

May 2017

By

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Published as part of the NERC funded project 'Injecting a Natural Capital Planning Tool into Green-Blue Infrastructure Management' (Grant Ref: NE/N017587/1)

Suggested citation: Scott, A., Hölzinger, O., Sadler, J., 2017. *Making Plans for Green Infrastructure in England: Review of National Planning and Environmental Policies and Project Partners' Plans*. Northumbria University & University of Birmingham.



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Acknowledgements

The authors are grateful to our case study partners (in alphabetic order) Birmingham City Council, Central Bedfordshire Council, Greater London Authority, Shropshire Council, Solihull MBC, South Downs National Park Authority and Southampton City Council for sharing relevant plans and documents as well as providing valuable feedback on the case study assessments.

1. Summary

This report provides a critical overview and exploration of English planning policy for Green Infrastructure (GI) set within national and local authority perspectives.

Initially, a brief literature review on GI was undertaken exposing its potential as a multifunctional tool to address a range of environmental, economic and social challenges using nature-based solutions. We found that the potential GI solutions offer are tempered by the disintegrated nature of the current policy landscape with sectoral myopia hindering more holistic approaches. Furthermore, the multiple values and benefits of GI are often hidden and unaccounted for in planning decisions using conventional cost-benefit analysis and resource economics. Consequently, this has made GI vulnerable to loss in planning applications and/or neglect in increasingly contested and reduced local authority budgets.

Following this review, a critical assessment of the English national policy arena within which GI is situated and contested was undertaken. Here, the key policy documents associated with national planning guidance; the National Planning Policy Framework (NPPF; DCLG 2012) and its associated National Planning Practice Guidance (NPPG; DCLG 2017) are compared with the Natural Environment White Paper (NEWP; HM Government 2011). In addition, the growing linkages of GI with health are explored through the Marmot review (Marmot, Allen and Goldblatt, 2010).

The policy review revealed that despite strong policy guidance on the role and value of GI it was all too often trumped by economic considerations based on viability and economic growth potential. A brief overview of current research in GI was undertaken to appreciate the current research priorities in GI. It is positive to note that GI is commanding a significant increase in research efforts across the Research Councils UK community with an emphasis on particular health and wellbeing benefits and needs of specific target groups normally bypassed in policy. There was a significant research gap in the way GI informs policy and decision making in land use planning matters; the focus of this NERC grant.

This combined intelligence allowed us to posit some best planning principles for GI that were then used to analyse 7 different local authority case studies using their existing/proposed GI strategies and local plans. This builds a picture of the different ways local authorities have responded to the challenges and opportunities of GI policy development. Finally, the report unpacks this analysis within a wider discussion of GI strategy. It is important to realise here that the operationalisation of these policies and plans through decision-making is not covered within this report. We use policy material only.

The results reveal a diversity of GI plans and policies in operation with each authority bringing something distinctive to the overall picture. For the most part GI strategies are positioned as non-statutory documents with visions that are aspirational championing GI as an economic, social and environmental resource. However, there is a deficit in delivery and funding mechanisms identified to achieve these with only London providing the notable exception. This is problematic when all seek to expand the extent of GI in terms of quantity and quality as well as to protect the integrity of the GI network. This has serious implications given the significant resource requirements for such management.

There is a wider governance issue associated with the need for a dedicated GI champion at a senior policy level who can command the necessary resources to make things happen. However, this may lead to the creation of a GI silo which hinders its wider multifunctionality being addressed across the council. Furthermore, the lack of quantifiable indicators for baseline monitoring poses problems to measure the impact of these strategies and policies and represents an urgent action.

For the most part there is a strong thread running through the case studies that now positions GI as an asset with evidence of natural capital and ecosystem services being used. There is a need to progress beyond the rhetoric and ensure that there is an evidence base that is reliable, updated and accepted for future plan development.

There is conservable potential to learn from the different approaches encountered in this study and we hope to build a strong social learning component into the work. Specific recommendations require the team in each local authority:

1. To learn lessons from the different approaches used by the local authorities in this report within a wider social learning context.
2. To assess the current governance arrangements for GI within which policy and decision making is made; to discuss the merits of GI strategies being made SPG to improve their statutory influence and to discuss the merits of having a GI champion or delivery body to help make things happen on the ground.
3. To identify specific delivery vehicles to translate aspirational visions, aims and policies into practice.
4. To identify suitable and assessable indicators to help monitor the impact of strategies and policies.
5. To identify data sources and resources to enable an evidence base to be built up and consolidated for use in future Local Plan developments.

6. To understand how national policy guidance (NPPF/NPPG impacts upon the delivery of GI policies and plans in a range of different development management decisions.

2. Introduction and Report Focus

This report provides a critical overview and exploration of English planning policy for Green Infrastructure (GI). Initially, a brief literature review on GI was undertaken leading to a critical assessment of the English national policy arena within which GI is situated and contested. Here, the key policy documents associated with national planning guidance; the National Planning Policy Framework (NPPF; DCLG 2012) and its associated National Planning Practice Guidance (NPPG; DCLG 2017) are compared with the Natural Environment White Paper (NEWP; HM Government 2011). In addition, the growing linkages of GI with health are explored through the Marmot review (Marmot *et al.*, 2010). A brief overview of current research in GI then follows to help appreciate the current direction of travel in GI priorities.

This combined intelligence allowed us to posit some best planning principles for GI that we then used to help analyse our 7 different local authority case studies using their existing/proposed GI strategies and Local Plans. This builds a picture of the different ways local authorities have responded to the challenges and opportunities of GI policy. Finally, the report unpacks this analysis within a wider discussion of GI policies and strategy. It is important to realise that the decision-making aspects of these policies and plans are not covered within the scope of this report.

3. Literature Review

Those committed to managing built environments sustainably face significant strategic planning challenges including public health, water management, housing need and delivery, economic growth, biodiversity and climate change adaptation (RTPI, 2015). Yet all too often such problems are diagnosed, managed and delivered within separate sectoral silos potentially leading to policy inefficiency and disintegration (Scott, 2012; Kerslake, 2014). GI has emerged as a core spatial planning concept potentially integrating these major planning challenges as a “natural” asset set within an ecosystem services framework (Millennium Ecosystem Assessment, 2005). However, this has yet to be realised due to problems of perception; its negative environmental associations which conflict with a predominant economic growth narrative; its elusive and intangible nature which inhibits its translation on the ground with sufficient quantifiable indicators and delivery mechanisms for its management and use; its requirement for long-term planning and management often conflicting with incentives for short-term optimisation prevalent in industry and politic arenas; and its multifunctional

nature conflicting with 'silo' problem-solving nature of Governmental institutions (Hölzinger *et al.*, 2014; Lennon, 2015; Natural Capital Committee, 2015).

Indeed, similar to 'sustainable development', GI has a relatively generic and broad definition which results in its uncritical use in academic and policy circles with different interpretations of what is and isn't included. According to the European Commission (2015, p. 3), GI can generally be defined as:

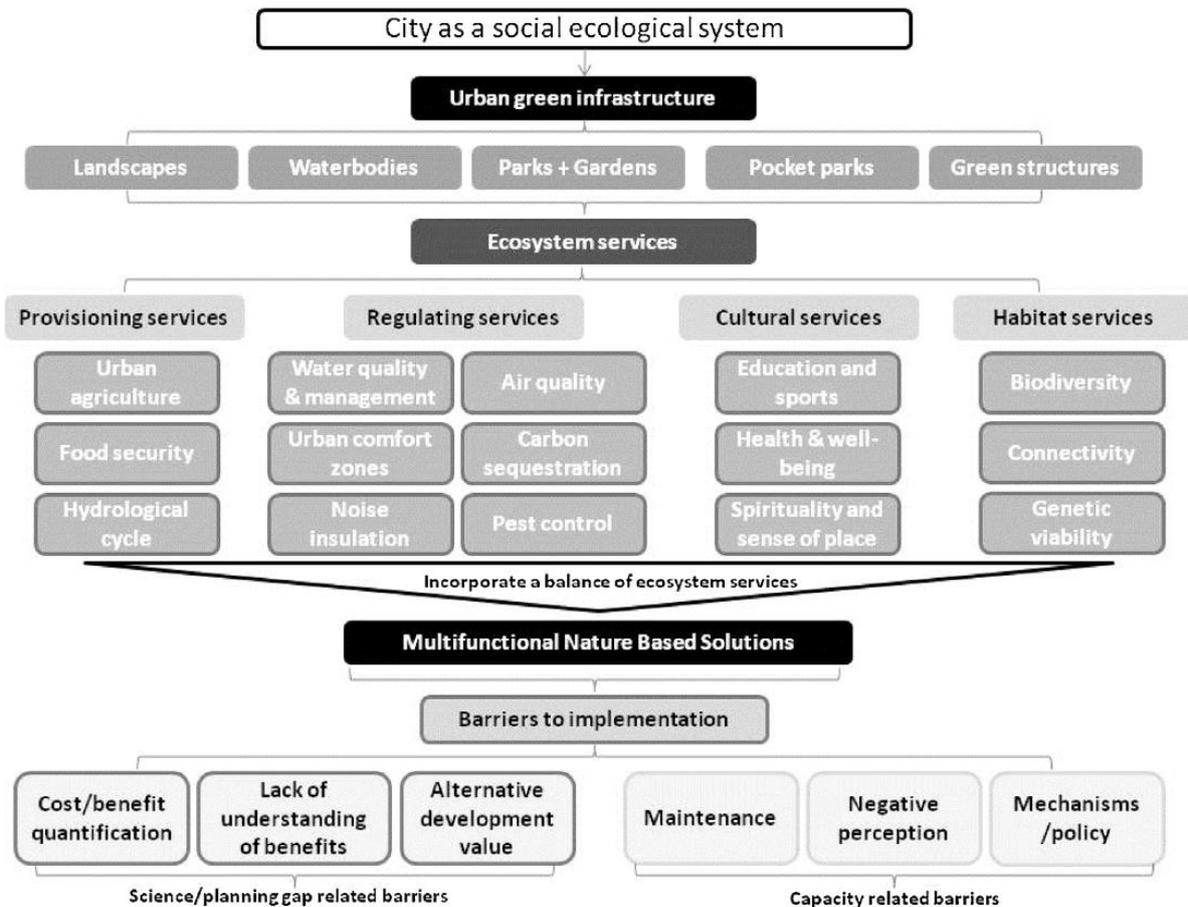
“a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings.”

Natural England's (2009, p. 7) comprehensive GI guidance complements the EC definition but also highlights the importance of urban-rural connections challenging more urban centric interpretations that pervade the literature.

“Green Infrastructure includes established green spaces and new sites and should thread through and surround the built environment and connect the urban area to its wider rural hinterland. Consequently, it needs to be delivered at all spatial scales from sub-regional to local neighbourhood levels, accommodating both accessible natural green spaces within local communities and often much larger sites in the urban fringe and wider countryside”.

However, on a more positive vane one of the key strengths offered by GI to planners is its multifunctionality and adaptability (Kambites and Owens 2006; TCPA & TWT 2012; Mell 2014). For example, this is made explicit within the EU project 'Transitioning towards Urban Resilience and Sustainability' (Figure 1) which uses a socio-ecological system perspective (Connop *et al.*, 2016). Although multifunctionality is well covered in the GI literature, there is a noticeable research gap on evaluating the efficacy and additionality of GI planning policies and strategies in terms of the value and outcomes achieved, particularly when set against other economic priorities (Kirby and Russel, 2015; Lynch, 2016).

Figure 3.1 A Framework of Green Infrastructure Implementation in Urban Areas



Source: Connop et al. 2016, p. 100

Despite this wider conceptualisation of GI, it is very much a resource under pressure from increased urbanisation and economic development (Buijs et al., 2016). The Natural Capital Committee, an independent advisory committee to the UK Government, states in its third ‘State of Natural Capital Report’ (Natural Capital Committee, 2015, pp. 43–44) that improving urban GI is cost-effective:

“Given that over 80% of England’s population now lives in urban areas, the quantity and quality of green infrastructure (GI) in our urban areas is of critical importance. It is not just an issue of wellbeing and economic benefits, but one of equity and distribution, too. [...] Investment in GI is often the first to be sacrificed during periods of financial pressure, but this is a false economy. [...] GI needs to be fully incorporated into urban planning systems, to help avoid short termism. Building GI into long-term development plans will not only ensure its benefits from the outset, but will also avoid costly retrofitting in the future.”

One problem is that in conventional accounting, GI is often purely seen as a liability ignoring the wider social benefits to society. This is because benefits including health, flood risk regulation, biodiversity etc. are not accounted for whilst the associated costs for greenspace management etc. are. When extending the accounts so that wider social (external) benefits are incorporated one can see that GI is often a net-asset rather than a liability (Hölzinger, 2016).

The recent CLG Committee Parks inquiry¹ captures the dilemma of undervalued multiple benefits which do not get the investment or protection due to contemporary economic and decision making models which only value what they measure as opposed to measuring what is actually valued. Thus, GI becomes vulnerable to declining investment and ultimate loss.

“Parks and green spaces matter. They make a vital contribution to many of our most important strategic objectives, such as climate change mitigation, public health and community integration. However parks are at a tipping point, and failure to match their value and the contribution they make with the resources they need to be sustained could have severe consequences.” (CLG Select Committee 2017, p. 4)

This raises some fundamental questions which any GI evaluation should consider.

1. What does success look like in the provision and delivery of GI?
2. How do we address the temporal time lag between strategy and results on the ground given that many GI strategies are relatively recent and outcomes are long term?
3. How do we ensure long-term management and funding so that GI benefits are not eroded over time?
4. How do we measure GI outcomes given the complexity of linkages between the multiple benefits and specific planning interventions or development impacts?

¹ CLG Select Committee (2017) Parks Inquiry, https://www.publications.parliament.uk/pa/cm201617/cmselect/cmcomloc/45/4503.htm#_idTextAnchor005, accessed 10th March 2017

4. National Scale: English Planning guidance for Green Infrastructure

Within the English planning system, at the present time, two key documents provide the core policy framework for GI; the Natural Environment White Paper (NEWP; HM Government 2011) and National Planning Policy Framework (NPPF; DCLG 2012) together with its associated National Planning Practice Guidance (NPPG; DCLG 2017) (Appendix 1²).

Natural Environment White Paper

The NEWP is a key document in this review as evidenced by it being an HM Government publication. This means that the policies and guidance within has been signed up to all government departments and should, in theory, be operationalised in their subsequent guidance.

The NEWP illuminates the importance of GI for its role as completing *“the links in our national ecological network”* and *“one of the most effective tools available to us in managing environmental risks such as flooding and heat waves”*. It stresses its role as a ‘bridge’ between town and country and an asset for growth:

2.80 “Green infrastructure maintains critical ecological links between town and country”

It also positions it as an asset that can help deliver economic growth:

3.22 “High-quality green infrastructure can also drive local economic growth and regeneration”.

The commitment and endorsement to the value of GI within the NEWP led to the establishment of a voluntary Green Infrastructure Partnership of around 300 stakeholder groups (now over 1000) chaired by the Town and Country Planning Association (TCPA). Its goals are to consider how GI could be enhanced to strengthen ecological networks and improve communities’ health, quality of life, and resilience to climate change³. This informal grouping helps bridge the gap between planning and environmental bodies through the sharing of research, innovation, news and best practice via newsletters and events. It seeks to influence key decision but arguably lacks a powerful voice at the present time.

² A separate Appendix 1 compares and contrasts the documents with respect to their areas of convergence and divergence in policy terms.

³ GI Partnership, <https://www.tcpa.org.uk/pages/category/green-infrastructure-partnership>, accessed 12 December 2016

The importance of natural capital is also championed within NEWP making explicit references to GI components as well as the ecosystem services that flow from these natural capital stocks. The paper led to the establishment of the Natural Capital Committee as an influential and independent advisory committee to government.

1.18 “Natural capital can be defined as the stock of our physical natural assets (such as soil, forests, water and biodiversity) which provide flows of services that benefit people (such as pollinating crops, natural hazard protection, climate regulation or the mental health benefits of a walk in the park).”

2.80 “Urban green spaces will provide varied ecosystem services and will contribute to coherent and resilient ecological networks.”

Notably, the NEWP acknowledges that the planning system in its current state fails to support sustainable land-use:

2.33 “The Government expects the planning system to deliver the homes, business, infrastructure and thriving local places that the country needs, while protecting and enhancing the natural and historic environment. Planning has a key role in securing a sustainable future.

2.34 However, the current system is [...] failing to achieve the kind of integrated and informed decision-making that is needed to support sustainable land use.”

National Planning Policy Framework

The NPPF is the key planning guidance for the English planning system. It is linked with the golden thread of sustainable development which is the overriding purpose of the planning system.

The NPPF proposes a definition of GI as:

“A network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities” (Glossary p52)

The linkage with the wider health and quality of life agenda is highly significant in its connection with wider ideas about sectoral integration inherent in spatial planning theory (Nadin, 2007; Tewdwr-Jones *et al.*, 2010).

The NPPF also suggests that all local authorities **should** set out a strategic approach to the creation, protection, enhancement and management of GI networks (paragraph 114) and requires that Local

Planning Authorities take into consideration the needs for open space, recreation and sport, based on an assessment of needs and opportunities (Paragraph 171). The emphasis on 'should' is important here as there is no statutory requirement to do so. This becomes important when other aspects of the NPPF have stronger statutory footings which may conflict with this expectation. Equally the issue of needs is not clarified in terms of whose needs are of primary concern and against which indicators such need should be assessed.

There are explicit policy linkages and synergies to the NEWP where the NPPF recognises the value of GI within the concept of ecological corridors, improved connectivity and the multiple environmental and quality of life benefits to development it delivers. However, it does not use the term natural capital which is troubling in terms of policy alignment with the NEWP. Indeed, ecosystem services are also only mentioned once in paragraph 109 with a relative weak policy wording stating only that their value **should be recognised**.

On a more positive note this is the first time that ecosystem services have been incorporated in planning policy guidance and thus does provide an important opportunity space for policy development; particularly as part of the evidence base (Scott *et al.*, 2014). The following concepts are key to the delivery of the NPPF and the planning system with important implications for the potential and actual role of GI.

Duty to Cooperate

The NPPF does have within its 209 paragraphs clear potential to improve the way GI is embedded in policy and practice. This is implicit within the Duty to Cooperate (DTC) function which deals with cross-boundary issues between local planning authorities. The DTC is a legal requirement as part of England's new planning landscape that all development plans must meet as part of their process of plan formation which is assessed as part of a test of soundness by government-appointed planning inspectors (DCLG, 2017).

DTC depends critically on the extent to which a planning authority has "*engaged constructively, actively and on an ongoing basis to maximise the effectiveness of Local Plan preparation in the context of strategic cross boundary matters*" (Localism Act 2011, c.1⁴). These strategic cross boundary matters, in theory, encompass GI as articulated in the NPPF/NPPG definitions which, of course, do not recognise administrative boundaries. However, practice to date has largely focused on cooperation between neighbouring authorities on housing need assessments. Yet there is no reason why GI cannot form part of this wider strategic cross boundary function and, indeed, be seen as part of the crucial

⁴ <http://www.legislation.gov.uk/ukpga/2011/20/section/110/enacted>, accessed 28 March 2017

infrastructure for quality housing developments thus moving beyond the simple housing numbers that currently dominate planning debates and inquiries (Scott et al. in press) One key gatekeeper here is the Planning Inspectorate (PINS)⁵ who oversee the Local Plan inquiries and can direct local authorities to address such issues.

Viability

The NPPF makes clear that viability and deliverability are key tests of all aspects of policy and decision making. Local authorities need to assess the cumulative burden of Local Plan policy. Crucially, these burdens should not deny ‘*competitive returns to a willing land owner and willing developer*’ (paragraph 173). However, the NPPF recognises that:

“Where safeguards are necessary to make a particular development acceptable in planning terms (such as environmental mitigation or compensation), the development should not be approved if the measures required cannot be secured through appropriate conditions or agreements. The need for such safeguards should be clearly justified through discussions with the applicant, and the options for keeping such costs to a minimum fully explored, so that development is not inhibited unnecessarily.” (par. 176)

This, together with enabling legislation such as the *Growth and Infrastructure Act 2013*, has reduced the capability for betterment in planning developments such as those achieved through Section 106 planning agreements/obligations and the more recent Community Infrastructure Levy payments. This has revised downwards the use of GI quotas (normally around 40% in most authorities) as economic considerations of profit override perceived environmental constraints. This is disappointing as there is clear potential for improving developments in pursuit of a wider sustainability agenda as envisaged in NEWP. It also shows that sustainable development can be interpreted in many ways and that when it comes to the implementation stage the focus is often towards the economic rather than social and environmental aspects; potentially because success is seemingly easier to define and measure. The House of Lords Select Committee on National Policy for the Built Environment emphasized that:

“...the strong policy emphasis placed on the financial viability of new developments. These changes, however, have the cumulative effect of progressively diluting the capacity of local authorities to scrutinise new developments, to safeguard quality and sustainability.”

(House of Lords Select Committee on National Policy for the Built Environment, 2016, p. 3)

⁵ Planning Inspectorate, <https://www.gov.uk/government/organisations/planning-inspectorate>, accessed 11th March 2017

Indeed, despite some notable advances in the re-framing of GI as an environmental and social asset as envisaged in the NPPF, there are growing concerns from the wider economic narrative within which much national policy guidance is formed which is hindering the influence of GI policy and delivery. In particular, concern has been expressed over the way the current planning system is not delivering sustainability given the primacy given to economic growth and housing at the expense of social and environmental considerations (Bird, 2013; House of Commons CLG Committee 2014; House of Lords Select Committee on National Policy for the Built Environment, 2016) Again, this indicates an imbalance towards economic goals when implementing sustainable development.

“First, we must take steps to ensure that the planning system delivers the sustainable development promised in the NPPF. We should ensure that the same weight is given to the environmental and social as to the economic dimension.” (House of Commons CLG Committee, 2014, p. 3)

Furthermore, the influential Nature Positive Local Plans Research Report highlights how the NPPF’s policies for biodiversity planning at a landscape scale championing connectivity with ecological corridors and GI planning have not been widely embedded in local plans (RSPB and TWT, 2015). While elements of GI and ecological networks were noted in over 70% of the reviewed plans, the detail and scope of these varies markedly. On a more positive note around 70% of plans set out explicit, or were moving towards, development of a spatially specific GI policy component of the plan.

National Planning Practice Guidance⁶

National Planning Practice Guidance (NPPG) is an important complement to the NPPF. In essence this is a web based portal that translates the NPPF wording into priorities on the ground in terms of day to day practices of policy and plan development and planning application decisions. In effect, it puts contemporary ‘flesh on the bones’ of the 55 pages and 209 paragraphs of the NPPF. It is a welcome additional tool for supporting decisions but as it is regularly updated without the need for consultation, keeping track of changes remains a challenge (LPEG, 2016).

This was brought into sharp relief when changes were made to the NPPG in January 2015 without any requirement for public consultation which effectively removed policy priorities for the value of GI in planning practice. This revealed an inherent vulnerability in its role as a planning tool when other priorities such as economic viability seemingly dominate. The TCPA and Landscape Institute mounted

⁶ In this review, we are referring to the NPPG version as off 12th December 2016, unless stated otherwise.

a strong public campaign against this⁷ which eventually led to its reinstatement later on in the year, but there is still only limited compulsion for GI in Local Plans. The relatively easy manner in which the NPPG can be changed and edited has sparked concern as previous online records do not formally exist unless they were screenshot (LPEG, 2016).

Consequently, the NPPG has been recently updated to include specific guidance to help with defining the scope, specificity and extent of GI:

“As a network it [GI] includes parks, open spaces, playing fields, woodlands, but also street trees, allotments and private gardens.” (DCLG 2017, par 27)

The inclusion of gardens is significant here given their overall contribution to GI in terms of ecosystem services as well as being important habitats in their own right (Goddard, Dougill and Benton, 2010; Bates *et al.*, 2014). This extends guidance to the household level which is important in terms of the cumulative impacts of individual decisions (e.g. decking; block paving and tarmacked driveways) leading to incremental but in the sum substantial land-use changes at the landscape scale. But it remains a neglected dimension in planning interventions and control (Dewaelheyns, Kerselaers and Rogge, 2016); where astroturfing, paving and timber decking add to increased surface run off in storm events and reduction in biodiversity.

NPPG (par 27) also recommends embedding GI into the development process at an early stage linking it explicitly to ecosystem services:

“Green infrastructure provides multiple benefits, notably ecosystem services, at a range of scales, derived from natural systems and processes, for the individual, for society, the economy and the environment. To ensure that these benefits are delivered, green infrastructure must be well planned, designed and maintained.”

The concept of ecosystem services in this context serves to emphasise the multifunctionality of GI; something that heavy engineered infrastructure solutions usually lack. Nevertheless, engineered solutions are often still a preferred solution, but these are often dealt with in small scale place-based interventions and isolated policy spaces to address a particular policy challenge; i.e. for flood control rather than within more integrated discourses connecting across different policy agendas. This can lead to sub-optimisation; not least because measuring and evaluating success often only incorporates

⁷ See <http://www.buildingconstructiondesign.co.uk/news/government-scrap-green-infrastructure-guidance/>, accessed 12 December 2016

the impact on the specific policy challenge to hand rather than the wider (holistic) impact on human wellbeing and society as a whole.

The Marmot Review

The health and social justice agenda is fertile territory for the GI agenda. It has long been recognised that green space has a beneficial effect on physical and mental health and overall quality of life (Tzoulas *et al.*, 2007; Coombes *et al.*, 2010). The Department of Health suggests that increasing accessible open spaces could reduce healthcare costs in the UK by more than £2 billion annually (pers comm., Mallika Ishwaran, Defra, 2011, cited in UK NEA, 2011, p. 1104).

The Marmot Review 'Fair Society, Healthy Lives' (Marmot, Allen and Goldblatt, 2010) recommended the creation and development of healthy and sustainable places and communities as key means of reducing health inequalities. The recommended policies required to achieve this included: improving active travel; improving the availability of, and access to, good quality open and green spaces and improving local food production and food growing (all important components of GI).

The review informed the Health and Social Care Act (2012) which transferred the responsibility for public health to local authorities, enhancing opportunities, in theory, for greater linkages between health and planning via GI provision, delivery and access. It also has the potential to liberate budget lines, hence reducing siloed responses to complex problems. The introduction of Health and Wellbeing Boards to develop Joint Strategic Needs Assessments (JSNAs) and Joint Health and Wellbeing Strategies (JHWSs) potentially will enable proactive interventions to secure upstream prevention of ill health such as through green gyms and nature/'green exercise' prescriptions from GPs. This active consideration of broader social, economic and environmental factors collectively helps realise the potential of positive GI interventions.

Current Research into Green Infrastructure

There is an emerging and exciting strand of UK research looking at the role and contribution of GI which will add to the evidence base with important potential for improving national policies and plans and for the Local Plan and GI strategy responses described later. It is highly significant that the Research Councils UK are funding two main schemes. First, the Valuing Nature Network (VNN)⁸, which is supported as an interdisciplinary partnership across Research Councils UK. The VNN has funded the study 'Improving Wellbeing through Urban Nature'⁹ which is a project integrating green/blue infrastructure and health service valuation and delivery. Another related VNN funded project is 'Green

⁸ VNN, <http://valuing-nature.net/>, accessed 12 December 2016

⁹ IWUN, <http://iwun.uk/>, accessed 30 March 2017

Infrastructure to Promote Health and Wellbeing in an Ageing Population'¹⁰ Both of these projects seek to provide better data and policy responses and interventions to help clarify and illuminate the multiple benefits that GBI can provide.

Second, the Natural Environment Research Council (NERC) has also funded a series of 10 smaller innovative GI projects, such as the one generating this review, within a £1.2 investment designed to improve life and create sustainable places by making better use of GI.¹¹

It is clear that GI research is focusing on ways of maximising its impact in planning and quality of life agendas with targeting of key groups and environments. Significantly, there is an urban bias with relatively few rural based projects. There is also a focus on developing tools which can help mainstream GI in policy. This raises important issues about their eventual use and transferability as there is no shortage of tools in the wider context of ecosystem services but questions remain as to their accessibility and usability (Scott *et al.*, 2014).

There is also a wider EU network of GI research. A recent report 'Supporting the implementation of GI' (European Commission, 2016) provides a powerful call for improved GI evidence and delivery. Specifically, it sought to:

1. Ensure a more effective promotion of GI at all relevant levels; (policy makers and publics)
2. Improve capacity building, training and education for GI;
3. Improve information and knowledge exchange mechanisms;
4. Assess and develop technical standards and innovation;
5. Assessing social costs and benefits

The Town and Country Planning Association (TCPA) has also just secured EU funding as part of the PERFECT (Planning for Environment and Resource efficiency in European Cities and Towns) project.¹²

¹⁰ GHIA, <http://www.micra.manchester.ac.uk/research/projects-and-groups/ghia/>, accessed 30 March 2017

¹¹ NE/N017404/1 Dr Larissa Naylor University of Glasgow A Decision Framework for Integrated Green Grey Infrastructure (IGGIframe); NE/N017498/1 Dr Adam James Barker University of Manchester Green Growth: Increasing Resilience in Cities Through the Delivery of Green Infrastructure-based Solutions; NE/N017587/1 Professor Jon Sadler University of Birmingham Injecting a Natural Capital Planning Tool into GreenBlue Infrastructure Management; NE/N017374/1 Claire Smith University of Leicester Assessing the contribution of domestic gardens to urban ecosystem services; NE/N016955/1 Dr Alona Armstrong Lancaster University Solar Park Impacts on Ecosystem Services: a Framework for Best-Practice (SPIES); NE/N017927/1 Dr Philip Wheeler Open University Valuing Green Infrastructure Through Tree Assessment Tools; NE/N017560/1 Mr Jonathan Simm HR Wallingford Implementing GI approaches to river engineering protection measures; NE/N017773/1 Dr Ian Dodd Lancaster University Tree Selection for Green Infrastructure; NE/N017730/1 Dr Pamela Berry University of Oxford Tools for Urban Planning and Evaluating Urban Green Infrastructure – Bicester and beyond; NE/N017307/1 Dr John Williams University of Portsmouth PROSuDs: Providing Real-world Opportunities for Sustainable For Sustainable Drainage Systems

¹² TCPA, <https://www.tcpa.org.uk/perfect-project>, accessed 10 March 2017

This project aims to improve the implementation of regional development policies and programmes, in particular investment for jobs and growth, through the integration and awareness-raising of the multiple benefits of GI into partner municipalities. Its aims are to:

- Identify and analyse good practice in multi-use of GI;
- Fully engage Managing Authorities on the socio-economic benefits of GI to influence new projects and improve governance of policy instruments;
- Increase the professional capacity of key stakeholders in delivering new projects;
- Develop action plans focusing on policy change to influence strategic investment in GI based on its multiple benefits.

Principles for GI Planning

From the above review and policy analysis we can start to identify good practice principles to help GI become a more holistic and multifunctional tool in planning policy and decision making.

Good practice principles for Green Infrastructure Planning:

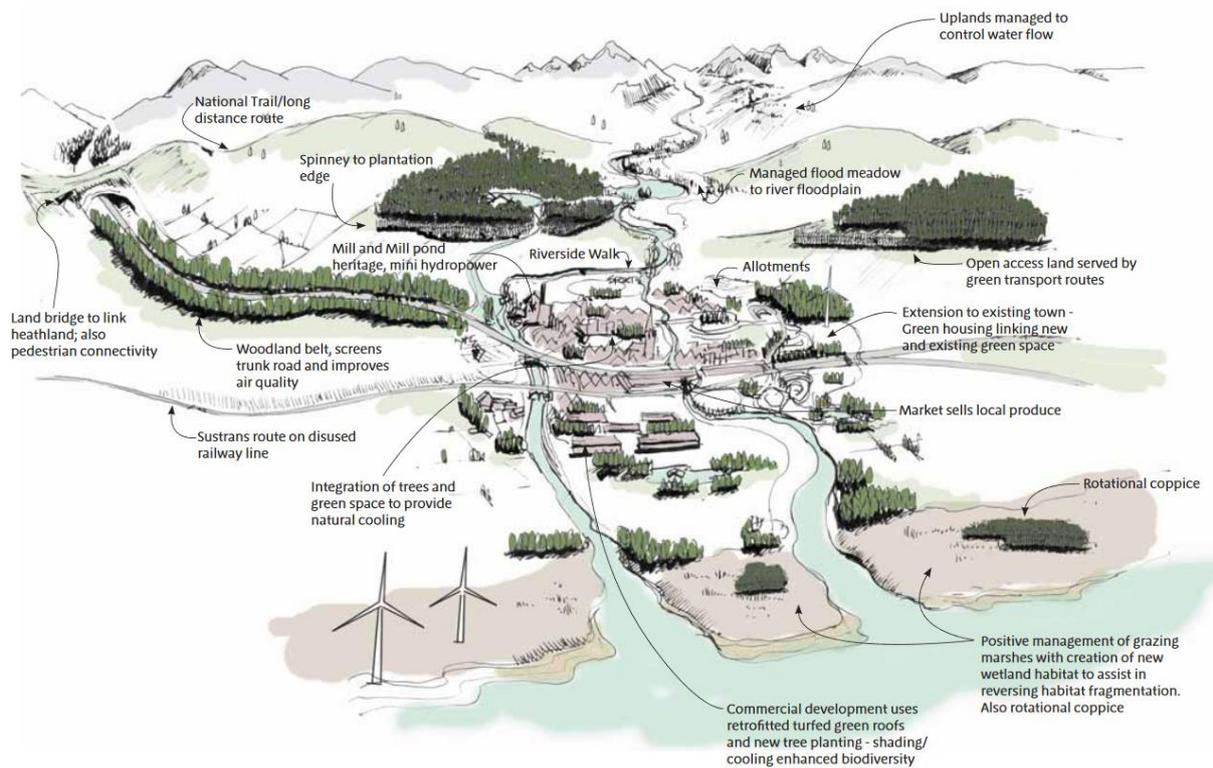
1. Create and enhance connectivity within and across urban and rural domains;
2. Value GI benefits holistically including all contributions to human wellbeing in terms of ecosystem services rather than ignoring those services not directly affecting the isolated policy challenge to hand;
3. Manage a variety of GI landscapes to optimise ecosystem services;
4. Assess and manage GI as part of an economic growth strategy;
5. Design planning strategies and policies to protect and enhance GI at multiple scales;
6. Protect and champion GI through collaborative and participatory processes;
7. Improve the evidence base of types and quality of GI;
8. Develop GI standards which can be monitored and evaluated against measurable indicators;
9. Enable Planning Authorities to fully incorporate GI value into planning decisions by providing knowledge exchange, resources and fit-for purpose tools and mechanisms (both, assessment and enforcement); and
10. Move away from planning goals driven by a focus on short-term economic activity (e.g. GDP) to long-term sustainability goals incorporating impacts on (natural) capital stocks.

Many of these principles have been characterised usefully within Natural England's GI Guidance landscape settings (Natural England, 2009; Figures 2: rural & Figure 3: urban).

Crucially, GI is located within an explicit **placemaking narrative** with multiple adaptation, mitigation, creation, localisation and integration functions (Scott *et al.*, in press). This positioning of GI across

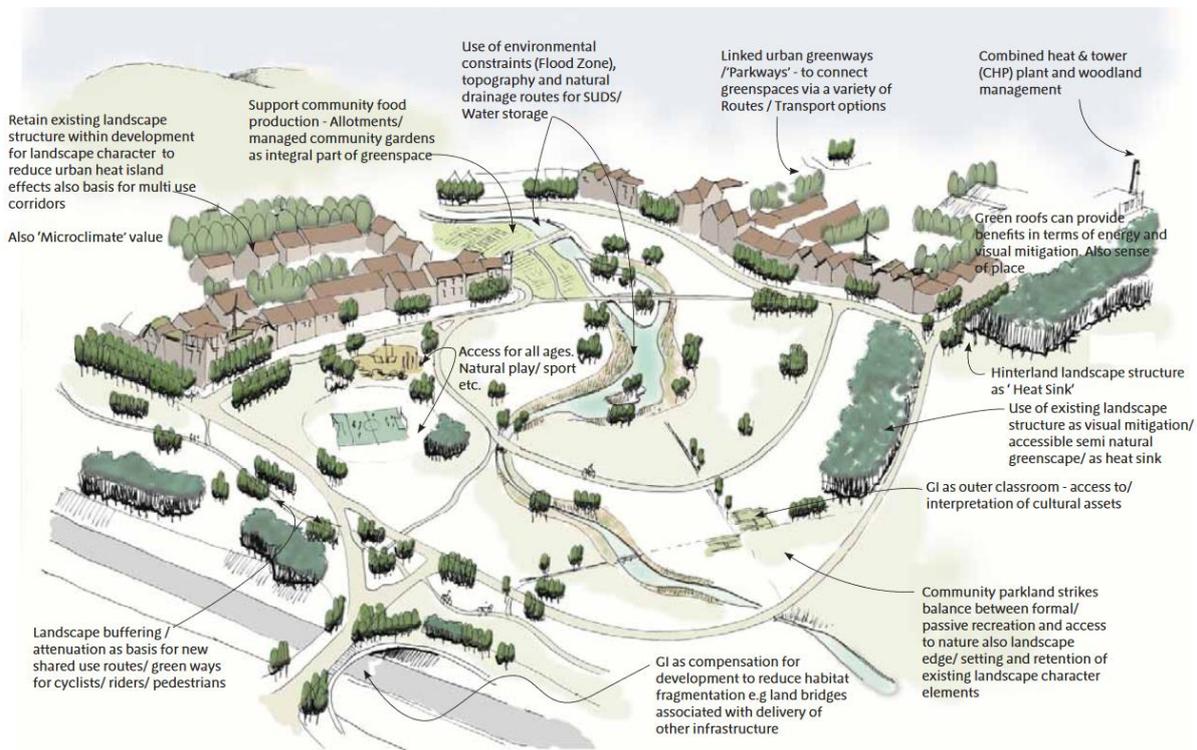
spatial planning, placemaking and ecosystem services narratives reflects its integrative role and disciplinary and professional versatility which can be seen as both, a strength in its ability to become part of these diverse agendas, but also a weakness in that it is rarely planned for in its own right. Consequently, in practice it often becomes a weak cross cutting theme or a bolt on (Scott et al in press).

Figure 4.1 Green Infrastructure, Multifunctionality and Place-making – Example 1



Source: *Natural England 2009, p. 26*

Figure 4.2 Green Infrastructure, Multifunctionality and Place-making – Example 2



Source: *Natural England 2009, p. 27*

Summary: GI challenges

Drawing from the results of the policy analyses and critiques so far we can identify some overall challenges to address to improve the way that GI is conceptualised and embedded in policy and delivery in England:

1. There is no statutory duty from the NPPF or legislation upon local authorities to protect or maintain their GI assets nor which proportion/quality of GI should be achieved. Thus the uptake of GI in local planning authorities is highly variable;
2. There is not yet a universally agreed definition of GI. This leads to uncritical and differential use of GI in the academic and policy literatures with terms such as ‘open space’, ‘greenspace’, ‘natural infrastructure’ etc. used interchangeably;
3. The environment is consistently relegated on the political agenda and through NPPF/NPPG priorities in favour of housing and economic growth considerations. This has hampered GI developments in Section 106 agreements and Community Infrastructure Levy as arguments of economic viability are used against loss of developer profits;
4. There is lack of strategic cooperation over GI despite significant potential within the duty to cooperate function;

5. The traditional set of tools used for calculating Cost Benefit Analyses (CBA) for development decisions rarely factor in the environmental and societal benefits that GI provides. The use of ES and NC assessments is only slowly emerging. Consideration should be given to the appropriate assessment scope (social CBA), timescale and discount rate (as GI benefits often occur over a longer timescale), the geographical assessment scope (neighbourhood (e.g. amenity values) to global (e.g. climate regulation)), and the distribution of costs and benefits (within society and across generations);¹³
6. Reduced public spending is leading to a lack of staff on the ground (parks and ranger services) and resources necessary to deliver the GI strategies in place;
7. Despite the potential to work across planning and the health agendas as exemplified through the Marmot Review, cuts to public health budgets are limiting this kind of new working arrangement;
8. Short term thinking and optimisation of developers and planners conflicts with sustainable long term goals achievable through GI provision. A public debate may be required to explore over which timescale we want to optimise public services as a lack of investment in GI now is likely to incur much higher costs in the future for example in terms of health costs, declining wellbeing or retrofitting measures;
9. Local authorities struggle to maintain ongoing GI management after initial arrangements/funding (e.g. Section 106) ends.

¹³ See also Hölzinger 2016; Sunderland & Hölzinger 2013

5. Green Infrastructure in Practice Across our Project Partners

This section assesses the planning policy approaches to GI within seven local authority case study partners. For each case study, we captured the latest GI strategy development and its focus and approach and delivery vehicles together with an appreciation of how it informs statutory Local Plans. The Local Plans themselves are also unpacked. The analysis adapts some of the good practice principles that we identified in the preceding section to capture the strengths and weaknesses in plan and policy focus. Although selective, attention is placed on both, the process and outcomes for the GI strategy and Local Plan documents. The table below provides a snapshot in time (September 2016) of the approaches and documentation supporting GI.

Table 5.1 Current Status (September 2016) of Local Plans and GI Strategies by Case Study

Case Study Partner	GI Strategy (Extant)	Local Plan NPPF Compliant	SPG	Ecosystem Services Evidence Base	GI strategy (Review)	Other Strategy Where GI Features
Birmingham City Council (BCC)	Yes <i>2014, non-statutory</i>	No <i>holding order May 2016</i>	No	Yes	No <i>independent evaluation undertaken</i>	No
Central Bedfordshire Council (CBC)	Yes <i>2008, only northern part</i>	No <i>Consultation draft December 2016</i>	No	Unclear	No	Environmental Framework 2016
Greater London Authority (GLA)	Yes <i>2012</i>	has its own London Plan	Yes	Yes	Yes <i>2016</i>	London Environmental Strategy 2016
Shropshire County Council (ShrC)	No	Yes <i>Core Strategy 2011 & Site Allocations and Management of Development 2015</i>	No	Yes	No	Countryside Strategy
Solihull Metropolitan Borough Council (SMBC)	Yes <i>2012</i>	<i>approved 2013 housing review not compliant</i>	No	Yes	No	No
South Downs National Park Authority (SDNPA)	No <i>But draft for consultation 2016</i>	No <i>preferred option stage</i>	No	Yes	Yes <i>2016 (draft)</i>	Partnership Management Plan 2014
Southampton City Council (SCC)	Yes <i>2008, non-statutory</i>	Yes <i>2015</i>	No	No	No	

Source: **Authors**

Table 5.1 illustrates the current status of both, GI strategies and the Local Plans. Encouragingly, most case study partners do have an extant strategy, although some are clearly outdated; two date back to 2008. Only Shropshire and SDNPA do not have extant strategies. However, Shropshire uses a different terminology around natural assets and environmental networks. SDNPA is a new National Park and planning authority (2012).

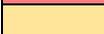
Most GI strategies are non-statutory documents helping to inform other plans. Only London has translated their GI strategy into Supplementary Planning Guidance (SPG) which now forms part of the statutory development plan.

In terms of the Local Plan situation this is more complicated. Several authorities do not yet have a formal Local Plan that is NPPF compliant although they are all at different stages in the plan process or review. Birmingham has, at the time of writing, just had its plan approved after a 6 month holding order over a proposed release of a green belt site for housing (itself representing part of the GI network), while Central Bedfordshire is yet to formally consult at the start of their plan process. Shropshire, Southampton London and Solihull all have approved plans. There is clear evidence in half of the case studies that ecosystem services and natural capital are becoming used as part of the GI language; particularly in the evidence base.

Tables 5.2 and 5.3 undertake a relatively crude analysis using the good practice planning principles arising from the policy analysis in the previous section as the assessment framework. A contents analysis of the written documentation in the GI Strategies (Table 5.2) and Local Plans (Table 5.3) provides a 'domesday' policy assessment snapshot of GI approaches (September 2016). It is important to stress that this assessment is only about policy and not about delivery which could not be assessed in detail as part of this exercise.

In the GI strategies (Table 5.2) the profile illuminates problems relating to (i) the lack of monitoring and evaluation procedures of extant GI strategies, (ii) the lack of financial instruments or delivery vehicles to increase or protect GI, (iii) limited urban/rural interlinkages, and (iv) only partial adoption/use of ecosystem services.

Table 5.2 Traffic Light Assessments of GI Approaches in GI Strategies

	BCC	CBC ¹⁴	GLA	ShrC	SMBC	SDNPA	SCC
Clear Vision for GI Articulated	Green	Green	Green	Red	Green	Green	Yellow
Explicit Link to Local Plan/Planning	Green	Yellow	Green	Red	Green	Green	Green
Geographical Mapping of GI Undertaken	Green	Yellow	Green	Red	Green	Green	Yellow
Assessment of GI Types and Quality	Yellow	Yellow	Green	Red	Green	Green	Yellow
Strategic Policies for GI	Green	Green	Green	Yellow	Green	Green	Yellow
Local Area Policies for GI	Yellow	Green	Green	Yellow	Green	Green	Yellow
Proposals to Increase Extent of GI Network	Green	Yellow	Green	Yellow	Green	Green	Yellow
Proposals to Protect Integrity of GI Network	Yellow	Yellow	Green	Yellow	Green	Green	Yellow
Fin. Mechanisms Supporting GI Creation & Protection	Red	Red	Green	Yellow	Green	Yellow	Red
GI Covers Urban and Rural Domains	Red	Yellow	Green	Yellow	Green	Yellow	Yellow
Explicitly Incorporates Ecosystem Services	Green	Yellow	Green	Red	Green	Green	Red
GI as Asset to Deliver Economic Growth	Green	Yellow	Green	Yellow	Green	Green	Green
Policies to Protect/Enhance GI at Multiple Scales	Green	Yellow	Green	Yellow	Green	Green	Yellow
Effective Collaboration and Participation Process	Yellow	Yellow	Green	Yellow	Green	Yellow	Green
Effective Monitoring Procedures in Place	Red	Red	Yellow	Yellow	Yellow	Yellow	Red
Legend							
	not evident/weak	BCC	Birmingham City Council				
	some indication/acceptance	CBC	Central Bedfordshire Council				
	strongly articulated strategies	GLA	Greater London Authority				
		ShrC	Shropshire County Council				
		SMBC	Solihull Metropolitan Borough Council				
		SDNPA	South Downs National Park Authority				
		SCC	Southampton City Council				

Source: *Authors*

In the Local Plans (Table 5.3), there are stronger policy protections in place. Interestingly, most authorities had protection for the entire GI network rather than individual pieces of GI. All authorities had policies to increase area of GI perhaps relating to new developments. The lack of financial instruments was also evident again which may impact on the ability to create new GI to the extent envisaged.

¹⁴ Only northern part assessed

Table 5.3 Traffic Light Assessments of GI Approaches in Local Plans

	BCC	CBC ¹⁵	GLA	ShrC	SMBC	SDNPA	SCC
Higher Level Strategic Principles Covering GI	Green	Yellow	Green	Green	Green	Green	Green
Dedicated GI Policies	Green	Green	Green	Red	Yellow	Green	Green
Other Policies Covering GI Goals	Yellow	Yellow	Green	Green	Green	Green	Green
Strategic GI Policy	Green	Green	Green	Green	Green	Green	Yellow
Local Area GI Policy	Green	Green	Green	Green	Green	Green	Yellow
Policy for Protection of GI	Green	Green	Green	Yellow	Green	Green	Yellow
Policy for Protection of GI Connectivity	Green	Green	Green	Yellow	Green	Green	Red
Financial Mechanism for GI Delivery	Red	Green	Green	Green	Yellow	Red	Red
Policies to Increase Extent of GI	Green	Green	Green	Green	Green	Green	Green

Legend		
	not evident/weak	BCC Birmingham City Council
	some indication/acceptance	CBC Central Bedfordshire Council
	strongly articulated strategies	GLA Greater London Authority
		ShrC Shropshire County Council
		SMBC Solihull Metropolitan Borough Council
		SDNPA South Downs National Park Authority
		SCC Southampton City Council

Source: *Authors*

We now discuss briefly each case study to help unpack and justify the scorings in Table 5.2 and 5.3. It is important to note that this narrative is based on a documentary analysis alone undertaken in summer 2016, using the GI strategies and the extant and/or emerging plans. Therefore, this can only be a snapshot given the dynamic nature of plan and strategy formation.

5.1 Southampton City Council

Green Infrastructure

The GI strategy ‘Green Spaces: Great Places’ (Southampton City Council, 2008a) represents Southampton’s Green Space Strategy Summary and Action Plan. This is supported by Southampton’s Green Space Strategy Technical Document (Southampton City Council, 2008b). The vision is inclusive and aspirational:

“Southampton will be recognised as the regional Green City, with a range of fine parks and open spaces that are easily accessible, represent good value for money and delivered in partnership with the local community for everyone to enjoy.” (Southampton City Council, 2008a, p. 1)

¹⁵ Only northern part assessed

The emphasis on joint partnership delivery is interesting and distinctive but lacks specificity. It is seen as an important non-statutory document *“that will enable us to prioritise where there is a need for improvement and guide planning policy to ensure green spaces are protected into the future”* (Southampton City Council, 2008a, p. 1)

The definition of green space is comprehensive:

“... concerned with all publicly accessible green space owned by the Council, including parks, recreation grounds, cemeteries, housing green space, highway green space and natural green space as well as the facilities and play areas within these spaces. The strategy also touches on other green space, such as privately owned green space (especially where it has public access) and more restricted spaces such as school fields and allotments. Green space is any area that provides “green” features such as grass or trees or shrubs.” (Southampton City Council, 2008a, p. 3)

However, gardens are not included.

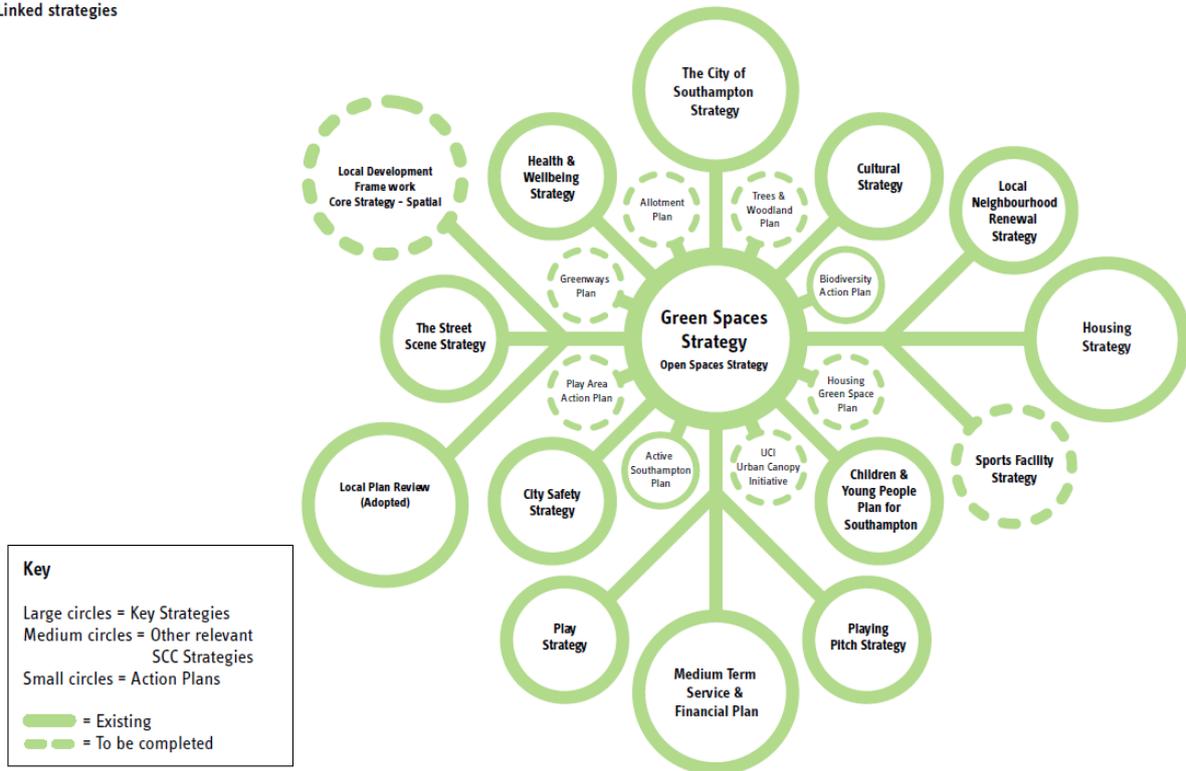
The GI strategy aims and associated actions are both generic and also highly aspirational:

1. To provide a network of high quality green spaces contributing to a unique sense of place. The actions require an agreed typology of green space with standards being publicly accessible;
2. To promote active community involvement and improved access for citizens and visitors. This is achieved by a citizen dialogue responding to needs, providing opportunities for informal recreation and facilitating infrastructure for meeting and group activities;
3. To establish the contribution parks make in developing the city’s economy and cultural opportunities. This is achieved by developing the profile of green spaces in the Southampton brand as part of the growth agenda;
4. To achieve attractive and sustainable green spaces in the city. This is achieved by developing a green grid across the city, using demonstration projects for wider learning and mainstreaming;
5. To maximise value for money and resources available. This is achieved by developing new funding sources and using volunteers.

The document does not sit in isolation and there is conscious attempt to link it with other emerging city strategies (Figure 4). The plan and vision are built upon a solid evidence base which included the mapping of all green spaces onto a GIS database, a value assessment of spaces with benchmarking and audit. There were also claims of widespread public consultation.

Figure 5.1 Southampton's Key Interlinked Strategies

Linked strategies



Source: Southampton City Council 2008a , p. 12

Local Plan

Local planning policy is operationalised through the Local Plan Review 2015 documents (Southampton City Council, 2015) and the Planning Southampton City Centre Action Plan (Harris, 2015). Here, Paragraph 1.6 of the Action Plan highlights the challenges and tensions facing the city as it seeks both economic growth and environmental protection:

“... Southampton faces a challenge to deliver significant new development bringing jobs and prosperity whilst protecting the historic and natural environments, tackling climate change and creating an attractive and uplifting place to live, work and visit.” (Harris, 2015, p. 3)

The key Local Plan policy for GI is Policy AP 12: Green Infrastructure and Open Space:

“The Council will increase the quantity and improve the quality and accessibility of open space in the city centre by:

- 1. Protecting and enhancing existing designated open spaces listed in Appendix 6;*
- 2. Designating additional existing open spaces listed in Appendix 6;*

3. Supporting the reconfiguration of existing open spaces, as part of the following development schemes provided the quantity and quality of open space is retained within the site;

4. Improving accessibility to open spaces through creating a network of strategic pedestrian and cycle links and facilitating a Green Grid of routes and spaces throughout the centre linking existing neighbourhoods, destinations, open spaces and the waterfront. The Green Grid will include tree planting, landscaping, green spaces and/or green walls;

5. Ensuring the provision of new open spaces as set out in policy AP 13;

6. Require all developments (and especially the key sites set out in chapter5) to assess the potential of the site for appropriate green infrastructure.” (Harris, 2015, pp. 53–54)

However, it is dangerous to view this as a stand-alone policy. It dovetails in with public open space in new developments (Policy AP 13) which sets out guidance on public open space provision for new development), renewable or low carbon energy plants, the District Energy Network (Policy AP 14), flood resilience (Policy AP 15) and Policy AP 19 on strategic links including green links.

Significantly, there is no general presumption of protecting the entire GI network; rather specific areas are identified for greater protection. There is a focus on creating new as well as enhancing the quality of existing assets through section 106 agreements and GI quotas in new developments.

5.2 Birmingham City Council

Green Infrastructure

Birmingham’s Green Infrastructure Strategy ‘The Green Living Spaces Plan (GLSP)’ (Birmingham City Council, 2013) is a non-statutory document which forms part of a suite of initiatives as part of the City’s ambition to become a global green city. Institutionally the GI strategy was championed through the development of a Green Commission body with cabinet level representation/leadership. Its vision to drive Birmingham forward is:

“A leading green City and so help create prosperity, fairness, good health; a more attractive City in which to work, live and enjoy - efficient in its use of scarce resources; and a better City for the delivery of green finance and business.” (Birmingham City Council, 2013)

The GLSP provides a key ingredient for delivering that vision by linking the issues of climate change, public health and spatial planning. From the evidence base and consultations with internal and external stakeholders seven core principles were identified, each with associated outcomes.

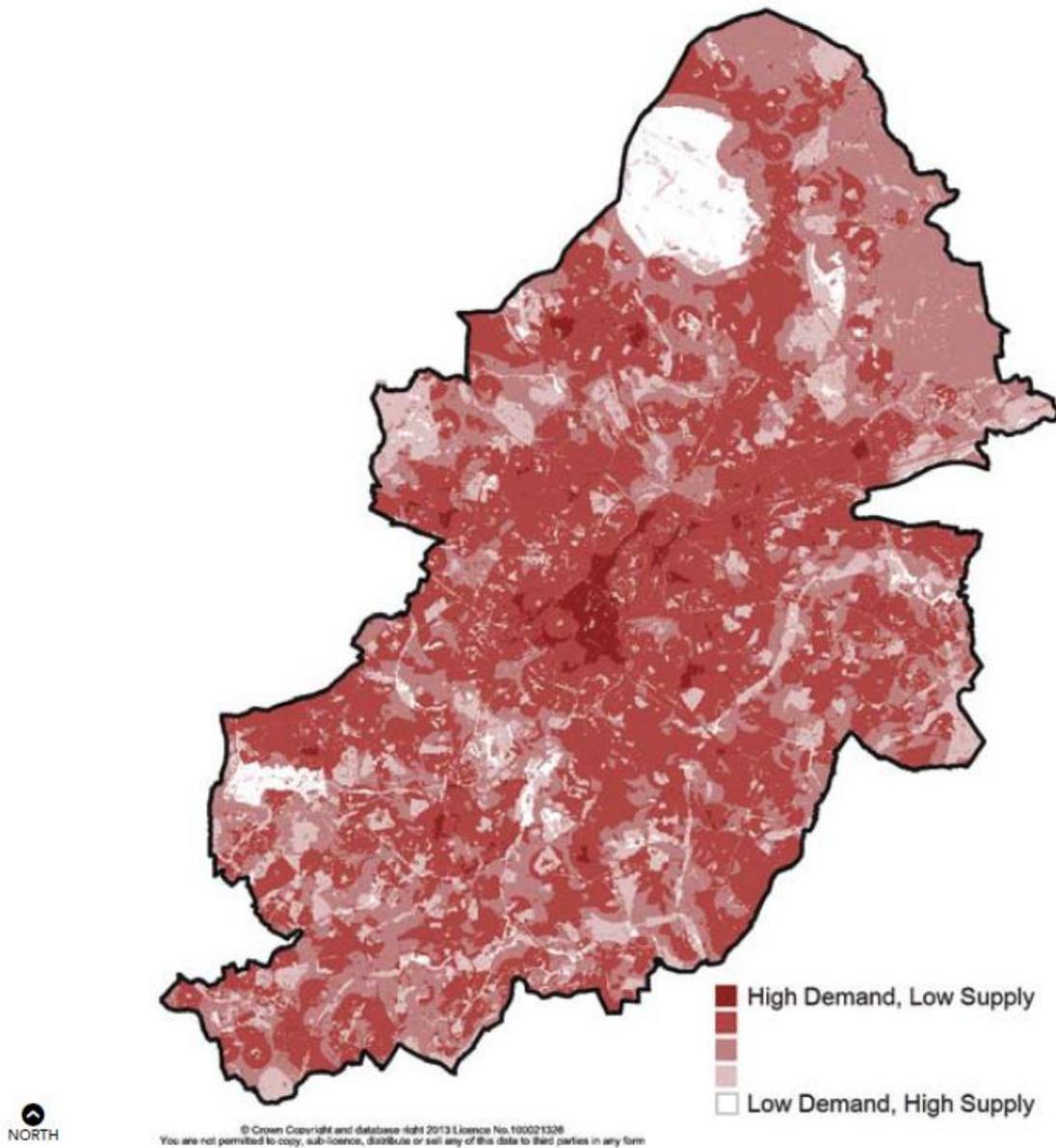
Figure 5.2 The Seven Green Living Spaces Principles

Principle	Outcomes
An Adapted City	Retain City's top ranking for adaption
	<ul style="list-style-type: none"> • Ensure all future growth is 'adapted'. • Trees for cooling and thermal insulation. • Green roofs, walls and street canyon research.
The City's Blue Network	Adopt water sensitive urban design
	<ul style="list-style-type: none"> • Integrated SuDS, flood and water management solutions. • 'Blueprint' for enhanced walking and cycling network. • Blue Corridor/network policy with Canal River Trust.
A Healthy City	Adopt Natural Health Improvement Zones (NHIZ)
	<ul style="list-style-type: none"> • Integrate the delivery of health and green living spaces. • Continue to extend the Be-active offer. • Public health as key partners in planning.
The City's Productive Landscapes	Embrace urban forestry and urban food growing
	<ul style="list-style-type: none"> • Continue to promote allotments. • Facilitate community food growing and orchards. • Promote the multiple benefits of urban forestry.
The City's Greenways	Change gear - to a walking and cycling City
	<ul style="list-style-type: none"> • Create walkable/cyclable neighbourhoods. • Citywide signed routes linked to public transport.. • Link healthcare activities and prevention programmes.
The City's Ecosystems	Birmingham as a biophillic City
	<ul style="list-style-type: none"> • City to adopt an ecosystem services approach. • Partners to lead on District NIA continuation plans. • Birmingham to join global Biophillic Cities network.
The City's Green Living Spaces	Birmingham an international City of Green Living Spaces
	<ul style="list-style-type: none"> • Adopt the 7 principles across Planning Framework. • Green Infrastructure and Adaption Delivery Group. • Work with business partners on green economy.

Source: *Birmingham City Council 2013, p. 10*

As part of the GLSP an Ecosystem Assessment for Birmingham's Green Infrastructure including the monetary valuation of ecosystem services (Hölzinger *et al.*, 2013a) was undertaken. Furthermore the ecosystem services concept was applied to six urban GI issues (aesthetics and mobility, flood risk, local climate, education, recreation and biodiversity) resulting in separate and composite GIS (Geographic Information System) maps of the city depicting areas of high and low demand/supply of each service (Hölzinger *et al.*, 2013b). The single multi-layered challenge map for Birmingham enabled GI to be linked with equity and social justice issues (see Figure 5.3). These assessments form Appendix 1 and 2 of the GLSP.

Figure 5.3 The Multi-layered Challenge Map for Birmingham



Source: *Birmingham City Council 2013, p. 26*

In summer 2016, the Council also adopted a 25-year Natural Capital Vision (WMCA, 2016) to further strengthen the value of GI as an asset within council work.

Local Plan

Within the Birmingham Development Plan 2031 (Birmingham City Council, 2017), which forms part of Birmingham's Local Plan, the vision states:

“By 2031 Birmingham will be renowned as an enterprising, innovative and green City that has delivered sustainable growth meeting the needs of its population and strengthening its global competitiveness.” (Birmingham City Council, 2017, p. 18)

As part of realising that vision, Paragraph 6.38 recognises that GI has a role to play as an environmental asset with social and economic attributes:

“Green infrastructure has a critically important role to play in mitigating the impacts of extreme weather events, particularly extended heat waves, and reducing flood risk. In addition, green infrastructure helps support biodiversity and makes an important contribution to the quality of the City’s environment, its quality of life and human wellbeing and its economic status and performance.” (Birmingham City Council, 2017, p. 76)

The core GI policy TP7 states:

“The City Council will seek to maintain and expand a green infrastructure network throughout Birmingham. The integrity of the green infrastructure network will be protected from development and where possible opportunities will be taken to extend and enhance the network and to improve links between areas of open space.

Any development proposal that would adversely affect the integrity of the network will be refused. *New developments will be expected to address green infrastructure issues in an integrated way and to take advantage of new opportunities such as green and brown roofs. It is important that **all new green infrastructure features and assets are designed to help the City adapt to a changing climate.***

The City Council will also seek to conserve and enhance Birmingham’s woodland resource (collectively known as ‘The Birmingham Forest’). Particular attention will be given to protecting the City’s ancient woodlands as irreplaceable semi-natural habitats. All trees, groups, areas and woodlands will be consistently and systematically evaluated for protection and all new development schemes should allow for tree planting in both the private and public domains. The importance of street trees in promoting the character of place and strengthening existing landscape characteristics will be recognised.” (Birmingham City Council, 2017, p. 76)

This policy has strong protection for the existing GI network with the use of the phrase “will be refused” making it extremely powerful. There is a focus on developing new greenspace, set within strategic corridors and areas of multiple deprivation. The linkage with climate change is also made

explicit. In our view the challenge for planning decisions is going to be on the extent to which individual areas of GI loss threaten the integrity of the whole network. This potentially allows piecemeal nibbling.

5.3 Central Bedfordshire Council

Green Infrastructure

Central Bedfordshire is a relatively newly created unitary authority (April 2009). Consequently, there is a legacy of developed GI plans at a variety of scales:

- A Strategic Level GI Plan covering the whole county of Bedfordshire and Luton (Bedfordshire & Luton GI Consortium, 2007);
- District Level GI Plans for Mid Bedfordshire (Mid Bedfordshire District Council, 2008) and for Luton and Southern Bedfordshire;
- Community Level Plans, developed by many individual towns and parishes across Central Bedfordshire.

The Bedfordshire and Luton Green Infrastructure Plan (Bedfordshire & Luton GI Consortium, 2007) was a response to the Milton Keynes and South Midlands Sub-Regional Strategy (The Stationery Office, 2005) and the growth agenda that signalled a period of rapid growth in housing and employment related development. The Sub-Regional Strategy recognised the need to ensure that development contributes to an improved environment, by protecting and enhancing environmental assets, and providing related GI to meet the needs of existing and expanding communities. The Strategic GI plan responded by providing the strategic framework for GI provision.

The District Level Plans followed, identifying in greater detail opportunities for environmental enhancement, and providing an evidence base for the Local Plans for the districts. Their focus is

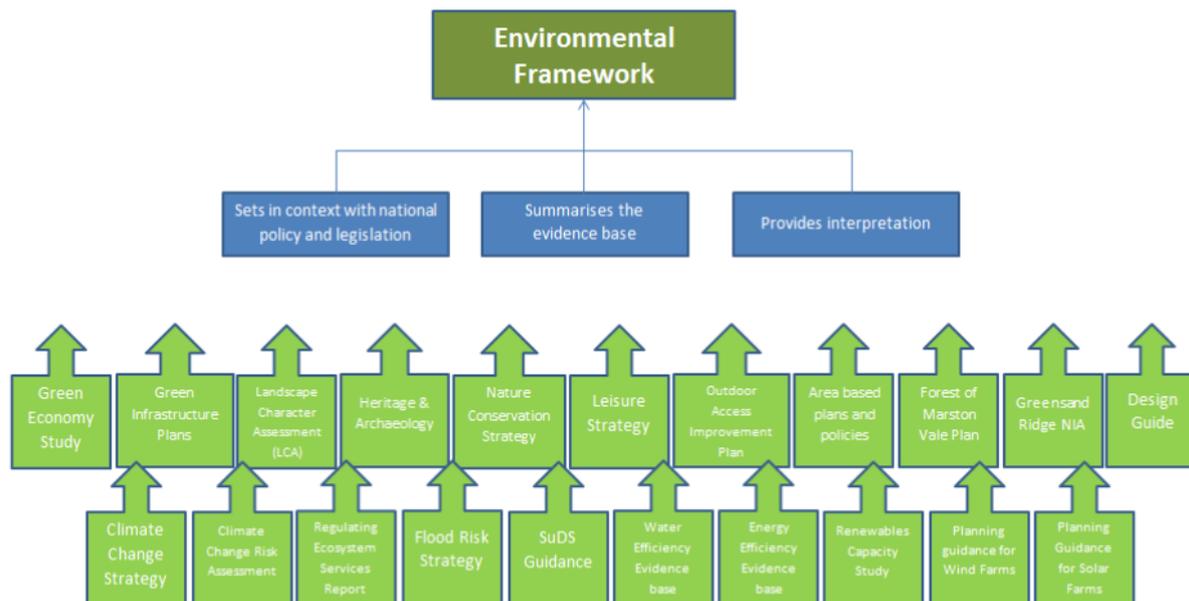
“... the protection and enhancement of the key existing natural, historic, cultural and landscape green infrastructure assets; accessible greenspace; and rights of way; as well as the identification of new features that will provide a connected multi-functional green infrastructure network for the benefit of both existing and new communities.” (Mid Bedfordshire District Council, 2008, p. 6)

Both, the Strategic and District Plans map priority GI networks based on an assessment of existing environmental assets and opportunities for enhancement across biodiversity, landscape, heritage, access and open space. Key policy considerations related to the process of mapping and then identifying priority GI networks/corridors; and how using GI provides multiple additional environmental benefits.

Environmental Framework (2016)

Central Bedfordshire Council has recently consulted on an innovative enviro-economy 'Environmental Framework' (Central Bedfordshire Council, 2016) which summarises and interprets the considerable body of environmental evidence in the form of various extant studies, assessments, strategies and guidance produced by the Council, acting as a meta executive summary.

Figure 5.4 The Central Bedfordshire Environmental Framework



Source: *Central Bedfordshire Council 2016, p. 4*

The framework document applies this information within the national and local planning policy context and prevailing narrative to enable local environmental needs and issues to inform economic growth. It also seeks to inform the development of planning policy within the Local Plan process as an evidence base as well as to inform other Council strategies and planning application decisions. This will be used as part of the evidence base for the Local Plan for Central Bedfordshire, and will have the status as a technical informal supporting document, rather than a statutory Supplementary Planning Document (SPD).

There is a clear focus on identifying strategic GI corridors across the whole county based on their landscape and amenity value. These form the basis for locally derived additions thus enabling GI assets to be identified at multiple scales. The document does not provide detail on delivery mechanisms however and is still in its emergent phase. But it does have a separate section on ecosystem services (pp. 61-66) which reflects collaboration with wider research as part of the BESS initiative¹⁶.

¹⁶ BESS (Biodiversity for Ecosystem Services and Sustainability) www.bess.net

Local Plan

The planning policy situation given the creation of Central Bedfordshire is complicated with the merger of Mid Bedfordshire and South Bedfordshire District Councils in 2009. There is an adopted core strategy for the northern part of the district (2009)¹⁷ whilst in the south there is an old adopted Local Plan (2004)¹⁸; both somewhat out of date. There is an emerging Local Plan process for the council as a whole but this has been stifled due to the failure to meet the duty to cooperate requirement over housing numbers in 2015. There are currently no emerging Local Plan documents available for public scrutiny as the plan consultation is now planned for Spring 2017. This means that comparing the statutory GI policies in force at present against the emerging policy framework is challenging to say the least. For this exercise we were therefore constrained to the extant northern area policies (Central Bedfordshire North 2009).

GI is embedded in strategic objective 11:

“To enhance and manage natural resources of the district in a sustainable and integrated way to bring about an increase in biodiversity, a net gain in green infrastructure, and the retention and enhancement of landscape character.” (Central Bedfordshire North 2009)

This is then translated into two key policies CS17 and DM18. The use of a strategic orientated planning policy supported by a development management policy is a useful approach here that parallels the relationship between local plans and planning permission. Furthermore, the area-based focus of the policy wording creates opportunities for a place-based approach.

CS17 states that the Council will:

“Seek a net gain in green infrastructure through the protection and enhancement of assets and provision of new green spaces as set out in the Strategic, Mid Bedfordshire and Parish Green Infrastructure Plans.”

“Take forward priority areas for the provision of new green infrastructure in the Forest of Marston Vale (including the Bedford and Milton Keynes Waterway), the Ivel Valley, the Greensand Ridge, the Flit Valley and the Chilterns.”

“Require new development to contribute towards the delivery of new green infrastructure and the management of a linked network of new and enhanced open spaces and

¹⁷ <http://www.centralbedfordshire.gov.uk/planning/policy/ldf-north/framework.aspx>

¹⁸ <http://www.centralbedfordshire.gov.uk/planning/policy/ldf-south/plan.aspx> [accessed 20 April 2017]

corridors. Development that would fragment or prejudice the green infrastructure network will not be permitted.”

DM18 states that:

“The Council will promote and protect green infrastructure by ensuring that proposed residential and commercial development:

- will contribute to the provision, extension and maintenance of green infrastructure in accordance with the requirements outlined in the area profiles in Chapter 3 Spatial Strategy, and in accordance with the mechanisms in the Planning Obligations Strategy.*
- which adversely affects identified green infrastructure assets and/or prevents the implementation of green infrastructure projects will not be permitted.”*

The policy wording in both gives strong protection (“will not be permitted”) and through use of the words “fragment” or “prejudice” the GI network as a whole gives an additional layer of protection to piecemeal loss. There is also a requirement for contributions of new GI in the planning process linking in with Section 106 agreements under planning obligations. However, there is no explicit linkage to Community Infrastructure Levy.

5.4 South Downs National Park Authority

Green Infrastructure

South Downs National Park Authority (SDNPA) is the UK’s youngest NPA. It came into existence in 2013. It has statutory requirements for the protection of natural beauty and informal recreation and the production of a statutory management plan. In planning terms it has a unique arrangement in that it can ‘call in’ for consideration any planning application or development proposals across the 15 local authorities that lie within the National Park boundary that is perceived to have a significant impact on the special qualities that contribute to its NPA status. The SDNPA is currently working on its GI Framework as a roadmap for the delivery of GI throughout the park which is available as consultation draft (Bayne and Hyland, 2016). This is a collaborative effort amongst its partners, staff and members. It brings together existing evidence including mapping of the GI resource using the ecosystem services framework (EcoservGIS¹⁹) and strategies in an effort to integrate and inform other park strategies as well as the 15 local authorities who interact with the Park. This approach enables gaps to be identified for action.

¹⁹ <http://ecosystemsknowledge.net/ecoserv-gis> accessed 11th March 2017

The GI work is positioned within their overall statutory partnership management plan strategy (SDNPA, 2013) and the more conceptual ecosystem approach philosophy²⁰ which has been central to all their activities including the emerging Local Plan (see below).

The collaborative co-creation process of plan formation between the SDNPA and its members and partners through workshops, exercises, evidence and data analyses plus case studies of good practice has led to the identification of seven GI principles (Figure 5.5) within which priorities have been agreed (Figure 5.6). Given that the document was out for public consultation at the time of writing of this report, this may have been modified within their wider engagement processes that characterise SDNPA work.

Figure 5.5 SDNPA Principles for Green Infrastructure Planning in the Framework Area

Make Strong Connections

The need for better connections crosses many areas – biodiversity networks and sustainable transport, as well as planning and delivering green infrastructure across boundaries and across sectors.

A Natural and Cultural Canvas

The well-being of the area fundamentally relies on the quality of the landscape, its ecosystems and the services they provide. The natural landscape and cultural heritage should be strengthened and celebrated, providing distinctive settings for its cities, towns and villages and underpinning the future prosperity of the area.

Support Sustainable and Healthy Communities

The health and well-being of people living in the Framework area is linked to the quality of their environment. People need access to nature and the benefits of a green environment. New development must build communities, not just housing. This is vital for the health of the towns and villages and contributes to the economic prosperity of the area.

Become Fit for the Future

The Framework area needs to build resilience to help it adapt to change. Housing growth and transport will continue to make demands on the landscape and natural resources, particularly water. Climate change will create pressures and challenges which will require adaptation. Economic forces will test farming and forestry. The management of these complex challenges requires forward planning into the medium and long term horizons.

Better Through Working Together

Partnership working, shared objectives, pooling knowledge, securing resources and advocacy will be the keys to success for the Framework and its ambitions.

Source: Bayne and Hyland 2016, p. 13

These principles help to clarify the juxtaposition of GI with other planning activities and represent a new narrative away from the multiple benefits ideas.

²⁰ <http://jncc.defra.gov.uk/default.aspx?page=6276> accessed 18th April 2017

Figure 5.6 SDNPA Strategic Priorities Formed from the Principles for the Framework

Make Strong Connections	A Natural and Cultural Canvas	Support Sustainable and Healthy Communities	Become Fit for the Future	Better Through Working Together
<ul style="list-style-type: none"> Assess needs and opportunities - then plan and deliver across administrative boundaries. Link towns and villages with the countryside - considering access, landscape, wildlife and rivers, not just one in isolation. Improve access connections around towns and from towns to countryside. Better integration of access and biodiversity to manage recreation without unduly pressurising biodiversity. Break down access barriers - main roads, rivers and railway lines without lateral access all disconnect the network. Improve ecological connectivity - 'mainstreaming' this into all areas and at all scales and co-ordinating connectivity modelling evidence. Work together - networks do not operate within administrative areas - everyone must look beyond their boundaries. 	<ul style="list-style-type: none"> Landscape sensitive planning (particularly outside the National Park where small-scale, gradual changes alter the landscape); Utilise tools⁹ to improve visual impact assessment of proposed development. Better managed and new woodland to address fragmentation, reinforce historic landscapes, provide new recreation opportunities and improve productivity, particularly through co-operatives. Improve understanding of ecosystem services and the role of both natural and urban landscapes in providing these. Keep special places in the landscape by identifying tranquil areas, areas of dark skies and key viewpoints. Recognise and celebrate the rich cultural heritage of the area. 	<ul style="list-style-type: none"> Enhance existing and create new greenspace in areas of deficit, especially in areas of poor health or deprivation - do not create further disadvantage in these areas. Ensure new development adequately contributes to providing greenspace - build communities not just housing. Increase the benefits provided by existing greenspaces in all areas e.g. increasing access, making better use of strategic gaps and urban fringe, enhancing biodiversity, increasing play space and ensuring good maintenance. Bring nature into towns - more wildlife in parks, better urban connections, naturalised and de-culverted rivers. Use green infrastructure in a planned way to combat noise and air pollution. 	<ul style="list-style-type: none"> Address future urban heating by planting trees to provide shade - in parks, streets, schools and in new developments. Promote sustainable water use and demand reduction to support the growing population and improve water quality. Use natural solutions to regulate water flow, through sustainable drainage, catchment planting, creation of wetlands and re-naturalising watercourses. Improve habitat and species connectivity to adapt to climate change. 	<ul style="list-style-type: none"> Bring together organisations based around common needs e.g. coastal communities. Identify potential advocates who will make the case for green infrastructure at all levels and to different - and influential - audiences. Support pilot projects to demonstrate green infrastructure and ecosystem service benefits, not least in economic terms. Provide opportunities for Planners and local politicians to better understand green infrastructure and its role in sustainable development. Assess the potential for working with new sectors and sourcing new funds.

Source: Bayne and Hyland 2016, p. 13

The Local Plan

The South Downs Local Plan (SDNPA, 2015a) is shortly²¹ to go to the Secretary of State for assessment and examination after a period of extensive public consultation. Significantly, SDNPA is using the ecosystem approach to drive their local plan approach which is highly innovative for a planning authority in the UK. Their unique planning status means that this plan will be used for development management decisions by the surrounding 15 authorities as well as the park authority themselves.

The plan has a set of 4 core (higher level) policies that sit above all other policies of the plan. Regarding GI, the ecosystem services policy SD2 is a significant development. The policy has the potential to affect the majority of planning applications and offers the opportunity to develop net positive gains from development through negotiation rather than the traditional constraining policies that typify environmental chapters. Sections a to e plus i all impact on GI resources and help to ensure that GI has a positive role in all planning applications where relevant.

Core Policy SD2: Ecosystems Services

"1. Proposals that deliver sustainable development and comply with other relevant policies will be permitted provided that they do not have an unacceptable adverse impact on the natural environment and its ability to contribute goods and services. Proposals will be expected, as appropriate, to:

²¹ at time of writing December 2016

- a) provide more and better joined up natural habitats;*
- b) conserve water resources;*
- c) sustainably manage land and water environments;*
- d) improve the National Park's resilience to, and mitigation of, climate change;*
- e) increase the ability to store carbon through new planting or other means;*
- f) conserve and improve soils;*
- g) reduce pollution;*
- h) mitigate the risk of flooding;*
- i) improve opportunities for peoples' health and wellbeing;*
- j) stimulate sustainable economic activity; and*
- k) deliver high-quality sustainable design."*

(SDNPA, 2015a, p. 34)

There is also a dedicated GI policy in SD14 which has two key parts. The first focuses on the need to protect and enhance the existing GI network including the creation of new GI where needed. The second part is more strategic and deals with the ongoing mapping and monitoring of the GI network set within a collaborative and evidence-based framework. It is clear that there is scope for the GI framework to become an integral part of the Local Plan.

Strategic Policy SD14: Green Infrastructure

"1. Development proposals that comply with other relevant policies will be permitted where, as appropriate, they:

- a. incorporate, reinforce and link green infrastructure; and*
- b. contribute to the delivery of green infrastructure that meets the needs of communities both within and beyond its boundaries, including establishment of new and enhancement of existing green infrastructure.*

2. Green infrastructure assets will be identified, enhanced and safeguarded through:

- a. not permitting development that unacceptably compromises the integrity of green infrastructure assets and that of the overall green infrastructure network; and*
- b. facilitating improvements to the quality, use and provision of multifunctional green assets and green linkages, either through developer contributions or through integrating them into development design.*

3. The SDNPA will support proposals that deliver a strategic cross boundary green infrastructure resource, which underpins a network of natural and semi-natural spaces and features as set out in the emerging Green Infrastructure Framework."

(SDNPA, 2015a, p. 96)

5.5 Solihull MBC

Green Infrastructure

Solihull has produced a bespoke Solihull GI Study (Solihull Landscape Architecture and Ecology, 2012) which is effectively its GI strategy. This is an interesting strategy in that the vision is produced at the end of the document after the presentation of all the GI evidence which includes developing its own GI typology and assessment of the resource base:

“Solihull will have an integrated, well-designed and diverse Green Infrastructure network throughout and extending beyond the borough, which will contribute to the quality of life of new and existing communities and help to create a positive sense of place for people who live and work here, while helping to protect and promote the Borough’s rich cultural heritage. Solihull’s Green Infrastructure will be valued for its contribution to the local economy and its capability of providing essential ecosystem services. Solihull’s Green Infrastructure should be a showcase for well-designed and sustainable communities, one which reduces inequalities, actively encourages healthy living, cultural awareness and sustainable travel whilst delivering a robust, biodiversity-rich natural environment, resilient to an ever changing environment. Green Infrastructure benefits can deliver many of the aspirations of the Solihull Sustainable Communities Strategy.”

(Solihull Landscape Architecture and Ecology, 2012, p. 79)

The vision is also linked directly to the emerging Sustainable Communities’ Strategy thus reinforcing policy integration.

The GI strategy is positioned as part of the evidence base for the Local Plan (Solihull MBC, 2013). It documents, characterises and analyses (qualitatively and quantitatively) the different GI types within its own typology: Natural/semi-natural green spaces, biodiversity and geodiversity, water, designed landscapes, landscape, food production, historic environment, accessible green space, green links access, and links. Additionally, there is an ecosystem services and functional assessment of the GI resource (pp. 39-54). The associated mapping exercise reveals significant gaps across most ecosystem services components (Figure 5.7). This data deficiency exposes the problems of identifying and using ecosystem service proxy indicators.

Figure 5.7 Data Availability for Ecosystem Services

TYPE OF SERVICE	Example	Data available /mapped
Provisioning services (products):	Food	<i>Productive landscapes: allotments</i>
	Timber	<i>Woodlands</i>
	Woodfuel	<i>Woodlands</i>
	Fresh water	<i>Running and standing water</i>
	Biodiversity	<i>High - low biodiversity value (based on HBA Phase One data)</i>
	Genetic resources	<i>No spatial data</i>
	Biochemicals	<i>No spatial data</i>
	Natural medicines	<i>No spatial data</i>
	Pharmaceuticals	<i>No spatial data</i>
Regulating services (regulation of natural processes):	Air quality	<i>NAEI 2009</i>
	Climate	<i>No spatial data at borough scale</i>
	Flooding Erosion	<i>Floodzones – 1:100, 1:1000 yr</i>
	Water purification	<i>No spatial data</i>
	Disease/Pest control	<i>No spatial data</i>
	Pollination	<i>No spatial data</i>
Cultural Services (non-material anthropomorphic benefits)	Pollution	<i>No spatial data</i>
	Spiritual enrichment	<i>No spatial data</i>
	Cognitive development	<i>No spatial data</i>
	Recreation	<i>Green Space Strategy data</i>
Supporting Services (operations required for all other ecosystem services):	Aesthetic enjoyment	<i>Street Trees, TPOs, veteran trees</i>
	Soil formation	<i>No spatial data</i>
	Photosynthesis	<i>No spatial data</i>
	Primary production	<i>No spatial data</i>
	Nutrient cycling	<i>No spatial data</i>
	Water cycling	<i>No spatial data</i>

Source: Solihull Landscape Architecture and Ecology 2012, pp. 43-44

The strategy concludes with a set of strategic objectives reflecting the need for a GI delivery plan which does seem a surprising omission from the strategy itself:

1. *Develop the GI Vision for the borough through production of a GI Strategy which will identify a series of strategic implementation projects designed to fill the gaps in terms of the physical networking, the quality and the functionality of GI assets;*
2. *Develop a Delivery Plan for the Green Infrastructure Strategy which enables the growth and development of the Strategy and its effective implementation through the LDF and other mechanisms (including cross boundary, joint GI partnership) projects with neighbouring authorities/other partners) to promote and deliver landscape scale benefits;*

3. *Develop a series of Green Infrastructure site briefs (constraints and considerations) to outline what is required by new development in specific areas of the borough in terms of strategic GI;*
4. *Support the growth and development of the Landscapes for Living network in Warwickshire, Coventry and Solihull - advocating the initiation of the Arden LFL project;*
5. *Ensure the Strategic Integration of Solihull's Green Infrastructure Strategy into relevant strategies and Initiatives (e.g. neighbourhood planning and the localism agenda) impacting up.*

(Solihull Landscape Architecture and Ecology, 2012, p. 80)

The Local Plan

The current 'Solihull Local Plan' (Solihull MBC, 2013) was adopted in December 2013 and covers the period 2011 to 2028. Since the Local Plan was adopted, a legal challenge resulted in the overall housing requirement being deleted and remitted back to the Council for reconsideration. It is intended that this deficiency will be addressed through a review of the Solihull Local Plan. Other policies remain approved and unaffected.

The policy context for GI is set out within a series of higher order planning challenges. These all cross-reference components of GI in the resulting objectives in managing spatial planning challenges.

CHALLENGE E - Protecting Key Gaps Between Urban Areas

CHALLENGE F – Climate Change

CHALLENGE H – Increasing Accessibility and Encouraging Sustainable Travel

CHALLENGE J – Improving Health and Well-being

CHALLENGE K – Protecting and Enhancing our Natural Assets (Significantly here an ecosystem approach strategy is being pursued).

CHALLENGE L – Water Quality and Flood Risk

This is then translated into a spatial strategy where GI is linked into an asset- based narrative linking across multiple sectors:

5.4 10 "Protecting, conserving, enhancing and restoring the Borough's environmental assets and green infrastructure for their contribution to health and well-being, environmental quality and climate change mitigation and adaptation, and ensuring that development protects and improves the quality of the water environment through the timely provision of foul water infrastructure and the use of sustainable drainage techniques." (Solihull MBC, 2013, p. 35)

This is part of policy P10 which is extremely long, so only parts that are most salient to the GI components are reproduced here. The multiple points do help to provide a strong narrative in linking GI explicitly to the challenges identified earlier as well as formally linking to the above GI study.

*“... The full value and benefits of the natural environment will be taken into account in considering all development proposals, including the contribution to the green economy and the health of residents, and the potential for reducing the impacts of climate change. Joint working with neighbouring authorities will be supported, recognising the need for a landscape scale approach to the natural environment and conservation of biodiversity. [...] Development should be informed by the latest information on habitats and species, and take full account of national and local guidance on conserving biodiversity, opportunities for biodiversity enhancement and for improving and restoring the Borough’s green infrastructure. [...] Where development would have an adverse effect on a site of local value, developers will be expected to incorporate measures to enhance the site or to restore the links between sites in accordance with the Green Infrastructure study, unless it is demonstrated that it is not feasible. [...] Developers will be required to undertake a full ecological survey and to deliver a net gain or enhancement to biodiversity, unless it is demonstrated that it is not appropriate or feasible. In considering the need for green space improvements associated with new development, developers should have regard for the standards and priorities in the Green Spaces Strategy in relation to accessible natural green space. [...] Where development is likely to have significant harmful effects on the natural environment, as a result of the development itself, or the cumulative impact of developments, **developers must demonstrate that all possible alternatives that would result in less harm have been considered.** Where development is permitted, appropriate mitigation of the impacts and compensation where relevant will be required to deliver a **net gain in biodiversity**, habitat creation, landscape character and local distinctiveness. Enhancements should be undertaken either on the site, or in its vicinity, but where it is demonstrated that this is not possible, offsetting in alternative strategic locations within the biodiversity or green infrastructure network, to deliver biodiversity or other objectives may be considered. Where appropriate, developers should demonstrate compliance with this policy through an ecological statement or by relevant information in the West Midlands Sustainability Checklist.” (Solihull MBC, 2013, pp. 105–106)*

The policy has some distinctive aspects present in terms of its requirement for all other possible alternatives to have been considered in cases of significant environmental harm. It also cross-refers

to biodiversity offsetting in cases of mitigation using their positive experience as one of Defra's six pilots (Warwickshire County Council).²²

5.6 Shropshire Council

Green Infrastructure Strategy

Shropshire does not have a dedicated GI strategy although there was a Green Infrastructure Strategy for Shrewsbury and Atcham produced in 2008²³ (TEP, 2008). It is not reviewed here given its spatial limitations given that there is an up to date Local Plan with a different framework to address GI concerns.

Local Plan

Shropshire has an adopted Core Strategy (Shropshire Council, 2011) covering the period until 2026. The adopted Local Plan comprises the Core Strategy (adopted March 2011) and the Shropshire Council Site Allocations and Management of Development (SAMDev) Plan (Shropshire Council, 2015) which was adopted in December 2015.

Section 3.1 of the Core Strategy sets out a series of challenges that Shropshire faces; but with only limited and implicit connection to GI. Those that do are highlighted below.

"A lower carbon footprint, ensuring development mitigates and adapts to the effects of climate change";

"The protection and enhancement of our natural and historic environment, its character, quality and diversity";

"Opportunities for local people of all ages to enjoy active, healthy safe and secure lives."
(Shropshire Council, 2011, p. 27)

However, translating these challenges within the spatial vision we encounter GI explicitly for the first time reinforcing its strategic role as a corridor and network crossing multiple sectors and delivering multiple benefits:

"Green infrastructure and areas of recognised environmental quality within towns and villages, with links to the surrounding countryside, will provide enhanced opportunities for

²² Biodiversity Offsetting Warwickshire County Council <http://www.warwickshire.gov.uk/biodiversityoffsetting> accessed 10 March 2017

²³ http://s3.amazonaws.com/zanran_storage/www.shropshire.gov.uk/ContentPages/639857655.pdf [accessed 20 April 2017]

recreation, with associated benefits for health and well-being of residents, flood management and improved biodiversity.” (Shropshire Council, 2011, p. 30)

In policy terms this is translated into strategic priorities within which dedicated policies are represented. This schematic representation (Figure 5.8) is visually appealing and effective, reinforcing the GI linkages across multiple policy domains thus helping integration.

Figure 5.8 Strategic Objectives for the Shropshire Core Strategy Related to GI

11	Ensure that the character, quality and diversity of Shropshire’s built, natural and historic environment is protected, enhanced and, where possible, restored, in a way that respects landscape character, biodiversity, heritage values, and local distinctiveness, and contributes to wider environmental networks.
Key policies for delivery:	CS2, CS3, CS4, CS5, CS6, CS8, CS9, CS16, CS17
Community Strategy priorities (with outcomes):	1 (5) 2 (1, 2, 3, 4) 3 (3, 4, 5)
12	Improve the quantity, quality and accessibility of multifunctional open space, rights of way, and sport, recreation and cultural facilities to provide varied opportunities for people of all ages to enjoy physical activity, cultural activities and lifetime learning, helping to improve health and well-being.
Key policies for delivery:	CS2, CS3, CS4, CS6, CS7, CS8, CS9, CS15, CS16, CS17, CS20
Community Strategy priorities (with outcomes):	1 (5) 2 (3) 3 (1, 2, 3, 4, 5)

Source: Shropshire Council 2011, p. 33

Significantly GI does not feature explicitly in plan policies; rather the concepts of environmental networks is advanced with an asset based approach in evidence. The environmental networks policy (CS17), reflects a different approach to other planning authorities in the conceptualisation of GI. Within the policy below it is interesting to note explicit reference to financing mechanisms which links the policy explicitly to other areas of the plan.

CS17 Environmental Networks:

“Development will identify, protect, enhance, expand and connect Shropshire’s environmental assets, to create a multifunctional network of natural and historic resources. This will be achieved by ensuring that all development:

- Protects and enhances the diversity, high quality and local character of Shropshire’s natural, built and historic environment, and does not adversely affect the visual, ecological, geological, heritage or recreational values and functions of these assets, their immediate surroundings or their connecting corridors;*
- Contributes to local distinctiveness, having regard to the quality of Shropshire’s environment, including landscape, biodiversity and heritage assets, such as the Shropshire Hills AONB, the Meres and Mosses and the World Heritage Sites at Pontcysyllte Aqueduct and Canal and Ironbridge Gorge;*
- Does not have a significant adverse impact on Shropshire’s environmental assets and does not create barriers or sever links between dependant sites;*
- **Secures financial contributions, in accordance with Policies CS8 and CS9, towards the creation of new, and improvement to existing, environmental sites and corridors, the removal of barriers between sites, and provision for long term management and maintenance.** Sites and corridors are identified in the LDF evidence base and will be regularly monitored and updated.”* (Shropshire Council, 2011, p. 108)

To support CS17, Shropshire Council has produced a detailed guidance note on environmental networks (Shropshire Council, 2013). Here, environmental networks are defined as:

“multifunctional corridors of green landscape, centred around a core of existing high quality Environmental Assets (landscape, biodiversity and heritage), which support essential ecosystem services, provide potential for adaptation to climate change and give us attractive, locally distinctive places in which to live, work and enjoy life.” (Shropshire Council, 2013, p. 2)

There is some spatial differentiation within these networks. Paragraph 6.2 identifies 5 different components of environmental networks based on the definition in the ‘Lawton Review’ (Lawton *et al.*, 2010):

1. Core Areas - areas of high nature conservation value which form the heart of the network.

2. Corridors and stepping stones – which provide functional connectivity between core areas enabling more mobile species to move between them to feed, disperse, migrate or reproduce.
3. Restoration areas – areas where measures are planned, or could be planned to restore or create new high value areas for ecological restoration.
4. Buffer zones –protect previous zones them from adverse impacts from the wider environment.
5. Sustainable land-use areas – areas within the wider landscape, focussed on the sustainable use of natural resources and appropriate economic activities, together with the maintenance of ecosystem services.

There are also other policies within the core strategy that have implicit reference to GI attributes.

For example, CS16 Tourism Culture and Leisure states:

“To deliver high quality, sustainable tourism, and cultural and leisure development, which enhances the vital role that these sectors play for the local economy, benefits local communities and visitors, and is sensitive to Shropshire’s intrinsic natural and built environment qualities, emphasis will be placed on:

... Promoting connections between visitors and Shropshire’s natural, cultural and historic environment, including through active recreation, access to heritage trails and parkland, and an enhanced value of local food, drink and crafts

... Supporting development that promotes opportunities for accessing, understanding and engaging with Shropshire’s landscape, cultural and historic assets.” (Shropshire Council, 2011, p. 104)

The SAMDev document has two key policies that have a GI component framed within their particular lexicon reinforcing notions of landscape characterisation and positive development for biodiversity.

MD2 Sustainable Design: paragraph 5 references provision of *“well-connected outdoor spaces which responds to and reinforces the character and context within which it is set [...] including natural and semi natural features such as trees, hedges, woodlands, ponds, wetlands and watercourses...”*

MD12 The Natural Environment, paragraph 3 encourages *“development which appropriately conserves, enhances, restores and connects natural assets”* and paragraph 4 supports development which makes a positive contribution to biodiversity at the landscape scale.

5.7 Greater London Authority

Green Infrastructure

The London Plan policies are supported by the All London Green Grid (ALGG) which is the policy framework to promote the design and delivery of GI across London.²⁴ The policy framework comprises London Plan policies on GI and urban greening and those relating to open spaces, biodiversity, trees & woodland, and river corridors; plus the ALGG Supplementary Planning Guidance (Greater London Authority, 2012) and a series of ALGG Area Frameworks.

The ALGG is Supplementary Planning Guidance (SPG) to the London Plan (Greater London Authority, 2016) meaning that it now has a statutory function in development management decisions and thus is different to all the non-statutory planning strategies for GI reviewed earlier.

The ALGG aims to:

- increase access to open space, conserve landscapes and the natural environment and increase access to nature;
- adapt the city to the impacts of climate change;
- make sustainable travel connections and promote cycling and walking
- encourage healthy living;
- promote sustainable food growing;
- enhance visitor destinations and boost the visitor economy;
- promote green skills and sustainable approaches to design, management and maintenance.²⁵

The ALGG (Greater London Authority, 2012) provides supplementary planning guidance which is expanded and spatially translated within Eleven Area Frameworks.²⁶ This was a collaborative and inclusive plan process by the All London Green Grid Area Groups which identified and prioritised projects as part of a delivery framework. This involved establishing a comprehensive baseline understanding of each area; defining a vision with area objectives and strategic opportunities; identifying the specific projects that improved and enhanced GI and encouraging partnership working within a more joined up approach to allocating resources.

²⁴ <https://www.london.gov.uk/WHAT-WE-DO/environment/parks-green-spaces-and-biodiversity/all-london-green-grid> accessed 10 March 2017

²⁵ <https://www.london.gov.uk/WHAT-WE-DO/environment/parks-green-spaces-and-biodiversity/all-london-green-grid> accessed 10 March 2017

²⁶ <https://www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/all-london-green-grid-area-framework> accessed 10 March 2017

The ALGG sets out to deliver an integrated view of GI. As stated in the foreword:

“We have to look on the green grid as an asset, valued for the whole range of social, health, environmental, economic and educational benefits it brings to London. It needs the same kind of protection, investment and innovation in design and management as other, more familiar, types of infrastructure.” (Greater London Authority, 2012, p. 7)

There are three aims to the protection, enhancement and delivery of the green grid set within much wider and ambitious integrative functions (Greater London Authority, 2012, p. 12):

- 1. Protect, conserve and enhance London’s strategic network of green and open natural and cultural spaces, to connect the everyday life of the city to a range of experiences and landscapes, town centres, public transport nodes, the countryside in the urban fringe, the Thames and major employment and residential areas;*
- 2. Encourage greater use of, and engagement with, London’s green infrastructure; popularising key destinations within the network and fostering a greater appreciation of London’s natural and cultural landscapes; enhancing visitor facilities and extending and upgrading the walking and cycling networks in between to promote a sense of place and ownership for all who work in, visit and live in London;*
- 3. Secure a network of high quality, well designed and multifunctional green and open spaces to establish a crucial component of urban infrastructure able to address the environmental challenges of the 21st century – most notably climate change.*

These aims promote a shift in the way grey and green infrastructure is viewed and used in the planning of London. This is articulated in policy 2.18 which performs both, a strategic and delivery role, as well as dealing with plan preparation across London Boroughs and subsequent development management decisions. Here, there is an emphasis on building partnerships and prioritising investment in areas with GI deficits. Policy 2.18 ‘Green Infrastructure’ is substantive and lengthy but given its distinctiveness from other plans is reproduced in its entirety:

“The Network of Open and Green Spaces

Strategic

A) The Mayor will work with all relevant strategic partners to protect, promote, expand and manage the extent and quality of, and access to, London’s network of green

infrastructure. This multifunctional network will secure benefits including, but not limited to, biodiversity; natural and historic landscapes; culture; building a sense of place; the economy; sport; recreation; local food production; mitigating and adapting to climate change; water management; and the social benefits that promote individual and community health and well-being.

B) The Mayor will pursue the delivery of green infrastructure by working in partnership with all relevant bodies, including across London's boundaries, as with the Green Arc Partnerships and the Lee Valley Regional Park Authority. The Mayor will publish supplementary guidance on the All London Green Grid to apply the principles of the East London Green Grid to green infrastructure across London.

C) In areas of deficiency for regional and metropolitan parks, opportunities for the creation of green infrastructure to meet this deficiency should be identified and their implementation supported, such as in the Wandle Valley Regional Park.

Planning Decisions

D) Enhancements to London's green infrastructure should be sought from:

- 1. Development and where a proposal falls within a regional or metropolitan park;*
- 2. Deficiency area (broadly corresponding to the areas identified as "regional park opportunities" on Map 2.8), it should contribute to addressing this need.*

E) Development Proposals should:

- 1. Incorporate appropriate elements of green infrastructure that are integrated into the wider network;*
- 2. Encourage the linkage of green infrastructure, including the Blue Ribbon Network, to the wider public realm to improve accessibility for all and development new links, utilising green chains, street trees, and other components of urban greening (Policy 5.10).*

LDF²⁷ Preparation

F) Boroughs should:

- 1. Follow the guidance in PPG 17 and undertake audits of all forms of green and open space and assessments of need. These should be both qualitative and quantitative, and have regard to the cross-borough nature and use of many of these open spaces;*

²⁷ Local Development Framework

2. *Produce open space strategies that cover all forms of open space and the interrelationship between these spaces. These should identify priorities for addressing deficiencies and should set out positive measures for the management of green and open space. These strategies and their action plans need to be kept under review. Delivery of local biodiversity action plans should be linked to open space strategies;*
3. *Ensure that in and through DPD [Development Plan Document] policies, green infrastructure needs are planned and managed to realise the current and potential value of open space to communities and to support delivery of the widest range of linked environmental and social benefits;*
4. *In London's urban fringe support, through appropriate initiatives, the Green Arc vision of creating and protecting an extensive and valued recreational landscape of well connected and accessible countryside around London for both people and wildlife."*

(Greater London Authority, 2012, pp. 17–18)

This policy is then delivered through partnership working through 11 green grid area groups. This emphasis on delivery is also a distinctive feature.

The current London Plan was prepared before the concepts of natural capital and ecosystem services really came to the fore. A green infrastructure task force was established and consequently published 'Natural Capital: Investing in a green infrastructure for a future London' (Greater London Authority, 2015) which sets out how London is taking forward its GI policies and programmes as it prepares a new integrated London Environment Strategy (a requirement of the Localism Act 2011) and the next iteration of the London Plan. Both will be prepared and published over by 2019.

The vision for 2050 within this strategy highlights how GI will become mainstreamed in to the life of Londoners and their neighbours with decisions based on natural capital valuation and assessment:

"Existing parks and green spaces will become part of an integrated green infrastructure network that is planned, designed and managed to deliver strategic functions as well as local needs. It will link seamlessly with a green infrastructure beyond the London boundary." (Greater London Authority, 2015, p. 2)

The strategy makes a series of points about the problems in assessing and costing the multiple benefits that are part of the GI asset. These narratives work across policy areas and impact on current priorities (Greater London Authority, 2015, p. 5):

1. Rethinking the purpose of GI. Here the need is to reframe the GI narrative to command greater protection.
2. Promoting Healthy Living: improving health outcomes by increasing physical activity, reducing stress and removing pollutants.
3. Strengthening Resilient Living: keeping the city cool, its air clean, and protecting it from flooding. Encouraging Active Living – increasing levels of walking and cycling.
4. Creating Living Landscapes: enhancing natural processes for the benefit of people and wildlife and conserving the most special landscapes, habitats and species.
5. Enhancing Living Space: providing a range of outdoor space for cultural, civic, learning and community.

This shapes a series of recommendations relating to (Greater London Authority, 2015, pp. 5–6):

- reframing notions of value based on ideas of natural capital accounting but within a recognition that data quality and the evidence base needs significant improvement.
- Integrating governance frameworks through the appointment of a GI commissioner to address the current fragmented nature of bodies that deliver and affect the provision and access to GI. This increasingly straddles across the public- private realm which is becoming blurred.
- Releasing new and existing funding streams for improved delivery (creation, maintenance and enhancement) of GI. These include market based instruments such as Payments for Ecosystem Services (PES), models that compensate for environmental loss or degradation (offsetting), or leveraging more private sector finance to offset the costs of upgrading more traditional infrastructure (e.g. tax incremental financing).
- There is also scope to encourage more philanthropy.

In many ways this document is a critique of traditional policy approaches to GI and this fourfold reframing represents a wider and challenging agenda for reform.

6 Discussion

The analysis of strategy and policy formation across our seven partner planning authorities together with our national policy analyses has illuminated some key contextual issues for GI with important implications for its wider conceptualisation and delivery. These are briefly synthesised and discussed in turn.

Green Infrastructure Policies in Local Plans: from ‘what’ to ‘how’

There are a range of distinctive policy approaches evident across our seven case studies (Table 6.1) which is a noteworthy finding in itself. Each bring something different to the GI table which is worthy of discussion in its own right. However, the point of the table is to show that each authority is doing it for themselves and there is value in learning lessons from the differences in approach and their resultant impacts that have been observed.

Table 6.1 Distinctive Policy Outputs from Partner Authorities

Case Study Partner	Distinctive Policy focus		
Birmingham City Council (BCC)	All new GI features and assets are designed to help the City adapt to a changing climate	Targeting investment in areas of high deprivation through demand and supply maps of ecosystem services	
Central Bedfordshire Council (CBC)	Area based policies with different	Development that would fragment the GI network will not be permitted	
Greater London Authority (GLA)	Supplementary Planning Guidance	Natural Capital Approach	Delivery groups able to produce a baseline and prioritise GI delivery
Shropshire County Council (ShrC)	Environmental Network as alternative to GI with spatial zonation	Links to financial contributions	
Solihull Metropolitan Borough Council (SMBC)	Consideration of all other alternatives in cases of environmental harm	Typology of GI	The policy context for GI is set out within a series of higher order planning challenges
South Downs National Park Authority (SDNPA)	Ecosystem services policy supporting GI outcomes through negotiation	Strategic GI policy for mapping and monitoring of the GI network set within a collaborative and evidence-based framework	
Southampton City Council (SCC)	No general presumption of protecting the entire GI network	Area based approaches	Links to Section 106 and planning obligations

Source: **Authors**

Each authority sought to achieve an increase in quality/quantity of GI as well as protect and enhance the GI network but interestingly no clear prioritisation could be easily discerned. It is positive to see many of the case study partners positioning GI within a set of higher level policies, priorities or challenges enabling pathways to some GI integration (e.g. GLA, ShrC, SMBC, SDNPA and SCC).

Some plans positioned GI policies in response to a series of spatial planning challenges (e.g. ShrC and SMBC). The SDNPA had linked GI within a higher-level ecosystem services cross-cutting policy whilst London had used the concept of a green grid. These approaches enabled a powerful cross-referencing system of associated policies and enabled GI to be seen cutting across other policy areas more explicitly. Here, links with climate change, Sustainable Drainage Systems (SuDS), health, flooding, open space and recreation were all featured.

Many GI policies were framed within two parts; one reflecting wider strategic planning concerns such as the protection and integrity of the network itself; whilst the other focussed on more local development management aspects in terms of protecting existing GI from development, or its mitigation, enhancement and/or creation through new developments (BCC, CBC, GLA, SMBC and SDNPA).

Interestingly, Solihull had created a typology of GI to inform its approach reflecting that different types of GI had different values, opportunities and needs. This was also evident in case studies within some spatial differentiation/landscape characterisation where policies were implemented according to the area needs and priorities (e.g. GLA, SDNPA and SCC). In the cases of Birmingham and London there was an emphasis on investing in GI in areas of deprivation and need.

Shropshire was perhaps the most interesting case in that it departed from using the term GI in its Local Plan; instead preferring environmental networks. This was spatially differentiated within 5 zones which together made up the network.

The main delivery vehicles (the how) for GI creation, protection and mitigation were less explicit in policies and justifications with only Bedfordshire, Shropshire and Southampton making explicit financial contributions to GI with Shropshire being the most explicit linking to other policies of the plan directly. Undoubtedly, the explicit use of quotas would likely be challenged in the plan process due to impacts on economic viability (DCLG, 2012, para. 173). Consequently, guidance on delivery was generic and therefore open to very wide interpretation.

In terms of GI protection there was relatively strong wording across the Local Plan policies (e.g. will not be permitted; will be refused) but these were all qualified towards developments which affected/threatened the integrity or led to fragmentation of the **entire GI network** (GLA, SMBC,

SDNPA). This generates room for debate and differing interpretations over when integrity of the entire network is threatened by one particular development enabling some nibbling at the edges. It also raises questions about appropriate monitoring mechanisms to identify e.g. incremental changes to GI which cumulatively could affected the entire GI network over time. Interestingly Bedfordshire has policies that prevented the fragmentation of the network.

The lack of statutory protection for GI inherent in NPPF/NPPG policies does allow economic growth considerations to trump these policy protections anyway. NPPF para. 173 on viability has become a key tool and it is here that the relative weighting is not apparent until the NPPG is consulted and used by developers to avoid or water down GI protection.

Concerningly, there are no similar requirements for social/environmental viability in the NPPF/NPPG which gives economic viability an overarching character at the operational stage. It needs to be further investigated if the argument of economic viability is used excessively and inappropriately by developers to avoid or water down stricter requirements towards social and environmental objectives including GI protection/enhancement. One problem here is that assessing economic (un)viability is commonly left to the developer with no requirement to proof when a development becomes economically unviable or even a requirement to transparently outline the economic models and calculations on which the argument is based. This makes it very difficult if not impossible for planning authorities and other stakeholders to argue against this ‘knockout argument’ of economic viability comparable to a poker game where everyone but the developer has to show their hands.

And even if all protective policies for GI were perfectly implemented and enforced they will still only mitigate negative impacts on GI rather than ensuring “*more, bigger, better and joined*” GI as called for in the Natural Environment White Paper (HM Government, 2011).

One interesting aspect of the policy basis for GI was the diversity of policy length. In London, Shropshire and Solihull the policies were very long with multiple strands to them reflecting wider policy linkages and actions. Whereas in Southampton and Birmingham the policies were much shorter. This raises an interesting point as to how well these policies work in what are often messy and complex decision making processes. This is seen to be a fruitful avenue of future research.

It is significant that London and Birmingham have both recognised that the prevailing narrative of GI and its associated multiple benefits did not readily lend itself to effective valuation in development management decisions and thus have reframed it within new principles and definitions taking account of Natural Capital and ecosystem services. A similar process is also evident in Solihull and South Downs whilst Shropshire, Bedfordshire and Southampton make reference to GI as environmental assets

reflecting ecosystem science thinking (Scott *et al.*, 2014). However, ecosystem service thinking need reliable and accepted data sets to inform the evidence base. At present there are significant gaps across ecosystem service proxies and mapping as indicated in Solihull's assessment. Nevertheless, Birmingham's ecosystem services maps and economic assessment (Hölzinger *et al.*, 2013a; Hölzinger *et al.*, 2013b) do point a way forward linking GI with other economic and social indicators to improve targeting interventions. However, its implementation in practical plan- and decision making will also require new skill sets and additional resources. Unfortunately, many local authorities lack sufficient ecological support/resource and planning officers are usually not conversant with ecosystem services language or how to operationalise it (RSPB and TWT, 2015) nor are planning authorities equipped with fit-for-purpose tools to assess and monitor changes to Natural Capital/ecosystem services value (Hölzinger *et al.*, 2015).

Finally, whilst plan policies usually clearly indicate what should be achieved in terms of protecting and enhancing GI, the reviewed documents are less clear about how this should be implemented in practical terms and how to deal, for example, with trade-offs between competing goals. London is the only case study that has set up delivery groups that actually go through this process. Indeed, it is within these more political considerations that GI appears to be significantly at risk.

Supplementary Planning Guidance's (SPGs) vs. Non-statutory Strategies for GI

Most case study partners with the exception of London have developed non-statutory strategies for GI which then seek to inform the statutory Local Plan process and other plans. In many cases these appear to form partial evidence bases. London's GI strategy is a SPG comprising part of the statutory development plan itself. The use of GI as SPG is also evident in Wales with Bridgend's GI strategy (Bridgend County Borough Council, 2014).

Birmingham did originally consider taking a statutory approach but rejected it in favour of a more flexible and incentive nudge-based approach. The statutory process was seen to take longer to be approved with more demanding public consultations. However, there is not necessarily an either/or here as the GI strategy can be translated into a SPG afterwards if so desired. This is seen as an interesting and rich area for debate across our case study partners.

It is notable that most of the GI strategies reviewed recommended a delivery plan or had extremely generic and aspirational actions within a delivery or action plan heading. This was also reinforced by similar aspirational visions which could really apply anywhere; lacking place based specificity. London's green grid provides an exception here with an interesting framework within which delivery plans could be designed and delivered as previously discussed.

Undoubtedly, the lack of identification of extant or proposed delivery mechanisms was a serious weakness in most documents (Table 6.1). Furthermore, the lack of any indicators as part of any monitoring process also challenged any strategy in being able to deliver any progress updates when a review was undertaken (again London provides the exception here). Without clearly defined goals and timed milestones which can be monitored against an evidence-based baseline, it will always be difficult to judge if a plan or policy has been successfully implemented. In such cases what is 'success' is up for interpretation. The reasons for the lack of clarity about what success is and how it is measured when delivering GI may be due to the fact that environmental policy is a classical cross-cutting issue affecting many policy areas and Local Authority Departments.

Notwithstanding this, each case study did have a vision articulated in terms of a common set of statements stressing connectivity, quality of life and resilient green space network assets. In many cases linkage with economic and social imperatives was apparent reflecting its value by those who created it. The key issue is whether the other local authority departments have bought into it given the silo based approach to policy that can occur (Scott *et al.*, 2013). It is worth pointing out that Solihull's approach to use the GI strategy and associated evidence to culminate in a vision in the conclusion was different and novel.

The Governance Structures for Green Infrastructure

The architecture of English governance has shifted significantly in recent years with the arrival of localism leading to Local Enterprise Partnerships (LEPs) with their Strategic Economic Plans (SEPs) and Local Nature Partnerships (LNPs) with their nature conservation plans; but each with different geographies, players, responsibilities and capacities. There has also been a move towards further devolution with combined authorities with elected mayors. In theory, this does offer new opportunity spaces for GI integration and mainstreaming. However, in this new and increasingly fragmented landscape and geography, economic growth and housing have become the key considerations with the role of GI largely absent or subservient in their documents and discussions. For example, the West Midlands Combined Authorities prospectus makes no mention to the GI environment at all.²⁸ This poses a vulnerability for GI in future SEPs and combined authority's strategic priorities. Whilst the creation of LNPs and Nature Improvement Areas (NIAs) is welcome, their role and presence in policy debates remains largely passive as an onlooker and consultee lacking sufficient resources and political

²⁸ West Midlands Combined Authority <https://westmidlandscombinedauthority.org.uk/> accessed 10 March 2017

support giving them 'teeth' to make a significant impact. Crucially, they are separated from the LEPs in terms of power and often also in terms of geographical scope.

It is significant in both, London and Birmingham, that there were changes to governance to try to champion GI explicitly. In the Birmingham case, there was a cabinet level champion and the establishment of the Green Commission which provided political leadership to work GI across the whole Council. In London, the Green Arc groups and the recent recommendations for a GI commissioner highlight the need and value of having a strong political champion who can fight the GI corner. While such initiatives do have the power to mobilise opinion, they need to be wary of creating further silos rather than enabling integration that is increasingly required within the multifunctional conceptualisation of GI that was stressed in our literature review.

The South Downs NPA status provides a further governance dimension drawing on its environmental credentials and core statutory purposes which enabled GI to be afforded greater understanding and priority across the elected members and officers without the need for any extra governance layer. Clearly, their statutory environment remit and management plan helped facilitate this and one task is to ensure that GI isn't seen as the preserve of such bodies alone.

Language and Changing Narratives of Green Infrastructure

Language and terminology is important in helping to secure wider public and stakeholder buy in on complex resource management decisions which characterise planning processes and outcomes. GI does have some public traction and understanding. In most authorities, the term GI was used explicitly. However, in Shropshire the term 'environmental networks' was favoured within an asset based approach. The asset term was also commonly encountered across other authorities in helping to unpack their GI policies, suggesting that the word has some traction to support or complement GI in terms of the multiple benefits delivered (Birmingham, Solihull, Bedfordshire, South Downs and London). This also fits in with the language used by the Natural Capital Committee (e.g. Natural Capital Committee, 2015) and is in widespread use across local authorities.

The case study analyses also provide clear evidence of an emerging GI narrative reflecting Natural Capital and ecosystem services which are becoming more prominent at the higher governance level (HM Government, 2011; UK NEA, 2011). This was most explicit in London's Natural Capital approach but also evident in the Birmingham, Solihull, Bedfordshire and South Downs cases. This different narrative of GI was there to help mainstream and embed it more effectively across other policy sectors. The question remains, however, as to whether it is simply a rebranding exercise of old wine in new bottles or whether the reframing actually represents an improved way of valuing the benefits to improve policy and decision making.

Strategy Overload vs. Lack of GI Delivery

In this review, across the case study partner authorities, the biggest gap was the lack of necessary delivery and funding mechanisms within GI strategies and Local Plan policies to secure GI outcomes in terms of its protection, maintenance and enhancement. There was no shortage of aspiration in evidence but this rhetoric does not protect GI alone and could be criticised as ‘symbol policy’ if not underpinned by robust delivery mechanisms. Creation was partly helped by Section 106 agreements although GI quotas for development were rarely encountered in the plans themselves. Most plans made reference to the need to secure new funding mechanisms but only a few identified specific mechanisms. South Downs identified the potential for Payments for Ecosystem Services (PES), London Biodiversity Offsetting and Tax incremental financing, and Solihull Biodiversity impact assessments as part of Biodiversity Offsetting. Significantly, the Community Infrastructure Levy (CIL) does offer a potential mechanism but seemingly this was not being applied by our partners at the present time.

Several case studies were working on current GI strategies (London, South Downs and Solihull) and they were going through consultations but others were quite dated (Central Beds 2008 and Shrewsbury 2008). It is unclear how many are actively being reviewed as standalone strategies versus their presence in countryside or landscape strategies such as those pursued by Shropshire. Central Bedfordshire provides an interesting innovation in using a bioeconomy strategy which aims to fuse together all the green plans and policies into one document as a kind of meta executive summary. This then links to the newly shaped industrial strategy (HM Government, 2017) as part of the new business department (BEIS).

There is an interesting discussion around the need whether to have a specialised GI strategy and/or incorporate a more generic strategy crossing different policy domains. The public consultation fatigue suggests that there should be less consultations rather than more.

There was also recognition across the case studies that a GI network had to cross administrative boundaries (London, South Downs, Solihull, Southampton, Central Beds), and thus the duty to cooperate requirement under the Localism Act 2011 provided a potential pathway to join up what were hitherto disjointed and fragmented approaches. However, there was little evidence of this in duty to cooperate statements which tended to focus on housing needs. South Downs provides something of an exception here (SDNPA, 2015b, p. 7) with the following strategic principles being identified for collaborative work with the surrounding 15 district authorities:

- *Conserving and enhancing the natural beauty of the area*
- *Conserving and enhancing the region’s biodiversity (including GI issues)*
- *The delivery of new homes, including affordable homes and pitches for Travellers*

- *The promotion of sustainable tourism*
- *Development of the rural economy*
- *Improving the efficiency of transport networks by enhancing the proportion of travel by sustainable modes and promoting policies which reduce the need to travel.*

Evidence Base

There was clear recognition of the data paucity and evidence base to cover the full range of multiple benefits that GI delivers. Although ecosystem services and Natural Capital offered productive new lenses to assess GI potential, proxy indicators were also limited and lacking. Both Solihull and London made this explicit within their own assessments. However, South Downs, Solihull, Birmingham and London were moving towards or had already adopted ecosystem based assessments for GI and therefore evidence bases were being bolstered by extensive local resource audits and mapping exercises. EcoservGIS was seen to provide a useful resource to facilitate this as reflected in the South Downs work where a dedicated Local Plan policy focused attention on improving this mapping component.²⁹ However, there was considerable variation across the case studies in the availability of mapping resources and crucially keeping these maps up to date to prevent them becoming merely ‘domesday’³⁰ maps. Indeed, with some GI strategies and evidence bases was still based on 2008-2009 data which is of concern.

Given the legal environment within which planning operates the evidence base needs to be robust and peer reviewed. It seems important to start to build cross authority partnerships to share data and methodologies that will stand up to scrutiny. The duty to cooperate under the NPPF is a key vehicle to use for this purpose and it is important that it goes beyond the housing fetish that currently attracts most time and resource.

Opportunity and Challenge Analysis

The discussion above suggests that there are some core opportunities that need to be grasped both within this project and GI more generally.

Challenge Analysis

- Turning GI strategies into delivery plans. Lots of aspirations here but little substance.
- Revealing of the true value of GI to society and wellbeing and raise awareness that GI is required for economic success – it is not an either/or;

²⁹ Ecoserv GIS <http://ecosystemsknowledge.net/ecoserv-gis> [accessed 20th April 2017]

³⁰ Domesday meaning caught at just one moment in time as a snapshot at that date

- Challenging the NPPF/NPPG primacy to economic growth with viability limiting the impact of GI on the ground. Here, offering GI viability as part of essential infrastructure could be a useful way to turn this challenge into an opportunity;
- Lack of mechanisms to deliver and assess/monitor GI gains in new developments. Need to create new financial instruments, incentives and assessment tools (e.g. tax incremental financing; payments for ecosystem services; payback);
- Incorporating ecosystem services science into evidence bases;
- Producing good strategies that reflect all stages of a policy cycle: ideas, survey, assessment, plan, deliver and monitoring. The lack of delivery and evaluation phases in GI strategies poses a major cause for concern; and
- Ensuring long-term finance and management arrangements to maintain GI at high quality over time.

Opportunity analysis

- Reframing the GI narrative towards a Natural Capital and ecosystem services framework.
- Creating GI strategies that are collaborative, inclusive and strategic crossing administrative boundaries to maximise connectivity issues invoking the duty to cooperate function beyond housing needs;
- Developing core policies that sit at a higher level that inform the identification and delivery of the GI network. Here the use of environment or ES/NC policy might prove a useful way forward;
- Providing case studies of good practice that show how GI can be used in different ways (Solihull);
- Developing SMART (Specific, Measurable, Assignable, Realistic, Time-related) GI policies underpinned by meaningful indicators and monitoring systems as opposed to aspirational ones;
- Creating and modifying existing governance structures to help mainstream and deliver GI across council departments rather than as a separate bolt on;
- Using GI to tackle deprivation and health issues explicitly by encouraging cross-institutional partnerships with health boards, LEPs etc.;
- Using the duty to cooperate as a tool to help build stronger collaborations on strategic GI natural solutions associated with climate change flooding, local food etc.;
- Establish GI champions at the highest local governance level to encourage the delivery of policy priorities such as public health, social equality and sustainable economic through 'green' solutions where possible;

- Require from developers to proof that GI others measures benefiting the public would result in economic unviability; and
- Equip planning authorities with the tools, resources and expertise to implement, monitor and enforce GI policies.

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8 Appendices

Appendix 1: NEWP vs NPPF/NPPG

	Natural Environment White Paper (NEWP)	National Planning Policy framework (NPPF) & Practice Guidance (NPPG)
Cross-referencing	<p>2.37 We need a more strategic and integrated approach to planning for nature within and across local areas, [...] enables development to enhance natural networks for the benefit of people and the environment. [...] We want the planning system to contribute to our objective of no net loss of biodiversity; to encourage local authorities to promote multi-functional developments.</p> <p>2.14 ...strengthening support through the planning system, including through biodiversity offsets.</p>	<p>NPPG 008: In considering how development can affect biodiversity, and how biodiversity benefits could be delivered through the planning system, it is useful to consider: the policies and commitments in Biodiversity 2020; the factors listed in guidance on local ecological networks that supports National Planning Policy Framework paragraph 117.</p> <p>NPPG 009: The components of an ecological network are explained at section 2.12 of the Natural Environment White Paper.</p>
Green Infrastructure	<p>2.80 Green infrastructure maintains critical ecological links between town and country.</p> <p>3.22 High-quality green infrastructure can also drive local economic growth and regeneration.</p>	<p>NPPG 028: Green infrastructure provides multiple benefits, notably ecosystem services, at a range of scales, derived from natural systems and processes, for the individual, for society, the economy and the environment [...] Green infrastructure should, therefore, be a key consideration in both Local Plans and planning decisions where relevant.</p> <p>NPPF 114: Local planning authorities should set out a strategic approach in their Local Plans, planning positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure.</p> <p>NPPG 029: This strategic approach to green infrastructure may cross administrative boundaries [...] may wish to consider how wider strategies for their areas can help address cross-boundary issues and help meet the Duty to Cooperate.</p>

		<p>NPPG 030: Green infrastructure can help to deliver a variety of planning policies</p> <ul style="list-style-type: none"> • Building a strong, competitive economy • Delivering a wide choice of high quality homes (placemaking) • Requiring good design • Healthy communities • Meeting the challenge of climate change, flooding and coastal change • Conserving and enhancing the natural environment <p>NPPG 031: Depending on individual circumstances, planning obligations, conditions or the Community Infrastructure Levy may all be potential mechanisms for securing and funding green infrastructure</p>
<p>Natural Capital</p>	<p>1.18 Natural capital can be defined as the stock of our physical natural assets (such as soil, forests, water and biodiversity) which provide flows of services that benefit people (such as pollinating crops, natural hazard protection, climate regulation or the mental health benefits of a walk in the park).</p> <p>P35: a new independent Natural Capital Committee, to put the value of England’s natural capital at the heart of our economic thinking (paragraphs 3.10–3.13).</p>	

<p>Ecosystem Services</p>	<p>Taking account of all the economic and non-economic benefits we get from these (ecosystem) services enables decision-makers to exercise judgement about how we use our environment.</p> <p>P11: Market Failure The values of most ecosystem services are currently omitted from national economic frameworks and local decision making.</p> <p>[This] results in less efficient resource allocation (NEA 2011).</p> <p>2.80 Urban green spaces will provide varied ecosystem services and will contribute to coherent and resilient ecological networks.</p>	<p>NPPF 109: The planning system should contribute to and enhance the natural and local environment by: protecting and enhancing valued landscapes, geological conservation interests and soils; recognising the wider benefits of ecosystem services; ...</p> <p>NPPF 109: minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks.</p> <p>NPPG 013: An introductory guide to valuing ecosystems services has also been published by Defra along with a practice guide, which could, where appropriate, inform plan-making and decision-taking on planning applications.</p>
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