Grantham Research Institute on Climate Change and the Environment

Harnessing England's Biodiversity Net Gain legislation to amplify urban flood risk management

Policy report

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Contents

Summary

- Nature-based solutions, such as the creation of urban green spaces, parks and wetlands, and the restoration of natural waterways, can contribute to flood mitigation while enhancing urban biodiversity. Such integration could provide multifunctional benefits to society, improving both the environment and the quality of urban life, as well as stated government priorities like improved water quality.
- However, there are persistent challenges in operationalising and scaling up nature-based solutions, not least in an urban context due to inherent space constraints. Green infrastructure competes with its grey counterpart for scarce resources, and limited monitoring of natural flood management projects hinders identification and replication of best practice. Furthermore, uncertainty remains in the UK regarding the new government's growth objective, its implications for planning, building and development and any unintended consequences for the environment. Local authorities are being challenged in how they support this objective due to highly constrained resources.
- The introduction of the Biodiversity Net Gain (BNG) legislation in England in February 2024 represents a key opportunity because it could unlock funding and innovative solutions that boost urban flood risk management (FRM) efforts and facilitate wider co-benefits. It is an approach to development and land management that aims to leave the natural environment in a measurably better state than before. BNG enables nature, and nature is good for FRM.
- BNG funding sources could be targeted at existing urban FRM plans, and benefit from the monitoring of those plans' effectiveness. Even where BNG funding finances a relatively small proportion of new green urban infrastructure interventions, its inclusion in the business case could shift the balance of the economic case for green urban infrastructure.
- To date, much of the focus on BNG has been on large aggregated parcels of land outside urban centres. BNG legislation favours net gain to be achieved as close as possible to the development site; finding ways to use that intent to incentivise urban green space would be a positive step forward.
- The insurance sector can play an important role within this landscape, by developing innovative insurance solutions designed to protect biodiversity and its maintenance/restoration over time – essentially de-risking investments in BNG/natural flood risk management (NFM).
- However, care is needed to ensure that a focus on NFM does not come at the expense of biodiversity: the objective should be to enhance biodiversity while also achieving co-benefits, including NFM. Guardrails are needed to mitigate against technically permissible, but detrimental, trade-offs or overly simplistic solutions. Innovative solutions will help to avoid such unintended consequences.
- While the BNG legislation is now enacted, there is uncertainty about what the future FRM and planning framework will look like – but also an opportunity to get it right. The legislation could have transformative potential if implemented effectively, and the recommendations we set out are intended to help amplify its impact – with support from key stakeholders including policymakers, those tasked with managing urban flood risk, property developers and their financiers/insurers.

1. Introduction

Flooding is the number one natural hazard in the UK (CCC, 2021). The risks and associated costs of flooding are growing due to climate change (interacting with non-climatic factors) but the planning system in England has not yet adapted accordingly. Both government statistics and independent reporting show continued building in areas of flood risk in ways that can fail to address risks (DLUHC, 2022; TCPA, 2024; Forsyth, 2024), and only non-statutory standards are in place for sustainable drainage systems (SuDS). At the same time, wildlife and habitats in the UK, and nature's ability to provide climate mitigation and other ecosystem services, are declining faster than at any time in human history (Dasgupta, 2021).

Given the scale and multiplicity of the challenges versus limited resources, innovative and integrated approaches are needed to both address flood risk management and stop or reverse nature loss. This will require the skills and collaborative efforts of a diverse stakeholder group that brings a full range of perspectives to inform holistic solutions.

The Biodiversity Net Gain (BNG) legislation came into effect in England from February 2024 and represents a significant shift in planning regulations. Now that the legislation exists – and a new government is in place – this policy report presents the case for integrating BNG and natural flood management (NFM) to enhance urban resilience, including integration of BNG funding with local authorities' NFM projects. This can best be achieved through appropriate policy measures, better leveraging of insurance underwriting solutions and research and collaboration.

What is the relevance of England's new biodiversity net gain legislation for flood risk management?

As part of the Environment Act, the BNG legislation aims to ensure that wildlife habitats are left in a measurably better state after development takes place and, as such, is likely to play a crucial role in restoring and preserving nature – notwithstanding the low baseline, particularly in urban areas. (See Box 1.1 for further details and 1.2 for an overview of the wider international context.)

Box 1.1. What is BNG, how does the new legislation work and what is the potential size of the market?

Biodiversity net gain is an approach to development and/or land management that aims to leave the natural environment in a measurably better state than before. Its objective is to establish standardised practices for developers to create and improve habitats, and apply a consistent metric (using habitat as a proxy for biodiversity) to bring about a quantifiable measure for biodiversity and habitat gain.

The BNG legislation mandates that developers in England provide a minimum of 10% biodiversity net gain by the end of a new development, and the habitat they create or enhance must be maintained for at least 30 years. Biodiversity improvements should first be considered within the project's designated boundaries in order to contribute directly to the local ecosystem and surrounding environment.

Initial market scoping analysis undertaken by eftec for the Department for Environment, Food and Rural Affairs (Defra) estimated the size of the BNG market to be c. 6,330 hectares per year with an associated requirement of 6,223 biodiversity units per year (eftec, 2021). With an estimated typical price per unit between £20,000 and £25,000 (depending on scarcity), the maximum expected value of the market in England was estimated between c. £135m and £274m per year (depending on the percentage of units delivered offsite).

The BNG requirement has the potential to boost flood risk management (FRM) efforts by providing an additional funding source or regulatory incentive that could be harnessed to encourage spaces for nature that bring a range of benefits, including natural flood management in an urban context. However, greater coordination and alignment of regulations and standards is needed to maximise co-benefits and incentivise greater take-up of projects. Understanding of BNG and other nature-based approaches is still evolving, so regulations that incentivise take-up while ensuring monitoring and verification of effectiveness can help promote nature restoration as the evidence base and best practice develop.

There is a role for the insurance sector in this regard, through development of innovative insurance solutions that are designed to de-risk the investment in BNG and NFM measures, informed by data and models to appropriately credit and incentivise such projects. Our recommendations in Section 3 include the insurance sector, as a result.

Box 1.2. Protecting and restoring biodiversity: the global context

The Biodiversity COP15 UN conference (in December 2022) saw the adoption of a new set of international goals for biodiversity called the Kunming-Montreal Global Biodiversity Framework (GBF). The UK was among 188 governments that agreed to the GBF and committed to address the ongoing loss of terrestrial and marine biodiversity.

Target 14 of the GBF states:

> *Ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity, progressively aligning all relevant public and private activities, fiscal and financial flows with the goals and targets of this framework.*

2. Implementing BNG to maximise opportunities for urban flood risk management

Taking a holistic approach to BNG, to boost flood resilience and other benefits

A holistic approach to BNG implementation could boost urban FRM efforts and unlock wider co-benefits. Seizing this opportunity is critical as part of wider national and local efforts to build resilience to flood risk.

BNG represents a key opportunity to create innovative solutions that enhance urban ecosystems and resilience against flooding, and generate wider co-benefits. Although there are barriers to nature restoration in urban settings, these can be overcome. (Box 2.1 describes how Hull City Council has approached this challenge.) This report is intended to prompt stakeholders to consider what lessons may be learned from such case studies and how the underlying solutions could be applied in their own contexts and settings. Doing so in reality will also rely on the identification of what measures BNG funding could finance, how well its availability aligns with overall FRM project needs and overcoming the coordination hurdles associated with channelling BNG funding to FRM projects. It will need an increase and upskilling of the teams tasked with delivering these new requirements, be they focused on BNG, green infrastructure, planning or other related roles.

Investments that are now required by law could be channelled to lead to co-benefits – which could be economic, social or environmental – and opportunities that might otherwise not be available given budget constraints, such as investments into local nature regeneration projects to make urban environments greener and more flood-resilient. The co-benefits range from carbon sequestration to improved health through better access to green space to green jobs.[1]

Overcoming challenges to harness the BNG opportunity for urban flood risk management

Among the significant and well-documented challenges to be addressed are:

- **The need for innovative approaches to embed BNG within the urban fabric without compromising on development goals or ecological outcomes**, i.e. where the biodiversity intervention is made 'offsite' or BNG delivery is via statutory credits.
- **Limited physical space and difficulties in integrating BNG with existing urban infrastructure and densely populated urban areas**, given the scarcity of available land for habitat creation or restoration – and the potential adverse impact of urban pressures on biodiversity.
- **The desire to achieve co-benefits, which could lead to the quality of biodiversity outcomes being compromised on larger sites**, for example where a developer seeks double credit[2] to increase their housing allocation for a site rather than doubling the benefits that accrue via BNG and drainage.
- **Urban nature typically losing out to grey infrastructure in the competition for limited budgets** (for water resources and flood control). This reinforces the importance of seeking (and measuring) adaptation co-benefits, especially around urban resilience (against

[1] Further examples include: *environmental* (biodiversity benefits, improved air and water quality, temperature regulation, flood and erosion control), *social and health/wellbeing* (amenities, community spirit/pride, noise attenuation), *economic* (reduction in healthcare costs associated with cleaner drinking water, enhanced resilience and ability to adapt to climate change impacts).

[2] Multifunctionality allows developers to incorporate a number of co-benefits on a given land parcel – such as biodiversity net gain, sustainable drainage and green space. This has significant benefits for viability on a constrained site. However, as developers pay 'once' for the BNG credits, on larger land parcels this can limit the extent to which other co-benefits are incorporated elsewhere on the site, thereby reducing the amount of green space overall and effectively permitting more land on which the developer may build.

flooding and the urban heat island effect). There is a need to move from a 'lowest cost' to a 'maximum value' approach, as well as to seeing measures as complementary rather than mutually exclusive. Setting aside land for drainage can be contentious, so integration with wider nature benefits can improve the value proposition.

- **The newness of the BNG legislation,** with associated challenges to its successful implementation yet to be overcome (Green Finance Institute, 2024b). Biodiversity markets themselves are in their infancy and will likely never be as straightforward to operationalise as carbon markets.
- **Sub-optimal governance and siloed teams within local authorities**, which hinders an effective and coordinated approach across relevant departments.
- **Many local authorities not being adequately resourced to fulfil their responsibilities arising from the new legislation.** This is exacerbated by the associated overhead if integrated with FRM projects where offsite gains are made on land owned by the local authority (under Section 106 agreements[3] or conservation covenants), or where there is a need to assess how well the 30-year maintenance requirement aligns with broader maintenance agreements for FRM projects.
- **Limited monitoring of most NFM projects**, which means there is a limited evidence base to inform best practice or to incorporate into flood models. However, the Environment Agency's recent slate of projects have required, and funded, monitoring.
- **Unknowns related to the new Labour government regarding its priorities and corresponding funding.** Removing obstacles to planning, building and development in pursuit of growth may have unintended consequences for the environment, and the prospects for Schedule 3 of the Flood and Water Management Act 2010, which is about sustainable drainage, remain unclear. A new regulatory regime for the water sector is likely, but it is unclear to what degree this will prioritise green solutions and their integration with other nature initiatives.
- **A perception on behalf of insurers of a risk in developing products and services that cannot or will not be used until applicable and compatible projects are identified and developed** (which in turn inhibits upfront financial backing for such projects), with knowledge and modelling capabilities relating to potential underwriting solutions still in development.

[3] This is a mechanism that makes a development proposal acceptable in planning terms that would not otherwise be acceptable.

Box 2.1. Hull case study

Hull and the East Riding of Yorkshire face high flood risk from numerous sources: coastal, fluvial and surface water/pluvial. The 'Living with Water Partnership' (LWWP) recognised the opportunities in aligning the delivery of BNG with its Blue Green Plan and retrofitting sustainable drainage systems (SuDS)/urban NFM, and has implemented a BNG initiative to enhance local biodiversity through development projects. The focus was intentionally on multi-benefit delivery as it is a very small local authority with tightly constrained boundaries and limited open space that has to be multi-functional in addressing many different issues (flooding, ecology, amenity and recreation, food security).

The initiative assessed: how to deliver BNG within SuDs features on new development or as retrofits (to address both the high level of surface water/sewer flood risk and viability issues), given the potential income available for both creating and maintaining the BNG; and what was required to adapt standard SuDs designs into BNG-enhanced designs. The latter resulted in a 'BNG/SuDS toolkit' that is now being applied more broadly. This ensures that Hull City Council creates and retains the required BNG to protect and sustain nature and ecology within the city, rather than delivering it in areas that may have less need.

Key points of note

External expertise and support: Atkins was appointed by the LWWP to deliver a project that explored options for match-funding for Hull's flood schemes, and which was key to Hull's understanding of what small changes in design could help create BNG. Atkins' support included an assessment of the likely demand for BNG units and, with the help of additional burden funding from government, it will also assess all council-owned open spaces, advise on priority locations for habitat banks and help with the practicalities of setting these up.

Primary stakeholders: Risk Management Authorities (Yorkshire Water, Hull City Council and East Riding of Yorkshire Council) plus local authority planning, open spaces and grounds teams.

Funding sources: SuDs schemes are funded by a blend of Yorkshire Water AMP7, Flood Defence Grant-in-Aid (partnership funding), UK Shared Prosperity Fund and devolution deal funding. Pilot funding came from the Natural Environment Investment Readiness Fund.

Planning permission: Helpfully, SuDs retrofits – delivered under a section of the Flood and Water Management Act 2010 – do not need planning permission (as agreed with planners).

Practical challenges encountered:

- **Resourcing/capacity/knowledge:** Hull's business model is to secure enough income from offsite BNG units on council land (and from SuDS, where possible) to resource the required ecology support. The Government's additional burden funding in this regard is welcome but insufficient. (Hull has submitted a devolution deal expression of interest for additional ecologists' support for the assessment of all council owned open spaces, setting up habitat banks and community engagement.)
- **Logistics/costs:** The Hull scheme is small-scale and spread across a few sites; it is unclear how to update the national register with these offsite units. The cost to register a site is expensive, so batching small sites of the same habitat into one is being explored.
- **Funding:** Significant bureaucratic challenges and complexities have been encountered and the associated costs (e.g. to provide hydraulic modelling and write the business case) often exceed the funding to be secured.
- **Community engagement:** Engagement and education are needed to help bridge the gap between BNG objectives and community expectations of green spaces and nature. This could be via signs and interpretation boards, but also ideally in-person communication.

How different BNG options could contribute to flood risk management

The Biodiversity Gain Hierarchy[4] emphasises prioritisation of onsite measures before exploring offsite options, ensuring developments contribute directly to the local ecosystem and surrounding environment. Irrespective of where BNG is delivered, it can contribute to FRM.

1. Onsite BNG units: contributing to FRM at the development site. Where there are known flood risks onsite that the developer must (legally) address, BNG could encourage the use of nature-based FRM (e.g. sustainable drainage systems or SuDS), combining the need to address flood risk and enhance biodiversity in how the site is designed.
2. Offsite BNG units: contributing to FRM offsite. This involves considering the extent to which BNG funding could support the financing of comprehensive FRM plans or could influence the inclusion of nature-based solutions (notwithstanding the challenge of linking offsite BNG with FRM where purchased units are not within the same water catchment area as the development). It may be difficult to account for BNG finance as it a) could represent a relatively small portion of overall project costs and b) not align with longer timelines of overall flood risk prevention work.
3. Statutory biodiversity credits: contributing to FRM offsite. The Government allocates funding from these credits, but in so doing may or may not consider flood risk or allocate to the same water catchment area as the development.

How schemes combining biodiversity units with insurance might work – examples

The insurance sector can facilitate upfront financial backing for BNG and NFM measures that protect biodiversity and its maintenance/restoration over time. Innovative solutions for BNG schemes are informed by data and models that appropriately credit and incentivise the measures taken.

For example, solutions might insure a landowner's upfront costs associated with protecting or enhancing biodiversity, or mitigate the losses associated with restoring biodiversity to its planned state if it has been adversely affected by a predefined insured peril. Incorporating insurance into BNG schemes should facilitate greater participation on both the supply and demand side of the BNG market.

The following provide further illustrative examples of the parties incentivised to enter into an insurance arrangement, and the associated beneficiaries:

- Habitat Bank (on behalf of the landowner from whom land is leased): insurance protects the measures co-created with and implemented by the landowner to enhance BNG on their land that is leased to the Habitat Bank, thereby securing the landowner's future BNG-related income potential.
- Buyer of BNG units (developer): protection offered by insurance enables the developer to discharge their BNG-related legal responsibilities without incurring further costs to secure new BNG units in the event that the original BNG is not achieved due to a pre-defined insured peril.
- Local community: Those living or working in the water catchment area in which the BNG is delivered will also enjoy the benefits of the flood risk mitigating effects of the NFM measures.

[4] See www.gov.uk/guidance/biodiversity-net-gain

3. Recommendations

i) Policy development

The overarching goal is supportive and flexible policies that facilitate the integration of BNG into broader urban development and into FRM strategies and maintenance plans. These plans should be designed to adapt to evolving environmental, social, economic and legislative contexts, so that they remain effective over time. Policies would also ideally incentivise BNG projects with benefits that are distributed fairly across different urban areas, and formally recognise co-benefits, including social benefits (or detriments).

Programmes designed to help projects to develop their business cases and become investment-ready (such as the Natural Environment Investment Readiness Fund) could further emphasise multi-benefits alongside clarified stacking rules. As potential BNG funding may be a relatively small proportion of some local authorities' overall FRM financing needs, the overhead associated with securing such funding needs to be minimised if it is to be worth pursuing.

Recommendations – policy development

National government (England):

- Provide clarity on drainage and flood prevention measures, ideally by implementing Schedule 3 of the Flood and Water Management Act 2010 and adopting related recommendations (see Defra, 2023).
- Recognise the benefit of stacking BNG requirements and Schedule 3 (per the principle identified in the 2023 Green Finance Strategy [HM Government, 2023]) and clarify stacking rules to ensure there are incentives to deliver co-benefits without creating double-counting loopholes (recognising the practical challenge for planning authorities to differentiate the stacked benefits for which credit is being claimed by developers and assess them for additionality).
- Notwithstanding the outcome for Schedule 3: i) consider revisions to the National Planning Policy Framework (NPPF) as part of ongoing review – encompassing zoning laws, building codes and environmental impact assessments – to include provisions that place flood risk and SuDS central within planning and promote BNG, while also considering trade-offs associated with multifunctionality. For example, include incentives to reduce impermeable surfaces and to develop urban green spaces (including 'pocket parks') at scale, supporting the financial case for such initiatives; ii) improve adherence to the NPPF and supporting planning practice guidance.
- Seek to close existing loopholes and assess the nature and extent of exemptions granted, along with associated rationale (e.g. lack of local authority capacity to assess developers' planning applications and habitat proposals and/or to monitor and enforce compliance with habitat management and monitoring plans).
- In conjunction with the stacking recommendation above, consider amending existing BNG legislation to incorporate a 'co-benefit multiplier', attaching more credit to BNG units with co-benefits (see also below regarding the required associated infrastructure).
- Integrate BNG funding with partnership funding for Flood and Coastal Erosion Risk Management (FCERM) projects, and allow funding of NFM projects from central FCERM budgets.
- Allocate sufficient funding for the initial costs of assessing the benefits and planning of NFM interventions, e.g. allow such costs to be reflected in the price of BNG units, to help overcome the inertia stemming from limited resources.

- Adopt formal provisions for the allocation of funding from statutory biodiversity credits to BNG projects that include flood risk management efforts.

National government and local authorities:

- Address gaps in local authorities' capacity and surface water management/SuDS knowledge and skills to enable flood risk assessments and delivery of these new, complex and overlapping requirements. These gaps may be addressed at least in part by pooling resources across local authorities, e.g. replicating the joint team structure that some county councils on the East coast have put in place for coastal flood risk management purposes.
- Ensure appropriate resources and robust governance arrangements remain in place to deliver Section 106 and conservation covenant commitments, for the maintenance of BNG (onsite and offsite) for 30-plus years.
- Coordinate and integrate related initiatives as appropriate, to improve coherence of climate resilience measures (such as the National Infrastructure Commission's review [NIC, 2022], activity by the London Surface Water Strategic Group [LSWSG, 2024], and existing funding models, e.g. FCERM grant-in-aid). For instance, with regard to mapping and data-sharing, leverage the ongoing actions under LSWSG's remit to identify urban pockets for BNG opportunities across London.
- Leverage data, technology and innovative policies with a view to: i) improving the planning, implementation and monitoring of projects to optimise project outcomes (e.g. simulation models and AI could help planners and decision-makers simulate interventions and visualise the impacts of green infrastructure on biodiversity and flood management); ii) defining metrics and tools for measuring effectiveness of nature in flood mitigation, building on the Environment Agency's recent requirement and funding for NFM project monitoring; iii) defining metrics and tools for measuring co-benefits to underpin standardisation of the 'co-benefit multiplier' recommended above; iv) adopting tools (such as ciriabest) that enable standardised allowance for co-benefits to reflect the full value proposition; v) developing shared databases of projects.

Local authorities:

- Engage local communities in planning and execution of integrated BNG and urban FRM projects to: i) help ensure that projects meet the diverse needs of urban populations and do not inadvertently marginalise or exclude certain groups; ii) help build support and ownership among communities, leading to more sustainable and accepted outcomes; iii) design and implement projects in a way that ensures benefits are distributed fairly across different urban areas, including underprivileged neighbourhoods.

ii) Insurance underwriting solutions

In broad terms, insurers' envisaged role in fostering the integration of BNG is the development of innovative insurance solutions designed to protect biodiversity and its maintenance/restoration over time. Specific opportunities include solutions that cover the protection and development of green or natural FRM infrastructure, natural ecosystems, and economic activities that conserve, restore and use biodiversity and ecosystem services wisely. Underpinning these opportunities will be data that can be incorporated into models to appropriately credit and incentivise projects with nature-positive effects.

These solutions would complement the existing insurance framework, in particular the role of Flood Re[5] which will run until 2039, at which time insurers should offer flood protection based on actual risk to property. The recommendations below facilitate resilience-building in anticipation of that transition to risk-reflective pricing.

Recommendations – insurance underwriting

Insurance sector:

- De-risk the BNG investment. For example, to ensure longevity (permanence) of BNG, replicate for BNG units the existing carbon credit market developments[6] that address the risk of reversals (where carbon stored by a project is later emitted, resulting in no cumulative change in atmospheric carbon over time).
- Be transparent about how urban NFM could influence insurance underwriting, e.g. what NFM measures are recognised by insurers, what would give insurers confidence in BNG / urban NFM projects, over what period might they expect to see benefits, and so on.
- Ensure that existing NFM projects are accounted for in flood risk maps and models so that risk reduction can be reflected in pricing (Green Finance Institute, 2024a).
- Support efforts to deliver urban nature as part of effective risk reduction, in line with broader planning policy advocacy.
- Collaborate to build required capabilities around collecting and analysing relevant data, incorporating relevant indicators and metrics, developing new risk assessment tools or modifying existing ones, and (as above) ensure data is reflected in flood risk models.

National government (England):

- Develop innovative regulations that support nature-positive underwriting as part of a new generation of insurance business models.

Off-site BNG providers and insurance sector:

- Increase the provision of appropriate insurance and financial services to off-site BNG providers, and clarify liabilities and processes so that standardised insurance/risk management products can be deployed to support BNG delivery (Green Finance Institute, 2024b).

iii) Research and collaboration

Research into best practice regarding the integration of BNG with urban FRM – and the systematic translation of emerging insights into decision processes – can inform and support better quality outcomes. This could include insights into how to develop comprehensive strategies that address multiple urban challenges simultaneously and 'what good looks like', what contribution BNG funding could make to financing FRM efforts, how to assign effective responsibility for maintaining BNG over a 30-year period, and what co-benefits are possible.

Engagement of and collaboration with a wide stakeholder group (including architects and built environment professionals) will bring a full range of perspectives to inform holistic solutions.

[5] Flood Re is a joint initiative between the UK government and insurers. Its aim is to make flood cover more affordable for households at the highest risk of flooding.

[6] Examples include Oka's Carbon Protect insurance policy and Kita's Buffer insurance policy

Recommendations – research and collaboration

National government (England):

- Encourage research and development into sustainable materials and construction practices that enhance biodiversity while reducing flood risk, e.g. permeable pavements and green roofs.

National government and local authorities:

- Advocate interdisciplinary collaboration among urban planners, ecologists, engineers and policymakers to deepen understanding of BNG's potential to enhance urban resilience and the uplift provided by a BNG intervention.
- Facilitate local market analysis[7] to improve visibility of, and confidence in, future demand for biodiversity units, so that this funding can be built into business cases and help to justify any investment by local authorities given very limited resources.
- Collaborate on the development and implementation of technical assistance programmes to: i) help local authorities and other stakeholders navigate the complexities of integrating BNG with FRM; ii) offer guidance on blending funding streams; iii) develop technical expertise, ensuring projects meet both biodiversity and FRM objectives.

National government and insurance sector:

- Collaborate on the development of data, metrics and models underpinning innovative solutions that give credit to and incentivise BNG projects, ensuring these benefits are systematically recognised throughout the lifecycle of BNG and related FRM projects.

Local authorities:

- Follow existing guidance for local authorities (e.g. the Planning Advisory Service's Nature Recovery Toolkit), and consider whether good practice 'toolkits' developed by peers could provide a playbook, for example regarding identification of the BNG benefits of different SuDS assets and how to maximise these, including as part of retrofitting initiatives (LWWP, 2023).

Local planning authorities (LPAs):

- Recognise the role of assets beyond the authority's boundary by working with neighbouring LPAs to develop a cohesive BNG strategy for more effective urban FRM.

Water and sewerage sector:

- Assess compatibility of existing land investments by the water sector with urban FRM and eligibility for BNG units, as part of broader coordination of the water sector's investment in solutions to manage surface water flooding including SuDS.

[7] A nature-based partnership in Oxfordshire published its own study that used a £25,000 unit price and an off-site delivery share of 7% (see Hawkins et al., 2023).

4. Looking ahead

The risks and associated costs of flooding are growing due to climate change and historical development that was not designed to meet the climate resilience and adaptation needs of urban society today. The introduction in February 2024 of England's Biodiversity Net Gain legislation presents a timely opportunity to boost flood risk management efforts, and in particular to amplify urban FRM. To make this a reality the barriers to implementing the legislation in urban settings need to be overcome.

Leveraging the new legislation may also drive efficiencies in associated implementation efforts, and enhance its adoption and embedding by affected stakeholders given the envisaged co-benefits. With limited funding available for allocation between grey and green infrastructure, consideration should be given to the extent to which BNG funding could support the financing of comprehensive FRM plans or influence the inclusion of nature-based solutions. This opportunity should be seized by policymakers and national and local planning authorities, with support from other key actors such as insurers.

With our aim of increasing awareness of the opportunities arising from the integration of BNG and FRM in an urban context, we hope that policymakers, those tasked with managing urban flood risk, property developers and their financiers/insurers – and the wider BNG community – will embrace our recommendations, learn from existing cases and help facilitate more demonstrator projects. Successful implementation of BNG will also support the Government's commitment in the *25 Year Environment Plan* to expand net gain approaches to include wider natural capital benefits such as flood protection, recreation and improved water and air quality.

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