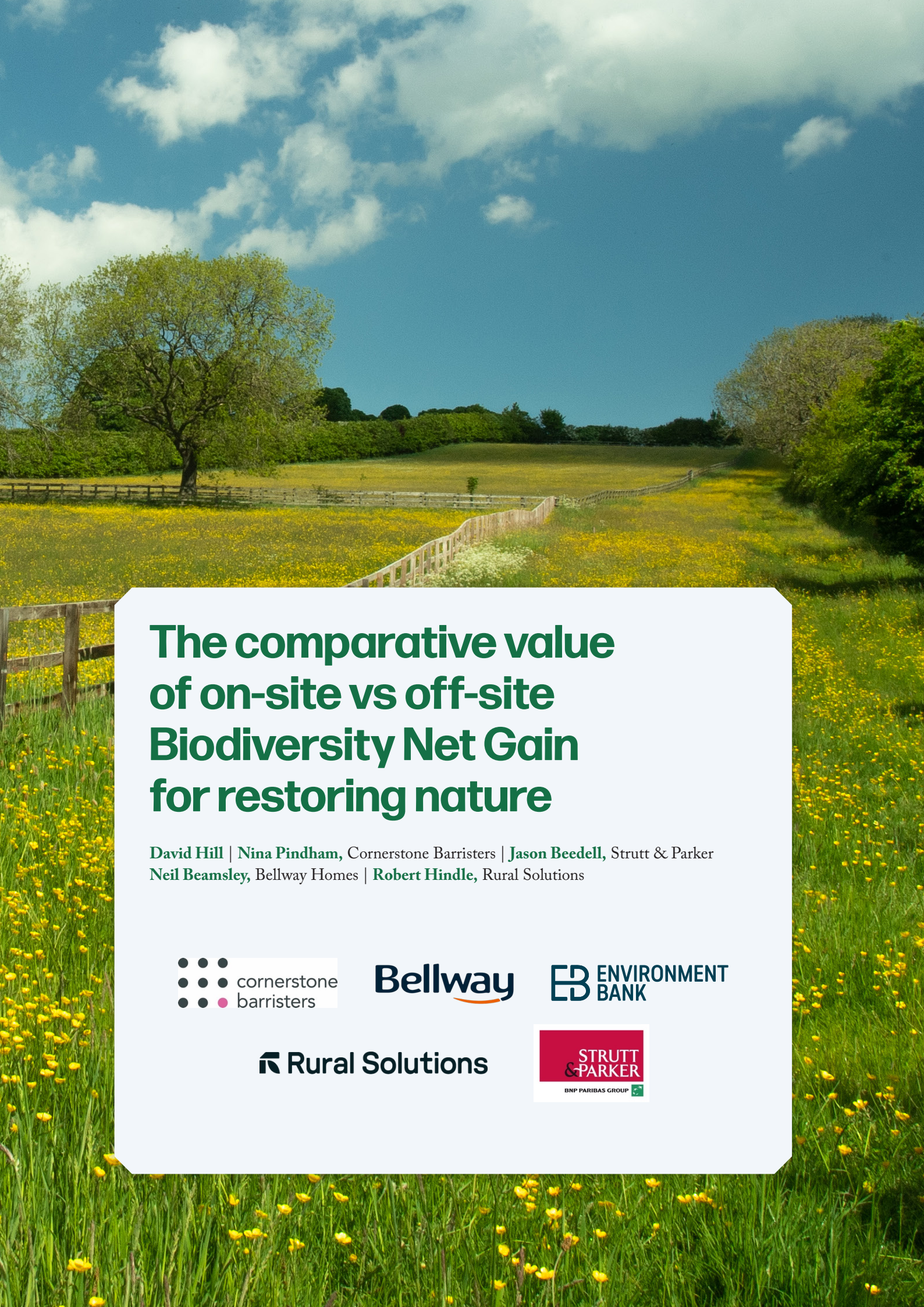

The comparative value of on-site vs off-site Biodiversity Net Gain for restoring nature

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Contents

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Summary

Biodiversity Net Gain (BNG) is beginning to work well as it embeds into the planning system to restore our natural environment whilst delivering on the government's growth agenda. The importance of a healthy natural environment is recognised as crucial to economic growth – "without a healthy environment, there is no food, no business, and no economy" (Defra 2025[1]), so it is critical that the restoration of nature occurs in parallel with enabling development. BNG provides that mechanism.

However, we believe that BNG can make a far greater contribution to nature restoration than is currently enabled by policy. The importance of making BNG even more effective by adjusting the policy to maximise delivery, is highlighted by recommendations in the recent Corry Review which seek to improve the positive impact of BNG on both nature and the development of nature markets through increased flexibility (Corry 2025)[2].

One refinement that would make a major difference to the scale of nature recovery that BNG can facilitate relates to getting the right balance between on-site and off-site delivery. This refinement would deliver more finance into nature, supporting the advice to government regarding the value of a nature accelerator in boosting the contribution made by the private sector through stimulating growth in nature markets, of which BNG is recognised as a key component. It would also boost government's key aim of marking out the UK as a world leader in the development of nature markets that will drive economic growth as part of its Plan for Change (Corry 2025, Defra 2025, see also the publication of a standards and regulatory framework for nature markets - BSI/Defra 2025[3]).

Biodiversity net gain was mandated into law through the Environment Act 2021 as the means by which development properly accounts for impacts on biodiversity. It presents a major opportunity to restore nature in England in accordance with the government's nature recovery ambitions at no cost to the taxpayer. Alongside facilitating growth BNG also contributes to greenspace provision, opportunities for quiet recreation, and improvements in mental health and well-being.

Added to these benefits, the processes and mechanisms for the delivery of mandatory BNG in England are being seen as a useful framework for the development of a voluntary, and likely in the future mandatory, requirement for the wider corporate business sectors to disclose and compensate for their impacts on natural capital.

Implementation of the law currently includes a preference for on-site rather than off-site delivery and whilst there are opportunities to deliver viable net gain on some sites, subject to various characteristics, there is a growing body of evidence that on-site delivery offers far lower benefits to nature than can be achieved through off-site provision. The environmental NGOs have pointed to this lost potential, in addition to the inadequate governance mechanisms concerning the enforcement of on-site BNG, to recommend that the rules around its implementation are strengthened.

The many years of consultation and evolution in BNG design have produced the world's first biodiversity compliance market with the potential, in the years to come, to provide substantial investment into the natural environment whilst giving developers choice on how to meet their BNG obligations through the operation of a market.

1 Defra (2025). Announcement of new leading nature finance standards launched to encourage green investment. Defra March 2025
2 Corry D. (2025). An independent review of Defra's regulatory landscape. April 2025.
3 BSI/Defra (2025). Nature markets – Overarching principles and framework – Specification. March 2025. Version 2. Defra and British Standards Institution.

The law is heralded, internationally, as progressive and ground-breaking. However, the capacity for BNG to deliver meaningful uplifts in biodiversity, at a landscape and wider countryside scale, as currently formulated, is being constrained. In short, the full potential of this ground-breaking law is not being maximised. An understanding of the extent to which on-site BNG can deliver sufficient and significant nature restoration by comparison to off-site provision, is therefore critically important if the BNG regime is to deliver on its potential for nature restoration and wider community benefits.

Purpose and scope

This report assesses the comparative value of delivering BNG on-site, within the development site boundary, or off-site, on specifically created and managed areas of land in the wider countryside. It explores whether on-site BNG can make a significant contribution to effective delivery of biodiversity, in accordance with the primary objective of the approach, and how the two delivery options compare in relation to a further objective of benefitting local communities, and the inherent health benefits of well-structured green space. There is wide agreement that the approach can and must support and enable economic growth and nature in parallel.

The work was undertaken by a panel of experts with detailed experience of the BNG practice and delivery landscape. Their experience covers the key issues of:

- ecological integrity and biodiversity value
- legal aspects of delivery
- the duties and role of local planning authorities and consideration of the planning system
- developer obligations and liabilities, and
- the comparative costs of on-site and off-site provision using a cost modelling exercise.

The focus of this report is on the relative benefits of on-site vs off-site delivery of BNG, an area of key importance if wider objectives relating to both economic growth and nature targets are to be realised. Readers will find much thinking that aligns with the Government's direction of travel for simplified, more strategic intervention that enables sustainable economic growth, providing the best 'macro' outcomes for nature whilst also creating the framework needed to attract private capital into the full spectrum of nature-based markets and connecting communities with the greenspace around them.

The importance of biodiversity and the state of nature in the UK is described and the critical aspects of successful biodiversity conservation explored including habitat size, fragmentation, the role of ecotones, impacts of disturbance, timescales for reaching ecological maturity, and governance applicable to habitat creation and restoration sites (policy, finance, monitoring and reporting). The primary objectives of the policy are outlined, and the evolution of the policy landscape is set out in some detail which has a bearing on the preference for delivery. Predictions of demand for BNG are given based on several approaches. On-site and off-site BNG project typology is described, with many off-site areas being established by a large and growing number of specialist site providers aiming to satisfy the expected demand for off-site BNG units. Detailed analysis of the planning, legal and development processes are provided followed by assessment of costs of delivery considering loss of profit and land price in the former though accepting that developers will always look to minimise costs in the siting of on-site BNG, using a variety of approaches.

The current situation of on-site and off-site BNG provision

The debate over on-site vs off-site BNG is largely the result of an artificial weighting given to residential development rather than a more considered view across the full range of development types, as house building is the more immediate focus of government. The practicality and financial 'cost/benefit' of BNG delivery can be complex for residential developments, but more straightforward for commercial developers who don't have the space and capacity to deliver BNG on-site.

Much of the current bias towards provision of BNG on-site is framed by perceptions of developers having greater control of political and planning risk, and it being lower cost (although full cost analyses should include the price paid for the land and profit foregone). On-site BNG does not require any significant financial investment by the developer until planning is granted. It comes with limited or discretionary enforcement by the local planning authority (LPA), largely because of a lack of resource prioritisation, hence no certainty on delivery. It also carries some risks for developers, including longevity risk (through handover of financial and management liabilities once the developer has left the site), risk of incorrect application of the mitigation hierarchy (where the application can be challenged by LPA decision makers or in the court), and planning risk (through seeking variations to the masterplan in order to fit BNG within the site boundary). For example, development density is often determined by local design guidance, restricting flexibility for impactful delivery of BNG.

Biodiversity considerations

Non-residential developments are mainly seeking off-site solutions from BNG unit providers. This is because commercial warehousing, retail, logistics sites, and large and/or linear infrastructure development has little space in which to incorporate biodiversity, being mainly comprised of large buildings, slabs of concrete and tarmac and where it is operationally difficult to provide ongoing habitat management, often for reasons of health and safety.

Most residential development sites of less than 25 hectares do not have the space to deliver meaningful biodiversity uplift and, where BNG is proposed for these sites, the BNG areas are generally characterised by very small size, isolated patches of 'habitat' with limited connectivity to the surrounding landscape and wider countryside, and high levels of disturbance from the people who live in the housing. It is important to note that such spaces often have wider societal benefits, particularly from a community recreation and wellbeing perspective, and BNG will play an important role in boosting the way these areas function as a consequence. The reality remains, however, that this will limit the biodiversity delivery potential.

By contrast, experience is demonstrating that sites being brought forward to provide off-site BNG units are many times the size of on-site areas (typically between 20 and 100+ hectares in size), are usually connected to the wider landscape, where disturbance by people can be minimised through a habitat management plan and appropriate access management, and where long-term funding enables the establishment of higher successional stage habitats that attract greater biodiversity value. Increasingly, these sites are strategically sited within planned biodiversity network areas (eg. emerging Local Nature Recovery Strategies).

Although it is early days, evidence from existing mitigation schemes within development sites strongly suggests that the likelihood of small patches of on-site BNG becoming mature and valuable habitat, is extremely limited. Once the developer has handed over the site to a residents' association or management company, the liabilities for the BNG habitat fall on them rather than the developer and their objectives and expertise may not align with the BNG requirements that enabled planning permission to be granted.

It is also possible that management companies will refuse to accept responsibility for BNG areas in the future, due to the liabilities associated with them, creating a major risk to delivery. The lack of resources and certainty regarding enforcement by LPAs is a further barrier to on-site BNG success.

As a result of these constraints, when tested against the various criteria of the Global Biodiversity Framework and the Convention on Biological Diversity, it is highly unlikely that on-site BNG will make any significant contribution to enhancing and protecting biodiversity. By contrast, off-site BNG sites offer far greater opportunities for making a meaningful uplift to biodiversity, secured for many decades.

A qualitative assessment of the relative value of on-site and off-site BNG delivery in relation to a range of development types suggests that:

1. Only for some (larger) residential developments and some solar and wind developments, can on-site BNG provide a genuine material and lasting biodiversity uplift in addition to wider societal benefits.

2. Off-site BNG provision, for all development types, can make a significant and material contribution to wider scale biodiversity uplift.

Planning, governance and legal considerations

In terms of governance, the panel consider that on-site BNG on residential sites may suffer from conflation of BNG delivery and greenspace provision, a lack of enforced monitoring and reporting regimes, limited resources available to enforce where delivery fails, limited or no expertise of biodiversity habitat retention for long-term security of delivery by management companies responsible for on-site BNG habitat, insufficient long-term financial security, and limited liability attaching to the developer. By contrast, off-site areas are more likely to be created and managed by professionals with the necessary management expertise, who undertake monitoring and reporting, and assume responsibility and liability for delivery from the developer.

Under the law, LPAs have a legal duty to ensure BNG is secured, whether on-site or off-site, or otherwise by offsetting biodiversity value loss through the purchase of statutory credits. However, they do not always have step-in rights (where the LPA takes over delivery) in respect of on-site BNG failures and have limited avenues to secure rectification in the case of failure. Historically, LPAs generally take a reactionary approach, initiated by local resident complaints, to enforcing this type of environmental mitigation, due to the need to prioritise resources. There are also potential cost risks to LPAs if they do try and enforce on-site BNG if there is an appeal. In contrast, off-site BNG provision has clarity of enforcement through an established legal agreement (such as a Section 106 agreement or conservation covenant), with LPAs or responsible bodies having recourse to site providers in the case of failure. Off-site BNG is therefore far easier for the enforcing body to manage.

Unless 30 years of sufficient funding is ring-fenced by the developer and handed to the body taking on the on-site BNG maintenance, there is a significant probability that the BNG will not succeed long-term due to the risks of failure of habitat creation and/or enhancement. However, this can have serious implications for future viability; if the landscaping and service charge on residents are set at the correct level, this mechanism can work if it is indexed, but success depends entirely on the competence of the management company to manage biodiversity and there is therefore a cumulatively high risk of failure and wasted investment.

There is currently no standard provision by LPAs for a 30-year maintenance fund to be in place, whereas

an off-site provider must satisfy either the LPA or responsible body that they have sufficient funds to enable their site to be registered and hence to be able to sell BNG units to a developer.

On-site BNG provision is a relatively easy solution to BNG delivery for a developer of a large residential development site but not for other types of development or SME house builders. The majority of developers are supportive of the principles of BNG, due to the certainty and structure it brings, but want the flexibility to deliver the most commercially prudent and cost-effective solution. In the absence of a policy preference for the use of off-site habitat banks, housebuilders are constrained (and often pressured) into trying to fit their BNG requirement within the development site boundary, potentially at the cost of additional housing in a recognised sustainable location.

In terms of social and community benefits, there is likely to be some value to residents on larger residential developments (say over 25 hectares) that can accommodate areas of BNG habitat, but even here provision is unlikely to be tailored to resident's recreational needs or, over the long-term, to be managed appropriately for wildlife, due to the pursuit of tidiness by residents or a formal management company, unless rigorously enforced. SME housebuilders are largely unable to provide habitats of value for biodiversity without sacrificing considerable net developable area, often critically affecting the viability of the scheme. Similarly, there is usually no community value arising from non-residential developments over and above basic landscaping and planting because of a much higher net developable area requirement and inability to manage habitats following completion of the development. By contrast, the purchase of off-site BNG units from professional habitat banks provides revenue to farmers and landholders in rural communities. The potential creation of new nature reserves that can be visited by people, is also of significant community value that, for example, could benefit from the emerging government-backed Land Use Framework.

Cost and value for money

Given the multiple benefits of off-site BNG provision compared to on-site BNG in terms of ecological integrity, biodiversity uplift value, enforceability, ease and clarity of legal compliance, ease of navigating the planning system and greater social and community benefits (taking the spectrum of development types), is the current bias by residential developers to deliver BNG on-site influenced by perceptions that it is cheaper? In other words, is it proving more cost effective to deliver BNG on-site?

Modelling and analysis of enquiries for the purchase of off-site BNG units showed that delivering BNG through the purchase of off-site units costs around 0.4% - 0.6% of gross development value, with costs for small developments proportionally more and large developments proportionally less, but not dramatically so.

The cost of delivering one BNG unit on-site, considering all costs (including the development land price paid for the land, the reduction in the number of housing units that can be built, and the profit foregone from them) is £896,000, compared to the purchase price of c.£27,000 for one BNG unit off-site from a third-party provider.

Even if the cost of the land on which the on-site BNG is placed is ignored (ie. netted off at zero) and the profit foregone from the houses that would have occupied the BNG area reduced to 5% (from the typical rate of 20% used in the model), the on-site BNG unit costs would still be £112,000 each (compared to the c £27,000 per unit off-site cost).

Modelling done for this report estimates that delivering all the BNG off-site is between four and six times more cost effective than trying to fit just a fraction of the BNG within the development site

boundary, dependent of course on whether the land costs and profit foregone are fully acknowledged or not. A preference for off-site BNG delivery would therefore satisfy one of the recommendations in the Corry review to "work to reduce the high-cost and low-nature scenarios".

Conclusions

Despite the fact that the BNG law is starting to work well, especially given that it has only been implemented for a year, its potential to meet the original objectives of faster development, facilitating growth and contributing substantial funding into nature restoration at limited cost to the developer, is being hampered by a preference for on-site delivery. This preference is also creating a number of perverse outcomes:

- inability for the BNG law to make an effective long-term contribution to nature restoration
- severe risk of undermining the nascent market for off-site BNG
- an abandonment of green finance by private investors, and
- potentially curtailing interest in the biodiversity restoration market through failure of the world's first compliance market for biodiversity.

Recommendations

1. The government should reconsider the sequential preference for on-site BNG delivery, and favour developers purchasing off-site BNG units from professionally managed off-site providers. This would enable multiple developments to purchase BNG units from large habitat banks, aggregating the value from a number of development sites, to deliver far greater benefits for nature through the restoration of ecosystems, supporting landholder income, providing bigger and better areas that would contribute wider community benefits, and be quicker, cheaper and easier for developers to implement. It would stimulate the rapid expansion of habitat banks, giving developers greater choice based on market principles. Housebuilders are screening sites before purchase, rejecting those that won't support on-site delivery because of risk in pursuing off-site solutions as a result of an on-site preference by the LPAs. Removal of the presumption in favour of on-site BNG first would enable developers to consider a wider range of sites and thereby increase the rate of house building. Although we acknowledge the inherent value to communities of creating better quality green spaces, biodiversity restoration and greenspace provision must not be conflated.

2. LPAs should take up this policy evolution by championing off-site BNG delivery in their area (through both local plan policy and a development management approach), providing a better, faster, more frictionless, and less onerous approach for developers and the LPAs themselves.

3. LPAs should be held more to account, by requiring more stringent and effective compliance monitoring of on-site BNG and given resources to enforce restorative measures where on-site BNG fails.

4. If an onsite approach to the delivery of BNG is to be retained in some form, it is essential that a level playing field for on-site and off-site BNG is created. The two factors needed to ensure compliance are a) that all on-site BNG must be transparently registered in the same way and place as off-site BNG, b) that on-site areas are also financed for the full 30-year term through, for example, the appropriate

use of the service charge which would include restorative measures should the on-site BNG be found to be failing, and the upskilling of the managing agent or management company responsible for the development once the developer has handed over the site. Both on-site and off-site BNG should be expected to adhere to the Defra/BSI nature standard.

5. That the communications around BNG from central government are reviewed and the benefits of the approach to both society and biodiversity are more clearly and widely publicised.

Introduction

The Biodiversity Net Gain (BNG) policy is beginning to work well as it embeds into the planning system to retore our natural environment whilst delivering growth. However, there is one refinement that would make a major difference to the scale of nature recovery achievable by the policy - getting the right balance between on-site and off-site delivery. This report therefore assesses the comparative value of delivering BNG either within the development site boundary or off-site on specifically created and managed areas of land in the wider countryside. We review how to make BNG most effective for nature restoration whilst accommodating development policy, of particular relevance given the publication by government of a consultation on reform of the planning system and how government sees development and nature recovery working together (MHCLG & Defra 2024) for the benefit of the growth agenda.

After decades of ineffective treatment of biodiversity within the planning and development control system in the UK, a new mechanism, introduced by the founder of Environment Bank, based on biodiversity offsetting called biodiversity net gain, was embedded into law through the assent of the Environment Act 2021. After a two-year transition period designed by government to enable developers and planning authorities to plan for and accommodate the new mandated regime within their businesses, the new legal requirement on developers and planning authorities finally became implemented from February 2024.

Alongside facilitating growth BNG also contributes to greenspace provision, opportunities for quiet recreation, and improvements in mental health and well-being. Added to these benefits, the processes and mechanisms for the delivery of mandatory BNG in England are being seen as a useful framework for the development of a voluntary, and likely in the future mandatory, requirement for the wider corporate business sectors to disclose and compensate for their impacts on natural capital.

BNG presents a major opportunity to restore nature in England (Scotland and Wales are, in due course, likely to follow a variant of the policy implemented in England) and although intensive farming and food production has had and continues to have a much greater impact on biodiversity across the UK than built development, nonetheless having a mandatory and legally enforceable policy for how biodiversity is treated within planning and development control, should enable some land to be restored to nature over time. This is critically important given the underpinning role that nature plays in global economies.

Whilst there are a number of barriers to remove to enable BNG to deliver its potential in delivering meaningful uplifts in biodiversity at a landscape and wider countryside level (see Annex 1), there is the potential for one barrier in particular, the policy preference towards on-site rather than off-site delivery, to be moderated in order to increase the extent of the contribution of BNG to nature recovery. An initial scoping exercise was undertaken to compare on-site and off-site features in order to inform this review (Annex 2).

This policy preference is being promoted by LPAs on the 'front-line' resulting in only 10% or less of BNG currently being delivered off-site, far less than the figure of 50%+ expected by government and their advisers prior to the implementation date. This report therefore compares the two delivery mechanisms (on-site and off-site) by assessing the impact of the relevant extent of both in terms of delivering effective biodiversity conservation, alongside a streamlined mechanism for developers and LPAs and providing value to communities.

One consequence of this preference for on-site BNG provision is that a functioning market for off-site BNG units, in which land providers bring forward significant tracts of habitat to service development demand, will be prevented from materialising. The opportunity to leverage substantial finance into the natural environment, and in doing so creating effective large-scale biodiversity conservation year-on-year, will be missed. As a result, revenue stream diversification for landholders will be curtailed. This report therefore focuses on whether the policy preference for on-site BNG delivery could thwart the financing of effective large-scale biodiversity conservation in which development provides a true net gain for nature. The key question asked is therefore 'can on-site biodiversity net gain deliver effective biodiversity at a scale sufficient to restore nature in accordance with the primary objective of the policy and how do the two delivery options compare in relation to a further objective of benefitting local communities?'

The review

Early indications of the implementation of the BNG law suggest that over 95% of BNG is being done on-site, where the developer complies with the statutory process by prioritising delivery on-site (zu Ermgassen et al 2021).

Whilst some of this is driven by the stated government preference (https://www.gov.uk/guidance/biodiversity-net-gain), other drivers are manifestations of the above barriers. zu Ermgassen et al (2021) refers to only a small number of planning applications being required to provide BNG in practice. If the majority of this delivery is on-site, then there will be no market for large scale nature restoration sites, currently being set up speculatively by a variety of providers. This would lead to market failure and the inability for BNG to make a meaningful contribution to nature recovery across England ie. to the government's commitment to provide 500,000ha of nature recovery by 2030 (HM Government 2018, 2023).

In order, therefore, to compare the efficacy and effectiveness of on-site and off-site BNG provision, a panel of experts with detailed experience of the BNG policy and delivery landscape covering the key issues of ecological integrity and biodiversity value, costs of delivery, requirements in respect of planning, legal matters and developer interests, was established to evaluate the evidence for how BNG should best be delivered. The points made in the report do not necessarily reflect a consensus across individual contributors or their respective organisations but do reflect a majority view.

The terms of reference for the study are to set out, with evidence and insight, the range of factors operating across BNG delivery and to assess each in terms of how best to contribute to biodiversity restoration whilst protecting the ability to deliver effective development in a timely manner through the planning process. Value to people is also an important consideration and this is addressed in terms of whether BNG can support both biodiversity and people's access to nature, or whether they are better treated as two separate outcomes and if so, how might that be delivered in practice.

The following experts comprise the panel:

David Hill, Ecologist and Environmental Markets Adviser

Nina Pindham, Senior Environmental Lawyer, Cornerstone Barristers

Neil Beamsley, Group Head of Biodiversity, Bellway Homes

Robert Hindle, Executive Director, Rural Solutions,

Jason Beedell, Research Director, Strutt and Parker

Their experience covers the key issues of:

- ecological integrity and biodiversity value
- legal aspects of delivery
- the duties and role of local planning authorities and consideration of the planning system
- developer obligations and liabilities, and
- the comparative costs of on-site and off-site provision using a cost modelling exercise.

Report structure

The report is structured as follows: The importance of biodiversity is first described, referencing the acceptance that biodiversity loss represents a global existential threat to us equivalent to that of climate change and therefore must be addressed with urgency. We then evaluate the state of nature in the UK, one of the most severely nature-depleted countries in the world, bringing into sharp focus the importance of tackling every factor that impacts on biodiversity, which includes built development.

We describe the critical aspects of successful biodiversity conservation in order to assess the success of BNG delivery including habitat area (the extent of the ecosystem), fragmentation and fragment size, the role and importance of ecotones, the impacts of disturbance, timescales for reaching ecological maturity, and governance applicable to habitat creation and restoration sites (policy, finance, monitoring and reporting).

BNG is a major policy response to addressing the impact of development on the environment. Its emergence and eventual mandating into law is explained. Getting BNG into law has taken many years and the regime and process has been thoroughly evaluated by the full range of stakeholders and consultees. The primary objectives of the mandate are outlined, and the evolution of the policy landscape is set out in some detail including the challenges that have been identified. We then set out an assessment of the predictions of the demand for BNG from several approaches.

Reference is then made to what constitutes an on-site and an off-site BNG project and how the latter are currently being established by a large and growing number of speculative site providers aiming to satisfy the expected demand for off-site BNG units. Planning and legal considerations are explained in some detail providing a step-by-step description of the current treatment of BNG, explaining how the

planning and legal systems are operating to incorporate the new policy into law, identifying risk areas and how they are, or are not, being mitigated. The perceptions of BNG from the development sector are described, recognising constraints and issues that must be addressed within the development cycle, noting the factors that influence the developer's decision to place BNG on-site or off-site and highlighting modifications to how on-site and off-site BNG delivery could be brought to bear to help developers and nature.

The costs of delivering BNG on-site and off-site are then compared taking into account loss of profit and land price in the former though accepting that developers will always look to minimise costs in the siting of on-site BNG, using a variety of approaches.

Finally, we provide a comparison of on-site and off-site BNG provision in relation to a set of detailed criteria covering contribution to nature restoration objectives, type of development, governance including developer, landowner and LPA liabilities, financial security, relative costs and commerciality, ease of delivery in the planning system, legal aspects, planning aspects, development benefits and constraints, and social and community value.

Biodiversity

The inherent and economic importance of biodiversity

Biodiversity loss is an existential threat to mankind equivalent to that of climate change, though neither can be viewed in isolation. Nature (biodiversity) and natural capital provides our food, pollination services, freshwater quality and quantity, air quality regulation, flood-risk management, soil structure, building materials, erosion control, disease and pest control, medicines and of course climate regulation. Some 55% of global GDP relies on what nature provides (OECD/WEF) and there is now a rapidly growing awareness of this dependency - that nature underpins global economies, and this is focussing the minds of governments, corporate business, investors and consumers. The scale of biodiversity restoration needed globally is substantial and the costs of that restoration will also be substantial. The costs of failing to do so are, however, much greater.

Biodiversity loss in the UK has primarily been caused by:

a. Intensive agriculture - encompassing habitat loss, habitat fragmentation, a simplification of crop diversity, a switch from spring sown to winter sown cereals, the abandonment of rotational cropping, drainage of wetlands, deep ploughing and loss of organic matter in the soil, a move away from mixed farming (livestock and crops), intensification of dairy herds supported by silage growing, increasing applications of artificial fertilisers, overgrazing, and the ever increasing use of a plethora of both broad spectrum and targeted pesticides – fungicides, insecticides and herbicides.

b. Built development – with an average of c.10,000ha of land in the UK converted to built development annually.

Biodiversity is also being significantly impacted by climate change, which is removing habitat envelopes

for many species whilst improving conditions in more northern latitudes for others that were, until recently, restricted to more southern regions, though the picture is a complicated one. The spread of invasive non-native species is also taking its toll on global biodiversity.

There is currently a significant movement to change the food production system to one based on 'regenerative agricultural' practices focussed on agroecological methods, rebuilding soil carbon, retaining and expanding habitats, rewetting land, growing a greater diversity of crops and the reintroduction of mixed farming. Biodiversity in the wider countryside could, if these methods become mainstreamed, improve along with an increase in bio-abundance (ie more individuals of the species). However, it will not be possible to reclaim areas of built development and improve biodiversity in those areas. Hard standing and increasing human population size works against real biodiversity increases.

The state of nature in the UK

Since 1970 species population abundance has declined globally by an average of 69% with a staggering 94% decline evident in wildlife populations of Latin America and the Caribbean. Biodiversity loss in the UK has been in excess of 60% over the past five decades with many well monitored groups such as birds exhibiting declines of over 90%. Declines were taking place before 1970, however, only since 1970 have baseline data for a range of taxonomic groups and habitats, been collected and analysed. Studies in western Europe have documented a 75% decline in invertebrate populations, comprising many species which underpin the survival of a vast majority of higher order species and provide pollination services for our crops. A million or more species are currently threatened with extinction (see Hallman et al 2017, State of Nature Partnership 2023; World Economic Forum 2022).

These statistics are indicators of a catastrophic collapse facing global economies given our emerging understanding of the dependence of economic production on biodiversity, with the majority of the impacts caused by human overpopulation and overconsumption by that population. It is against this background of environmental degradation, and our understanding of its causes, that we must do everything possible to rebuild functioning ecosystems, and quickly.

The UK has set ambitious targets to address nature loss through the Global Biodiversity Framework based on the Convention on Biological Diversity (CBD). The latest State of Nature report (State of Nature Partnership 2023) has grouped the CBD targets into five broad areas of focus to be delivered via the development and implementation of national biodiversity strategies. These five areas are considered those that are collectively necessary to halt and reverse biodiversity loss, leading to effective and extensive nature restoration, rebuilding ecosystems and their functionality, thereby averting catastrophic collapse in global economies. The five areas are:

a. Improving species status

b. Increasing nature-friendly farming, forestry and fisheries

c. Expanding and managing protected areas

d. Increasing ecosystem restoration

e. Co-ordinating our response

Through setting out these five areas of focus there is general agreement that any policy or activity that

does not make a significant contribution to this restoration mandate, has only very limited value – effort needs to be focussed on making the biggest difference to the current state of nature over as short a time period as possible. Hence, we evaluate the BNG mandate in relation to the contribution it could and should make to these five focus areas.

Attributes for maximising biodiversity value

Even though the relative area delivered through BNG is likely to be small (see BNG demand section below), for the BNG policy to succeed in relation to delivering nature restoration at as great a scale as possible across England within a realistic timeframe (and by inference to be of value to emerging policy in Scotland, Northern Ireland and Wales), it is important that an evaluation of those components of a landscape that attract the highest biodiversity uplift, are understood. Principally, factors that impact on biodiversity at a spatial scale include size of area, fragmentation, fragment size and connectivity, presence of ecotones (where two habitat types meet also referred to as 'messy edges'), timescales, disturbance impacts, security of long-term finance, and security of long-term governance. Each of these factors is addressed below.

Habitat area - extent of ecosystem

There has been extensive research over the past six decades that shows how species richness increases with an increase in the area of land or water assessed (see for example the seminal works of MacArthur and Wilson, 1967, Ricklefs 1976, Strong et al 1984, Begon, Harper & Townsend 1986, Wiens 1989). Based on island biogeography, as the area of 'an environment' (land, water, forest, ecosystem) increases, so does the number of different habitat types/patches and hence niches that can be exploited by species – the bigger the area, the more niches as a result of differing soils, geology, hydrology, topography and aspect, and the greater the number of species able to inhabit those collective niches. Larger areas support larger populations of individual species that are less likely to fluctuate and suffer local extinction (in a hard winter, for example) and because the larger areas are likely to be more physically variable, they provide greater habitat diversity (Whittaker & Fernández-Palacios 2007). The relationship between area and species richness is essentially asymptotic (the 'species-area relationship' in which species number increases with increasing area before reaching a plateau; Connor & McCoy 1979) and that relationship can hold across a range of spatial resolutions eg habitat type, landscape, catchment, ecosystem, country or continent, with 'jumps' in richness attributable to major changes at the boundaries of these resolutions.

Whilst the original findings came from analyses of species populations and diversity from islands of different sizes, the thesis applies to area attributes more generally ie bigger parcels of land hold more species than smaller parcels. This is the basis of the Lawton Making Space for Nature report (Lawton et al 2010) in respect of 'bigger' is better for biodiversity.

The relationship of bio-abundance also largely holds true for area – large areas can support more individuals of a species than small areas. Large areas provide more opportunities for providing food and shelter. Large areas, with large populations, may also provide better conditions for avoiding predation even though predator species richness and abundance will similarly be greater on large areas and/or at large spatial scales. Greater bio-abundance is also facilitated by sheer numbers too – large areas may attract more individuals of different species because there are already good numbers present.

Fragmentation and fragment size

Intensive agriculture has had the biggest impact on driving down biodiversity as a result of habitat loss,

parcel size reduction and habitat fragmentation, (as well as pesticide use, intensive cropping regimes, simplification of crop types grown in an area, nutrient enrichment etc) though built development has also created significant impacts. Although it is impossible to be precise about how much habitat is required for individual species, as a rule of thumb the species-area relationship (eg. Diamond & May 1976) predicts that losing 90% of the habitat will ultimately lead to the extinction of 50% of the species in that habitat, although ecological networks and habitat management aim to reduce the rates of extinction. Almost all farmed landscapes in the UK have experienced massive direct habitat loss, creating only small, isolated remnants or fragments of habitat, usually too small and isolated to support high levels of biodiversity or high bio-abundance. The reverse of this situation, using habitat modelling, suggests that networks of wildlife sites may need to be significantly larger than they currently are to cope with a further pressure such as climate change (Hannah et al. 2007).

Nature conservation is about creating as large a site as possible, connected to other habitats and landscapes in a continuum (see Sutherland & Hill 1986). As a result and the growing interest in and experiences of, nature conservation, there has developed a significant literature on the effects of habitat fragmentation on population sizes of species and species diversity (see for example www.conservationevidence.org for a number of recent specific studies from around the world). Interconnected parcels of habitat within a landscape generally hold a greater species number than those that are isolated. As a result of studies over many years, the concept of ecological networks has emerged as a key principle in the management of land for conservation, especially in relation to conserving wildlife species in environments that have become fragmented by human activities.

An ecological network comprises a suite of high-quality sites which collectively contain the diversity and area of habitat that are needed to support species, and which have ecological connections between them that enable species, or at least their genes, to move. Over 250 ecological networks are currently being planned or implemented at international, national and regional levels around the world, including in some parts of the UK. Provision for ecological networks is made in a number of international treaties and agreements, but England has not yet met its commitments under these agreements. Taking steps to do so, however, will deliver a range of benefits for people as well as wildlife, because of the range of ecosystem services that resilient, coherent ecological networks can provide.

Creating and restoring sites for biodiversity in close proximity to, or abutting, areas of existing nature conservation interest, is far preferable to locating a site within a 'sea' of barren arable farmland, distanced from any existing semi-natural habitat. So, proximity to existing sites or areas not farmed or developed, has a distinct advantage for biodiversity. Applying these principles to BNG, on-site BNG delivery cannot achieve the uplift in biodiversity value compared to off-site areas because it will generally be very small, fragmented ie. unconnected to the wider landscape/habitats, heavily disturbed and subject to the probability of significant change.

Ecotones – messy edges

Another usually beneficial characteristic of larger sites is reduced 'edge effects' - the proportion of 'edge' decreases with larger sites. The edges of habitats eg a wood abutting a more hostile environment (a cereal or improved grassland field for example) often differ markedly in microclimate and other characteristics from the habitat centre (Ries et al 2004). In addition, small patches of grassland may be degraded by nutrient pollution from fertilisers and spray drift from adjacent arable land. These edge effects can penetrate across significant distances into a habitat, making the area less suitable for many species and effectively reducing the ecological value of a site, hence the importance of buffer habitats between nature reserves and arable farmland, where possible.

Some edges, however, can be important habitats in their own right, especially where they provide transitional habitats. In traditionally managed woodlands, for example, large sites can accommodate glades and rides, which provide open habitats for a range of species (eg. butterflies and other invertebrates) that would not inhabit the denser forest areas. Small woodlands are unable to provide this type of within-site habitat diversity.

Disturbance

Small fragments of habitat, even if they can be managed for biodiversity, are also much more likely to suffer from human disturbance. The fact that any on-site BNG areas, should they survive in extent beyond the first five years, will be used by residents (particularly in residential developments), is likely to give rise to significant habitat change due to disturbance. Heavy trampling changes and simplifies vegetation communities which in turn reduces soil microbiota and invertebrates. Amphibians, reptiles, birds and mammals similarly decline as a result of these changes, in addition to the sheer presence of people (and their cats and dogs) which render many small sites incapable of having anything but an impoverished biodiversity. Managers of nature reserves strive to screen and hide visitors from the areas inhabited by wildlife since people visibility causes it significant disturbance and reduces the value of a habitat that, in the absence of disturbance by people, would have much greater wildlife abundance. Further examples of the impacts of disturbance on wildlife are provided in the review by Hockin et al (1992).

Timescales

Ecological maturity takes time. Depending on the objective of a restoration project, the timescales to achieve something of biodiversity value differ greatly. For example, early-stage wetland can provide earlier biodiversity value than a fully functioning woodland which may take over a hundred years to mature, but many hundreds of years to represent anything like the biodiversity value of ancient woodlands. Successional development considerations are therefore important. Conifer plantations, for example (though these are not considered appropriate for nature restoration projects), develop an early flush of biodiversity interest that wanes and eventually dissipates after say 10 years of growth (ie. it is essentially a short-term transitional habitat). Further details are in Sutherland & Hill (1986).

In general, nature restoration projects in the UK need a minimum of 25 years to begin to show significant biodiversity uplift, hence why a term of 30 years was considered appropriate for BNG. During the development of the BNG policy, many stakeholders and consultees wished for a minimum of 100 years to be guaranteed in terms of the deployment of finance, with one eNGO suggesting 1,000 years, which would not have been feasible or realistic. The farmer/landholder community are generally able to accommodate 10-year contracts since they have familiarity with such contractual terms if they have signed up to agri-environment schemes. So, it took a great deal of persuasion to enable the time horizon to be pushed out to 30 years. Whilst a number of habitat types that might be brought forward to satisfy a demand for that habitat ought to reach significant biodiversity value in 30 years (such as woodland scrub-grassland mosaics, neutral species-rich meadows, ponds, ephemeral wetlands, hedgerows), others such as heathland restorations, woodlands, saline lagoons etc. will take considerably longer. However, a 30-year term for a nature restoration project, provides an adequate compromise.

Governance – policy, finance, monitoring, reporting

Natural England's own advice for the creation of a resilient ecological network as part of the 30x30 policy and ambition for 500,000ha of nature recovery states that sites that comprise this overall target will be of adequate size, taking account of the needs of the natural environment to adapt to climate change. As recommended by Lawton et al (2010) the network of sites needs to receive long-term protection and

appropriate management together with sufficient ecological connections between sites to enable species movement.

Lawton et al (2010) sets out what needs to be done to enhance the resilience and coherence of England's ecological network which involves improving the quality of current sites by better habitat management, increasing the size of current wildlife sites, enhancing connections between, or joining up, sites, either through physical corridors, or through 'stepping stones', creation of new sites and reducing the pressures on wildlife by improving the wider environment, including through buffering wildlife sites.

Lawton et al (2010) explicitly states that surviving in small, isolated sites is difficult for many species, and often impossible in the longer term, because they rarely contain the level of resources, or the diversity of habitats needed to support sustainable populations. Securing a suite of high-quality sites which collectively contain the range and area of habitats that species require, ensuring that ecological connections exist to allow species, or at least their genes, to move between them, would be achieved by establishing a network of core sites connected by buffer zones and wildlife corridors.

Despite the recommendations in the Lawton report the government's BNG policy preference for on-site BNG goes against the principles of the creation of an effective ecological network, whereas a resilient network of large-scale habitat banks, funded through off-site BNG, is much more likely to be able to deliver effective nature recovery at scale.

Nor will on-site BNG attract significant third-party investment since the objectives of the developer are at variance with the objectives of government's nature restoration policy. Many developers currently prefer a solution that is flexible with limited opportunity for enforcement and where they are able to discharge their long-term liability by handing over the site to a management company or residents association once they vacate the development. Were off-site solutions to be promoted by LPAs and central government, demand could easily be satisfied by off-site BNG unit providers, developers could still (but legitimately) discharge their long-term liabilities and costs in a transparent and transactional manner, landholders would receive a diversification in their income, biodiversity would be prioritised, and sites so created and managed would contribute to the government's goal of nature recovery at scale, contributing to resilience against climate change and facilitating a frictionless route to growth.

Mandatory Biodiversity Net Gain Creation and Application

Policy development

For decades, the planning and development control sector has treated biodiversity largely as a constraint on development. Much of the inadequacies of addressing biodiversity within planning and development control became highlighted during the 1990s with attention being focussed on the ineffectiveness of environmental impact assessments (EIAs) in delivering mitigation for biodiversity impacts from built development. A seminal paper by Treweek & Thompson (1997), showed that the majority of EIAs failed to account for biodiversity, with false claims being made of how developments would protect

biodiversity within the development footprint. A follow up study 16 years later showed little improvement (Drayson & Thompson 2013). The reality was that development was entirely failing to address the biodiversity loss that it caused.

A substantial industry has grown up around delivery of environmental and ecological impact assessments (EIA, EcIA) whereby pre-developed sites, before they are developed, are surveyed by teams of ecologists and biodiversity is evaluated, with a plan as to how the development will 'mitigate' impacts in accordance with the mitigation hierarchy (Treweek 1999). The number of ecological consultants, as evidenced by membership of the professional body the Chartered Institute of Ecology and Environmental Management, has soared from a few hundred in the early 1990's to over 5,000 today. And yet, even with such an expansion in the number of ecological professionals, it is difficult to find evidence that, pre-BNG, biodiversity protection and enhancement improved as a consequence of development; impacts continued to have been almost entirely underplayed, and biodiversity has suffered as a result.

The reasons are largely because on-site mitigation plans devised by ecologists almost never materialise or become fulfilled, mainly because of a) the ineffectiveness of siting biodiversity within active development sites (as a result of habitat fragmentation and disturbance), b) a reluctance on the part of planning authorities to enable developers to compensate (off-site) for impacts, preferring the 'control' associated with constraining the development through a misguided view that biodiversity should be retained as part of the development within the footprint, c) overstating the chances of mitigation working and d) through an almost complete lack of monitoring and enforcement by planning authorities once planning permission has been granted. It is often the case that the pressure to deliver a solution masks the inability of the space allocated to accommodate it. Whilst a 'no-net-loss' position might be achieved by on-site delivery, providing even a 10% gain is more challenging, a point reiterated by Wildlife & Countryside Link who are calling for LPAs to set higher BNG targets.

Clearly, the previous planning approach was failing biodiversity. Environment Bank was therefore established in 2006 to bring forward a disruptive approach to accounting for biodiversity through the planning system based on developers being allowed to 'offset' the residual impacts of their development after having applied the mitigation hierarchy. Such a system has operated in the United States, under the term 'mitigation banking', since the 1980s.

Environment Bank lobbied government for development to be required to deliver gains for nature (Hill 2005), resulting in the emergence of the concept of BNG. The Environment Bank 'timeline' is shown in Figure 1 and details of its development are provided in Annex 3. Initially introduced as a voluntary regime, it soon became apparent that only a regime mandated into law would be effective; the government's Ecosystem Markets Taskforce (EMTF) recommended in 2013 that biodiversity offsetting should be made a mandatory requirement of planning permission (EMTF 2013). Defra subsequently established a series of pilots, and the policy expanded as a result of a major consultation and stakeholder engagement exercise, and an impact assessment undertaken by Defra and HM Treasury.

The original concept development for BNG focussed entirely on how it needed to provide a more effective means by which built development accounted for and compensated for impacts on biodiversity in the wider environment, through a system of biodiversity offsetting. The development of a standard metric (known currently as the Defra statutory metric, version 4.0) enabled a more effective consideration of the extent of compensation required for any given loss. Although there was external policy campaigning around the work of the Business and Biodiversity Offsets Programme and others, it was the internal policy push within Natural England, with the subsequent development of the metric, that was the reason why BNG became embedded into law through enactment of the Environment Bill in 2021; the external policy landscape played only a small part.

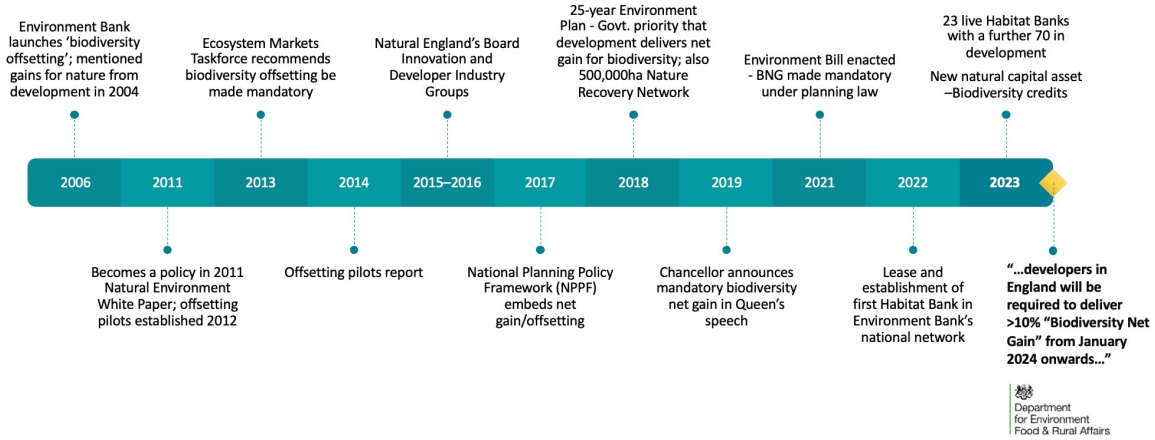

Figure 1. *Environment Bank timeline from the initial concept development of biodiversity offsets and gains for nature in 2004 to mandatory introduction of BNG in 2021 and implementation in early 2024.*

The BNG policy was being developed at the same time as the 25-year Environment Plan of 2018 which made it a government priority that development delivers net gain for biodiversity, the plan also set out the target of a 500,000ha Nature Recovery Network.

How the policy has been implemented

However, the policy suffered mission creep prior to being implemented into law, most notably in relation to demonstrating the value of BNG to people rather than just biodiversity. The original concept of better treatment of biodiversity conservation within the planning and development control system became conflated with human benefits needing to accrue to any policy, such as access to greenspace and health and well-being.

This was manifest by a notion that the developer should include biodiversity within the developments' design (without realistic understanding of the fact that high quality biodiversity is not feasible within the majority of developments) and was predicated on a view that people want biodiversity immediately where they live, despite the fact that residential development is only one aspect of the built development sector; commercial/logistics/warehousing and retail developments, ports, airports and linear infrastructure such as roads and rail, which form a significant proportion of the overall construction sector, are largely unable to fit meaningful areas of biodiversity value into their designs.

Economic studies have also questioned the policy preference for on-site BNG delivery. For example, in a recent study published in One Earth, researchers from the University of Exeter's Land, Environment, Economics and Policy (LEEP) Institute heavily criticise the implementation of the policy which forces the majority of offsetting to occur within or near development sites rather than where it might most benefit biodiversity. This localised offsetting, which is supported by the National Planning Policy Framework, is considered to treat the natural environment as homogenous; however analysis indicates that incorporating ecological and economic information into the targeting of offsets can greatly improve benefits to wildlife as well as help those living in some of the most nature deprived areas of the country to be able to engage with the natural environment.

The researchers from LEEP employed models of biodiversity and nature services that took into consideration factors such as the density of wildlife species, the recreational benefits to humans of being around

nature, and the costs of offsetting (typically from compensation to farmers and landowners for land use change).

They applied the models to estimates of housing developments across England over a 25 year period and tested five scenarios: the status quo or current policy (where local offsetting is favoured); where conservation benefits are maximised (highest improvements for priority species can be achieved); where costs (compensation to landowners) are minimised; where the ratio of recreational benefits to costs is maximised; and where recreational benefits are weighted towards those on lower incomes. They found that targeting offsets to locations best for biodiversity was found to double the conservation gains. The current implementation of BNG performed poorly across all criteria, with other scenarios outperforming it on some or all counts.

However, the research focused on benefits to people, especially those in lower income categories, which was never the original objective of the biodiversity net gain policy, with the lead researcher stating that "if we are interested in providing disadvantaged communities with access to high quality environments then tying BNG offsets near to new executive homes won't address inequality". The research goes on to state that implementation of BNG projects in England favours offsets being located near to new developments, in part to provide recreational benefits to local communities and ignores the wildlife benefits of targeting areas where biodiversity gains could be much greater. Their analysis suggests that by incorporating ecological and economic information into the targeting of offsets, they can provide a significant contribution to addressing the challenge of biodiversity loss or deliver substantial ecosystem service co-benefits to disadvantaged communities.

Restoring biodiversity at significant scale as a result of requiring development to properly address impacts and deliver effective compensation, and providing disadvantaged communities with greenspace are, however, two entirely separate entities and objectives. Conflating the two fails to deliver either effectively and, in the process, has biased the focus of the BNG policy onto residential development rather than the full suite of development that impacts on biodiversity.

Alarmingly, the policy preference for on-site BNG delivery, because of a notion that having biodiversity located exactly where people live was a good thing (for people rather than biodiversity), was entirely framed in the context of residential developments and yet there was never a survey or analysis to support a position that people would pay for biodiversity within their housing schemes. The result has therefore been a policy preference for BNG to be delivered within the boundary of the development site, leaving many if not most developments unable to fulfil the BNG policy requirement and high risk of distortions of the regime through improperly claimed exemptions or unjustified proposals.

In essence this has resulted in a weakening of the value of BNG to biodiversity restoration because the weight of emphasis has shifted towards people benefits. Whilst this shift may have prevented the policy being scrapped under tightening local and national government finances and a powerful drive to prevent burdens on developers, the resulting delivery of BNG is likely to have limited value to biodiversity restoration in its current form. The single most significant manifestation of this policy shift has been the preference shown to delivering BNG on-site, without sufficient thought to the ecological science of what constitutes effective biodiversity restoration.

A further constraint of the BNG policy relates to poor governance operating around the preference for on-site delivery. Rampling et al (2023) conducted an evaluation of the current status of BNG delivery which highlighted considerable risks facing the policy, having the potential to undermine its biodiversity outcomes. Most importantly, they found that just over a quarter of the biodiversity units delivered so far through the policy fall within a critical governance gap, putting them at substantial risk of non-com-

pliance and non-delivery. Half of the biodiversity units delivered via the policy mature more than five years into the future, which leaves them at risk of shifting enforcement priorities and lack of oversight under the current planning system. Specific infrastructure classes generate large biodiversity unit surpluses with limited ecological justification. These factors, coupled with the high occurrence of basic errors in BNG calculations by developers which have been accepted by LPAs, highlight the fundamental need for a greater investment in LPA capacity and skills to enable them to take action to mitigate the policy's significant risks to the policy delivering its objectives. In the absence of major increases in resources for LPAs that would enable the governance to deliver higher compliance rates, a shift in focus towards providing biodiversity units through targeted off-site offsets could be justified. The Rampling et al study concluded that replacing on-site units at severe risk of non-delivery with relatively more robust off-site units delivered via offsets would increase the demand for offsets by a factor of four. This would significantly increase the revenues raised by BNG for investment into conservation activities on private land. In the face of continued infrastructure expansion, it will be necessary to develop mechanisms that reconcile the biodiversity losses caused by development with biodiversity gains.

Given that mandated BNG is the first global compliance market-based biodiversity credit regime to be implemented, the main prize and perhaps legacy of BNG will be the creation of a framework for a voluntary and eventually, mandated, regime for biodiversity credits from corporate sector buyers. Businesses that are needing to offset the residual impacts of their company and their supply chains on nature (and to achieve Nature Positive status – see naturepositive.org for example) as a result of demand from investors and eventually from a financial regulatory environment, would apply the mitigation hierarchy in much the same way as the development sector has recently been required to do for BNG.

As far as the current BNG policy is concerned, therefore, the evidence suggests that far better ecological and economic outcomes could be provided by shifting the preference to off-site BNG delivery, being better for biodiversity restoration by enabling scale based on the 'Lawtonian principles' of larger, better and more joined (Lawton et al 2010). It would also be more advantageous to local communities by creating bigger sites for people to enjoy. And better for the rural economy ie. landholders, landowners and farmers who would benefit from significant revenues into the rural environment provided by the increased investment attracted to more robust outcomes as a result of the greater certainty of long-term value. Pressures on stretched LPAs would be alleviated by enabling greater governance to be provided by third parties through more effective monitoring, reporting, and enforcement of the regime.

Having said that, clearly there is much interest in providing better developments that contribute to wider health and well-being objectives through the design and management of greenspace. In essence we need development to deliver both biodiversity and access to health and well-being but the design and management of greenspace for these two distinct purposes requires different approaches.

The success of the globally admired BNG law will be based on the most appropriate deployment of on-site and off-site delivery under the prevailing circumstances. Preference for one model over the other requires challenge since there is emerging evidence that developers are proposing on-site solutions because of the requirements to have off-site provision included within a Section 106 agreement (s.106 agreement) or conservation covenant. However, significant on-site BNG also requires either a condition, s.106 agreement, or conservation covenant though the extent to which this is applied is not visible.

Similarly, the relative costs of delivery of on-site and off-site BNG often ignore factors such as reductions in net developable area for on-site solutions which results in profit foregone and a loss on the price paid for the land. In addition, there is currently an unlevel playing field in respect of burden of acceptability. For example, on-site provision has no enforcement mechanism nor guarantee of 30+ years of funding. If on-site delivery by the developer is to make a significant contribution to biodiversity restoration, all of

these factors need to be considered, though such a modification would require the developer to accept, and pay for, the full 30-year liability if delivering BNG on-site in the same way as is required by off-site providers.

A recent report from the Green Finance Institute (GFI 2024) in partnership with the UNDP Biodiversity Finance Initiative and UNEP Finance Initiative, reference the fact that many stakeholders within England's BNG landscape argue that off-site delivery is usually more effective and robust in delivering biodiversity uplift than on-site delivery because the latter is often through small, more fragmented parcels of land that face anthropogenic or urban pressures (such as proximity to residential areas). Habitat uplift is therefore unlikely to be achieved over the 30-year period. The report points to the need for more stringent assessments of property developers' on-site plans that would translate to greater volumes of off-site BNG delivery that has a better chance of delivering biodiversity gains. The report also highlights stakeholder concerns of unequal governance standards between on-site and off-site habitat uplift – such as the lack of a bespoke register for on-site habitat gains.

They go on to quote the situation within the US wetland and streams mitigation programme in which developers that impact upon wetlands and streams are first incentivised to use pre-established (ex-post) habitats, which are largely provided off-site by private mitigation banks. This 'mitigation hierarchy preference' for off-site was put into US national policy in 2008, when ecological research found that on-site compensation delivered consistently poorer outcomes due to unequal standards and enforcement. The 2008 rule established a clear preference for off-site mitigation resulting in on-site compensation now accounting for less than 20% of the programme's outcomes.

Nature compensation has been undertaken in the US for a number of decades and their analyses have clearly shown the preference for off-site delivery. Yet the UK government failed to take that evidence into account when mandating the BNG policy. Had they done so, there would not have been a preference shown to on-site delivery because of its failure rate, the point consistently made by Environment Bank since 2006.

Given that the new government has pledged to bring forward more effective BNG policy (MHCLG & Defra 2024), now is a good time to provide the thought leadership to enable that to happen. The following aspects would need to be addressed in comparing and contrasting the two delivery options so that the most appropriate route for the developer and biodiversity can be identified:

a. Value to biodiversity and wider contribution to nature restoration

b. Ease of delivery in the planning system

c. Governance – monitoring, reporting, longevity, expertise deployed

d. Relative liabilities of developer and LPA

e. Commerciality

f. Financial security of delivery

The above points are assessed for the two delivery options later in this report in association with other criteria relating to both domestic and international conservation policy and best practice. The removal of barriers and policy preferences that introduce an unlevel playing field between the two approaches would stimulate the off-site market whilst reducing liabilities on and accountability by developers, enabling

them to do what they do best – create developments. The outcome of this evaluation should be a win-win for the development sector, LPAs and biodiversity restoration.

The policy has been designed to require a minimum of 10% uplift in biodiversity as a result of a development. However, this percentage is at the discretion of the LPA in terms of the actual requirement set within the LPA area. There is evidence that a growing number of LPAs are requesting BNG of greater than 10%, with 20% and even 30% being required in some jurisdictions. A report by the Wildlife Trusts suggests that 10% is a bare minimum and that this level is only likely to deliver no net loss at best, hence their advocacy for BNG uplift to be set at greater than 10% as the policy develops (Figure 2).

> **10% net gain represents a bare minimum for nature. The original 2018 impact assessment for the policy highlighted that 10% gain in theory would be chipped away in practice by a number of factors, including habitat degradation between initial assessment and construction completion, pressures from occupation (such as light and sound pollution) and the possible loss of gains over decades. As such the impact assessment described 10% as the 'lowest level of net gain that the department could confidently expect to deliver genuine net gain, or at least no net loss, of biodiversity and thereby meet its policy objectives.' A slither of genuine biodiversity net gain, or at least no net loss, does not represent a level of ambition commensurate with the scale of the nature recovery challenge. The 2023 State of Nature report presented evidence of a 16% decline in the average abundance of terrestrial and freshwater species in the UK since 1970 (an earlier 2019 assessment had put the figure at 13%). The new Government is committed to meeting Environment Act targets, including the target to halt the decline in species abundance by 2030. Given this scale of challenge, the 10% figure should be swiftly reviewed to establish whether it is still sufficient to meet nature recovery policy objectives and to help provide private finance to help fill the estimated £56 billion nature funding gap (calculated by Green Finance Institute). Evidence from a range of local authorities strongly suggests that an increase to 20% would be financially viable. In the words of the Local Government Association, drawing on a study conducted by Kent Nature Partnership: 'A shift from 10% to 15% or 20% BNG would not materially affect viability in the majority of instances when delivered onsite or offsite. The biggest cost in most cases is to get to mandatory, minimum 10% BNG. The increase to 15% or 20% BNG in most cases costs much less and is generally negligible. Because the BNG costs are low when compared to other policy costs, they are highly unlikely to be what renders development unviable.'**

Figure 2. *Statement by Wildlife & Countryside Link on the need for a higher BNG requirement. (Wildlife & Countryside Link 2024).*

Predictions of BNG demand

The demand for BNG will give rise to only a relatively small volume and area of habitat creation compared to the actions needed to effectively restore biodiversity across the UK, but this is far better than the almost complete lack of accountability given to biodiversity impacts from development up to the BNG mandate becoming law. It is estimated that the c.10,000ha+ of built development in the UK per year (excluding linear infrastructure) equates to a need for 3,000-4,000ha of land to be put under nature restoration per year. However, this figure is derived from two key studies and the nature requirement may be slightly more than this in practice, though the ultimate amount of land needed is small. Further, if only 10% of BNG is delivered off-site, the actual market demand will be just a few hundred hectares. This will make

no material difference to England's biodiversity status or bio-abundance of individual species, hence the importance of ensuring that the default position for BNG delivery is off-site rather than on-site if the objective is to restore nature at no direct cost to the taxpayer, bearing in mind also that reform of intensive agriculture also has a major contribution to make to nature recovery; it is not just development that causes impacts.

In the absence of national market analysis prior to February 2021, Environment Bank undertook a granular assessment of demand using data sets from developments across England and a review of local plans for every LPA in England to understand anticipated future development pressure. This study estimated that the annual demand for offsite BNG units in England was c.17,000 under a mandatory regime. This would equate to between 2,850ha and 3,060ha based on between 5.5 and 6 BNG units being delivered per hectare (using the BNG metric).

In February 2021, the government published a high-level market analysis by Eftec[4] that used baseline datasets and historic mapping to estimate the rate of development which was then projected forward to estimate likely future BNG unit demand. This analysis estimated an annual loss of 6,330ha of land to development with a total BNG unit demand of 12,443 units which could be generated by 2,073ha - 2,260ha of nature restoration per year. The report assumed 50% of the demand would be delivered on-site and hence the predicted off site unit demand was estimated at 6,221 units pa, or only 1,036ha – 1,130ha per year.

In August 2023, Environment Bank (EBL) commissioned a bespoke update of the Eftec report as a result of Environment Bank customer analysis of over 700 potential buyers indicating the initial assessment of market demand by Environment Bank in 2021 was too high. The updated 2023 Eftec demand analysis indicated the total mandatory market size to be 13,680 units with the market size for off-site units being 8,671 pa, which equates to an area requirement of between 1,445 and 1,577ha.

In January 2024, Environment Bank conducted its own internal analysis of actual LPA planning applications. This was a forensic review which first checked all applications which were submitted since 1/1/20 and then checked all granted applications with a decision date in 2023. All simple change of use applications and simple conversions were discounted. On-site vs. off-site BNG figures were analysed to deliver a baseline +10%. 22 LPAs were fully reviewed (6,700 individual planning applications)[5]. As a result of this market research and applying a level of caution to a small data set that is a snapshot in time (2023) pre-mandatory BNG, an upwards multiplier of 5 was applied to the original Eftec data set. Based on these assumptions, the off-site BNG unit market was valued at c.£200 million each year. Cross-evaluation with the average minimum and maximum areas of land needed to deliver off-site BNG (see Table 1 summary), generates a BNG off-site market size of £244 – £264m per year in England.

Table 1. *Summary of three calculations of off-site BNG demand*

Approach	Off-site BNG unit demand	Off-site area required (ha)*
Local plans data 2021. Environment Bank analysis	17,000	2,850 – 3,060
UK Government analysis 2021	6,221	1,036 – 1,130

4 Strutt & Parker were part of the Eftec consortium

5 Bolton, Buckinghamshire, Darlington, Dorset, Mid Devon, Mid Sussex, Stratford-on-Avon and West Oxfordshire, Bassetlaw, B&NES, Breckland, Cornwall, Leeds, South Oxfordshire, Swindon, Tunbridge Wells, Vale of White Horse, Wealden, Westmoreland and Furness

Approach	Off-site BNG unit demand	Off-site area required (ha)*
Environment Bank commissioned analysis by Eftec August 2023	8,671	1,445 – 1,577
Mean value	10,630	1,777 – 1,922

*Based on 5.5 and 6.0 BNG units per hectare

The next two sections set out some typology in respect of what constitutes a 'typical' on-site and off-site project.

A typical on-site BNG project

As the current policy and guidance is framed, on-site BNG can be delivered with only limited risk of enforcement for failure. Many developers therefore choose this route. However, on-site provision is essentially only possible for larger developments, say over 25ha, since smaller developments, usually by SME house builders, simply do not have space. This has led to a consultation on allowing exemptions for small developments with a corresponding risk of developers using such a revised system to claim that their development is composed of multiples of small sites. However, in the absence of such exemptions, off-site BNG would lend itself to provide efficient solutions to these small and/or exempt sites.

Restrictions being imposed by LPAs in relation to providing Section 106 agreements for off-site habitat banks together with a perceived lack of off-site areas at a spatial resolution sufficient to meet devel-opment demand, have created a situation where developers firstly allocate the BNG to areas within the development site. However, if BNG is placed within the development site boundary, irrespective of the fact that it has limited or no material value to biodiversity, it does consume net developable area, and this ultimately has an impact on development costs and returns on investment (see later).

For those areas within the development site boundary that are accepted for BNG by the LPA via the biodiversity gain plan, most of the BNG takes the form of a) new hedges, b) an uplift in the value of grassland type ie from low grade neutral grassland to species-rich hay meadow, c) tree planting, and d) wet margins associated with attenuation ponds (which is often part of a sustainable urban drainage scheme or SUDS). On many brownfield sites some element of restoration to even the most basic grassland, or small areas of tree planting, may be sufficient to deliver the mandatory 10% gain. However, apart from on large developments that can accommodate some form of BNG, the size of the BNG areas being delivered are very small, essentially fragments, unconnected to the wider countryside/ landscape, and which fail to survive past the first few years.

Essentially, this replicates exactly the problem of the past few decades of development where:

a. ecological surveys are used to contribute to the environmental impact assessment/statement though usually the statement concludes that the development is 'unlikely to have a significant impact or effect';

b. there is minor adjustment to the masterplan to accommodate small concessions to biodiversity in order to secure planning permission;

c. the developer often returns to the planning authority stating that constraints caused by biodiversity, are impacting viability, once a development is about to start on site;

d. the planning authority yields to this plea for an amendment;

e. biodiversity is short-changed and there is no follow up or enforcement, hence no real incentive for the developer to take biodiversity seriously;

f. biodiversity is failed at the site.

On-site BNG delivery is regularly proposed in some specific circumstances such as within solar developments using reversion of arable use to neutral grassland, sometimes with the objective of generating surplus BNG units that could be sold to satisfy other developer's needs. However, grasslands within a solar panel array often offer limited material biodiversity uplift, even less so if they are subject to sward maintenance to prevent interference with the solar operations[6]. Grazing with sheep, as is sometimes the case, is even worse for biodiversity. Nor can the limited biodiversity created within the solar array be enjoyed by the community for obvious safety and security reasons. Few if any people would get their nature 'fix' by walking through a solar 'farm', even if they were allowed to do so by the operators. In some cases, BNG may be delivered within a solar development by utilising unused areas around the edges of the site. However, again biodiversity would be limited, and no-one would be likely to enjoy the experience of walking around what is effectively a modern industrial facility.

Larger sites, and especially urban extensions or new communities might utilise a SANG (suitable alternative natural greenspace) approach which often provides an open space amenity alongside habitat creation. Pras Trewolek at Nansledan is a good example. Here, a site of c. 4,000 homes with businesses, retail, a primary school and community facilities, has had 75 acres of meadow grassland habitat created with it. However, given the recreation pressure on many of these sites, it is doubtful that high levels of biodiversity are achievable. SANGs were originally devised and designed as a means of alleviating recreational disturbance pressures on sites of European conservation importance (eg Special Protection Areas and Special Areas of Conservation). Hence SANGs are not primarily designed to deliver significant biodiversity uplift as part of a BNG regime although they could be designed with a dual purpose if they included higher value and more diverse habitats than arable farmland, such as wildflower meadows, larger areas of woodlands, ponds and other water bodies and would need to be professionally managed.

In terms of governance and liability, one major factor working against delivery of on-site BNG is the 30-year management and maintenance requirement. Very few housing developers, for example, retain an interest in the site once the last house has been sold, with, usually, the forward management of the site's infrastructure including landscaping areas, being handed to a management company or residents association. The same is true of practically all other types of development. The success of any on-site BNG relies on securing the 30-year commitment from the developer at the point the development is permitted (although this may lead to viability issues for the developer), and this should not be via the establishment of a management company or similar body since they are unlikely to have aligned interests, or the land management skills required to ensure the permanence of the on-site BNG. In theory, LPAs have the powers to enforce but not the resources to do so which leads to a lack of accountability and deterioration of any biodiversity value as the land is transitioned to amenity use once the developer leaves the site. One of the key conditions that enabled the planning scheme to be permitted in the first place is therefore broken.

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6 https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2664.14745 and https://doi.org/10.1002/2688-8319.12307

A typical off-site BNG project

Off-site BNG sites are provided in a number of ways. They may be bespoke sites established by a landholder for a specific developer, by the developer themselves on undevelopable land, or landholder led whereby they speculate as to the likely demand for BNG units in an area, or habitat banks established by a capital investor (eg an institutional investor) under a lease agreement or by a local planning authority on land under their ownership.

Evidence to date shows that whilst there is no 'typical' off-site project, sites range in size from 1ha to 100+ha, in which habitat creation takes place on a biodiversity-poor area of land with a commitment to its long-term (30+ years) management. However, potentially much larger sites are now being brought forward to speculatively satisfy both BNG demand and demand from the currently nascent voluntary biodiversity credit market (which is being driven by corporate disclosure and the nature positive agenda). Figure 3 shows a range of current providers of off-site nature restoration schemes that have been established to service a speculative anticipated growth in demand for BNG units from developers and biodiversity credits for the corporate sector.

Figure 3. *The range of speculative providers of biodiversity units are scaling (as at November 2024).*

The term 'habitat bank' is used to categorise sites destined to be restored for biodiversity to support these anticipated markets and a large number of commercial habitat bank providers have emerged over the past couple of years. Their business models range from individual landholders bringing forward land parcels but with limited or no capital to support site longevity, through to institutional investors financing an intermediary to fund upfront capital creation works and a guarantee of 30+ years of finance for management, reporting and monitoring, securing the land through a lease agreement. Other models include the outright purchase of the land, giving greater security of tenure.

Commercial habitat bank providers set expected rates of return, with anecdotal evidence suggesting a wide range from eg. 2.5% of capital deployment per year to 18%+, this pertaining to institutional investors that have to deliver high returns to their own backers such as pension funds etc. Irrespective of the type of habitat created/managed in the habitat bank, focus is usually on the habitat that is easiest to create and

manage in the early years post-establishment (lowest risk of establishment) and least costly to manage over the long-term. These criteria are mostly satisfied by arable reversion to some form of species-rich grassland combined with hedgerow establishment (or restoration), tree planting (not necessarily with a view to creating a fully functioning woodland over time), and areas of scrub. Wetland projects provide higher value (and price per unit) but are considered an even greater permanent land use change than those habitats just described and require more specialist skills.

The size of the habitat bank created is largely determined by a) the perception of demand – mostly for BNG at present in the absence of the corporate biodiversity credit market emerging, and b) not consuming too much of the land holding in case BNG units cannot be sold. Habitat bank providers are hedging their bets. Larger sites are generally created and set out to satisfy both BNG and biodiversity credits (or even other asset classes such as carbon, nutrient neutrality, ecosystem function such as water quality etc.) as part of a wider diversification of income streams, and to serve multiple developments in the case of BNG. Site size therefore needs to be large enough to generate material receipts (100 BNG units for example) but not too large a commitment of land from the farming system and small enough to manage risk and management commitment.

It is likely, however, that as the biodiversity credit (see Hill 2024) market takes shape and expands, so site size will increase; corporate buyers will want to buy into large sites (eg. upwards of 200ha) where biodiversity gains will be greater because of scale for reasons described above. It is becoming clear, for example, that the larger Landscape Recovery projects (funded through the government's Environmental Land Management scheme) and rewilding projects, focused on delivering nature restoration outcomes through blended financial models rather than just BNG, are more likely to provide richer and more diverse habitats and consequently greater species richness and bio-abundance. Models such as those being established by the company Nattergal at Boothby Lodge Farm (617ha in Lincolnshire), High Fen (292ha in Norfolk), Harold's Park (206ha in Essex), and other businesses, eg Wendling Beck (809ha in Norfolk) and the Iford Estate (1200ha in East Sussex), based on land ownership rather than lease, can offer greater scale, secured by a range of income streams such as BNG units from developers, biodiversity credits purchased by corporate buyers, nutrient credits, other ecosystem function asset buyers and eco-tourism.

Analysis of 27 live habitat banks designed and established by Environment Bank by October 2023, shows a total land area of live habitat banks created to date of 692ha, with a mean area of 25.6ha (minimum 10.3ha, maximum 67.8ha). The same analysis of an additional 23 sites in legals (not yet established) equates to a total area of 970ha and a mean area of 30ha (minimum 13.8ha, maximum 178.9ha). Data for other providers are not readily available, although Nattergal is operating on a much higher area basis, primarily targeting the corporate sector but also entering the BNG unit market with their three current sites.

Data from 33 Environment Bank habitat banks in the process of undergoing creation, or at the final stages of the legals process, show that the original or starting land cover composition over these sites is predominantly cropland (40.5%) and grassland (55.9%), and is transitioned through a habitat management agreement to predominantly species rich grassland (such as hay meadow) (78.6%) and scrub (in some cases with heathland on appropriate soils) (14.9%) (Figure 4). The greatest uplift in biodiversity is achieved by transitioning intensively farmed arable land to a woodland-scrub and species-rich grassland mosaic. The 'average' habitat bank from analysis of this data set has an existing baseline hedgerow component of 1.8km of hedgerow, augmented by an additional 215m on each habitat bank.

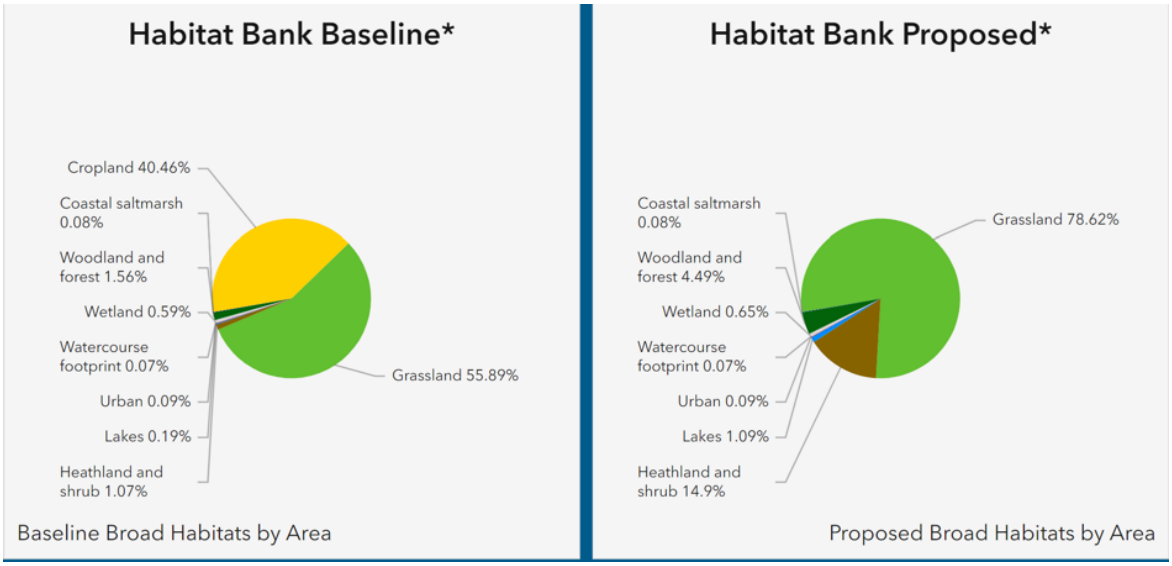

Figure 4. *Transitioning land from baseline cover types to a habitat bank - based on 33 Environment Bank sites.*

Context for delivery

Planning

This section considers the planning process and identifies areas of risk for the effective achievement of BNG, comparing on-site and off-site delivery, from which recommendations for streamlining the process can be made.

The planning process comprises both the creation and application of policy. Policy is set within the Local Development Plan which must be produced in accordance with national planning policy set down in the National Planning Policy Framework and guidance set out by government in national Planning Practice Guidance. Policy within Local Development Plans must be consistent with national policy. Each Local Development Plan is subject to several rounds of consultation and a formal examination in public conducted by a government appointed Planning Inspector.

Most (if not all) currently adopted Local Development Plans were produced and examined before mandatory BNG was introduced in 2024. This inevitably means there is unlikely to be any policy within the adopted plan that accurately reflects the requirements for mandatory BNG introduced by the Environment Act 2021 and associated regulations.

This does not mean that all Local Development Plans are silent on BNG; several local planning authorities had previously introduced policies associated with the delivery of biodiversity net gain from the development process in advance of the Environment Act. These policies remain relevant, in so far as they form part of an adopted Local Development Plan, but they cannot be relied upon in the event they conflict with the statutory approach and regulations associated with mandatory BNG as introduced by the Environment Act.

Applicants may be able to resist any requirements placed on them by local policy associated with BNG where it exceeds the mandatory requirements, for example requiring a 20% rather than a 10% uplift, or expressing a preference for off-site delivery via geographically targeted habitat banks without due reference to the on-site / off-site sequential assessment required by the Environment Act and associated regulations. However, the authority and will of the LPA should not be underestimated in this respect as a significant number consider that 10% is likely only to lead to a no net loss position, hence these authorities are likely to request a higher percentage uplift.

New Local Development Plans will be able to introduce local policy expressing a preference for the way that delivery of BNG via planning is approached in their territory, and subject to it satisfying the tests of soundness through Examination in Public and remaining within the adopted Local Development Plan, this local policy will become applicable.

One local policy approach would be to direct applicants towards a preference for off-site delivery (perhaps for specific types of development) where the authority considers greater biodiversity impact can be achieved via larger scale, specifically targeted or designed nature recovery projects. Another option would be to link BNG through planning to the delivery of a Local Nature Recovery Strategy by directing applicants towards habitat banks established with the express purpose of meeting the objectives of the Strategy. LPAs may therefore override a preference for on-site BNG if they consider the benefits of delivery are greater where BNG is placed off-site, even though many authorities will want BNG delivered locally to the development site.

In the absence of BNG policies in a Local Development Plan, the default approach set out in the Environment Act and associated regulations will apply.

Risks to nature – policy

Considered and effective BNG policy within Local Development Plans can be a positive force to aid the delivery of a strategic approach to nature recovery within the Plan territory (for example directing applicants to deliver biodiversity networks and priority habitats in different parts of the territory). It can leverage finance into nature-based solutions for the benefit of both biodiversity and local communities.

Local Plan policy might also be developed to address and shape the creation and operation of habitat banks (as a means of delivering mandatory BNG through planning) within a Local Development Plan territory. Such an approach would enable a LPA to set standards around matters such as access to land, organisation, financial viability and resilience, skills and capacity expected and / or required of a locally 'accredited' habitat bank for BNG through planning.

Absence of specific BNG policy or poorly drafted and vague policy within a Local Development Plan will be likely to impose the default, base level requirements set by the Environment Act and associated regulations on applicants for planning permission.

It is important to note that such a policy is applied "ex ante". It cannot affect matters arising after the granting of planning permission, such as the quality of BNG delivery, monitoring and enforcement, although LPAs should have enforcement-specific policies.

Risk to nature - development management

Delivery of BNG through planning, and the quality of BNG achieved, is hugely reliant upon the Development Management process. A detailed flow chart of the Development Management process as it applies to LPAs is provided in Annex 4. The figure demonstrates the complexity of the process that has arisen from statute and regulations. It is important to note that these requirements are new and additional duties of LPAs.

Development Management teams were not dealing with mandatory BNG on large sites until February 2024, and from April 2024 for small sites (from an initial filter to determine if mandatory BNG applies) on every single application. According to Planning Portal data on the number of planning applications, this is a new process that LPAs have to address approximately 350,000[7] times a year, every year, at a time when LPAs are under severe budgetary pressure with a record shortage of both planning officers and ecologists.

The progress of a BNG scheme through the Development Management system in England looks something like this:

A. Applicant submits a planning application. LPA must determine if the proposal is exempt from mandatory BNG, or if the requirements apply.

Risk to nature: reliance on applicant to provide sufficient and appropriate information and failure by LPA officer to make the right decision on eligibility.

B. If subject to mandatory BNG, the applicant must explain how BNG will be achieved. It must consider any local policy requirements in an adopted Local Development Plan or Supplementary Planning Document. It must then carry out an informed assessment of the current habitat on the site (incidence, condition and significance/distinctiveness), convert this into UK Habitat Classification language and, using the Defra BNG Metric, assess the current biodiversity 'value' of the site using the proxy of BNG units. The applicant must then identify the habitat and consequential number of units that will be lost and propose how these units, plus at least a gain of 10% (in units) will be achieved.

Risk to nature: the applicant's assessment is ill informed, overtly optimistic or deliberately incorrect. There are errors (of application and / or judgement) in the use of the Defra BNG Metric. The habitat solution proposed is unlikely to be achievable.

C. If there is no adopted local BNG policy, the applicant will be expected to follow the hierarchy of delivering as close to the affected community as possible. This principle comes with an expectation that on-site delivery is preferred, and that consideration of the options for on-site delivery should be exhausted before off-site delivery is proposed.

Risk to nature: this sequential preference plays into an approach that prioritises simplistic 'compliance' based delivery using habitat that is easiest to create or via a solution which minimises the area of habitat that needs to be created, regardless of site specific or strategic nature recovery drivers. Small, fragmented sites within developments generate limited or no value for biodiversity and are usually simplified further once the developer leaves the site (as explained above).

D. On receipt of the applicant's proposal (and supporting metric calculations) the LPA planning

7 See Government Statistics.350,000 planning applications received in the year end to March 2024.

officer must determine, without necessarily any prior knowledge of the site, or the ability to visit and inspect the site, and even potentially without sufficient advice from a LPA ecologist, whether this assessment is accurate, complies with the mandatory BNG requirements, and is practical – in terms of the establishment and maintenance of habitat (either as part of the development 'on site' or 'off-site' via another mechanism). The assessment ought to cover ecological integrity, governance, financial security, effective monitoring and reporting and community value.

E. Post-consent but prior to commencement of development the applicant must then demonstrate how BNG will be achieved through the production and submission of a BNG Plan, covering habitat management and maintenance, together with a monitoring and reporting plan. The planning officer must review, consider, challenge if necessary and ultimately sign off on these proposals (and supporting documentation). All (most likely) without having an opportunity to visit the site and unless supported by a trained ecologist, without technical knowledge.

Risk to nature: the LPA may not pick up errors or potential areas of failure in the metric calculation. They may not have the skills or time to consider proposals in the BNG Plan and Habitat Management & Maintenance Plan critically. If there is no local policy directing or shaping delivery of mandatory BNG, the test will become one of compliance. They will have little opportunity to challenge the applicant's proposals on the basis of value to nature recovery.

F. The LPA must ensure delivery of mandatory BNG. They must do this via planning condition(s) or legal agreement (s.106, conservation covenant). If the BNG is to be delivered on-site and is considered to be "significant", the LPA must bind the land through s.106 agreement securing the establishment and then maintenance of created and/or enhanced habitat for a minimum of 30 years.

G. If the BNG is to be delivered off-site, the LPA must be satisfied that the applicant has entered into the necessary commercial agreement with the habitat provider to ensure their responsibilities have been acceptably adopted by the habitat provider. They must ensure the legal agreement binds the habitat provider and the land on which the habitat provider is reliant to deliver the mandatory BNG.

Risk to nature: the method the LPA chooses must be effective and enforceable. If it is not, nature is the loser.

H. Once the establishment and future management and maintenance of the habitat required to deliver the mandatory BNG have been secured, unless the applicant relies upon a third-party responsible body, the LPA must take on ultimate responsibility for monitoring delivery and enforcing failure to deliver the mandatory BNG. Developers Vistry, state they prefer to deliver their BNG requirement on-site where they have large development sites, but report they are repeatedly having issues with LPAs being reluctant to take on on-site open space management and maintenance. Since there are therefore already major challenges in relation to LPAs refusing to take on the maintenance and management of public open space, it is highly unlikely that LPAs will agree to take on responsibility for BNG management and maintenance.

I. In many cases managing agents may be engaged to take on the on-site BNG liabilities for the 30-year period once developers have left the site, through a mobilisation fee in the same way as public open space is handed over. However, there is significant due diligence risk to managing agents if they haven't fully understood the liabilities. They need to check that all the required work has been done pre-handover and that management fees are sufficient (experience to date suggests that only small sums are being provided for restorative action following any planting failures).

Risk to nature: the LPA is ill equipped to actively monitor progress and, if needed, to enforce against Habitat Management & Maintenance Plans. It is reliant upon either the habitat provider, or a third party to provide insight and information that BNG delivery is failing. It is reliant on the developer for on-site delivery but once the developer vacates the site who takes on the liability, who reports a failure to the LPA and who pays for repair of that failure? There is a high risk that the LPA will lose track of a third-party managing agent over a period of 30 years. The managing agent is highly unlikely to inform a LPA if it changes ownership, transfers BNG responsibilities to another party or goes out of business.

Risk to nature: If the applicant has relied upon a responsible body, who polices the responsible body?

Risk mitigation

One obvious solution would be to equip LPAs effectively to deal with mandatory BNG through planning. This is likely to require a combination of dedicated BNG officers with appropriate ecological education and skills with increased capacity (and appropriate training) in Development Management (validation, planning officer case management skills, monitoring and enforcement). Each LPA is likely to require a number of additional dedicated officers to deliver BNG through planning effectively. On-site provision comprises of a substantial number of very small, fragmented sites (and a small number of large ones in respect of the very largest developments). The administration of on-site BNG is therefore a major task, if done properly, consuming very significant resources and time. By contrast, off-site delivery on large habitat banks that service many developments is administratively simple with information provided to the LPAs by third-party providers and professional ecologists.

Securing optimum benefits for nature from BNG through planning would be further enabled by judicious and strategic local policy approaches that focus investment from mandatory BNG into local nature priorities, as set out by Local Nature Recovery Strategies, although at the time of writing these are still to be created across the country.

Fewer risks for nature are also likely to arise from an approach that enables, and perhaps in many cases prioritises off-site BNG delivery for all but the most 'landed' development sites and / or 'habitat management capable' applicants. Engaging with professional habitat providers and managers will carry fewer risks in terms of skills, resources, continuity of access to land, monitoring and enforcement.

Professionally operated habitat banks that respond to local BNG policy in terms of location, scale, habitat type and biodiversity networks / connectivity are likely to deliver far more valuable outcomes for nature than a series of 'pockets' of isolated new habitat where location, scale and quality is governed by development opportunities, practicalities and viability rather than a targeted and considered approach to achieve biodiversity uplift.

Only the parties who are delivering or enforcing BNG obligations should be party to a s.106 agreement or conservation covenant (between LPA and/or responsible body, and landowner). This may, but will not always, include freehold landowners. Mortgagees should not be required to enter into s.106 agreements or conservation covenants. There is currently confusion and inconsistency on this point with mortgagees' conditions placed on them by mortgage lenders, often delaying or preventing off-site areas to be brought forwards to provide BNG units.

The allocation of biodiversity units does not necessarily need to take place before a biodiversity gain plan is approved but does need to take place before the commencement of development. At present, often a developer prefers to deliver BNG on-site because they have ultimate control within the planning system by doing so rather than relying on an off-site solution.

Where developers do use an off-site solution such as a habitat bank, they should not be required to enter into s.106 agreements or conservation covenants since they are discharging their duty to BNG by purchasing off-site BNG units and have no legal hold over the land. The legal agreement would need to be entered into solely by the land provider with the LPA or responsible body having recourse over that provider should the BNG not be delivered. A clean break for developers through purchasing off-site BNG units enables a transactional approach to BNG, while off-site gains are delivered and managed as large-scale nature restoration projects by specific providers. The discharge of liability for BNG on the part of the developer therefore has significant value, a value that is removed if the developer is expected to sign up to a legal agreement on the off-site land. Further, it makes no sense for a developer to have to enter such an agreement in that multiple developers are likely to buy units from the same habitat bank.

Delivery by a third-party habitat bank provider and operator also facilitates a more streamlined and enforceable monitoring and reporting regime, providing greater clarity to the LPA and removing another liability from, and reducing costs to, the developer.

Where there are legitimate concerns over the long-term ability of a party to deliver the biodiversity gain, alternative protections can be sought, such as performance bonds, or sums held in an escrow account which would survive the bankruptcy, or insolvency of the obliged party. New financial products are being developed now specifically for this purpose, for example "annual evergreen" bonds which ensure management and monitoring budgets are held for the benefit of LPAs and land managers in the long term.

There are many instances where SME developers are rejecting off-site BNG solutions because they are being asked by LPAs to manage and deliver small fragments of habitat (biodiversity units) off-site, which is impractical, unviable and unworkable. Purchasing off-site units from habitat banks alleviates this problem.

Many large infrastructure projects are unable to deliver their BNG on-site because of the masterplan layout, the linear nature of the development (eg. road and rail), operational constraints (such as power plants, ports and airports) and health and safety risks in undertaking the required management. Off-site provision is usually the only effective solution for such projects.

Legal - a summary of the BNG legal regime

The regime is relatively complex due to the need to bolt a brand-new law onto the even more complex planning law regime established under the Town and Country Planning Act 1990. The Environment Act 2021 inserted s.90A and Schedule 7A into the Town and Country Planning Act 1990, but true integration required a host of secondary legislation, policy and guidance, and, inevitably, will also require case law to fill in any remaining gaps. The regime automatically imposes (from 12 February 2024) a mandatory condition on every non-exempt planning permission granted under Part 3 of the Town and Country Planning Act 1990 requiring the provision of at least 10% BNG for at least 30 years (for the condition see paragraph 13(2) of Schedule 7A).

Schedule 7A, paragraph 1(1) of the Town and Country Planning Act 1990 confirms the purpose of the condition is "to secure that the biodiversity gain objective is met." Schedule 7A, paragraph 2(1) then provides the biodiversity gain objective is met if "the biodiversity value attributable to the development exceeds the pre-development biodiversity value of the on-site habitat by at least the relevant percentage". The relevant percentage is 10% (Schedule 7A, paragraph 2(3)).

Thus, in a nutshell, the biodiversity gain objective means development granted planning permission must provide for at least a 10% increase above the pre-development biodiversity value of the on-site habitat. The 10% figure is measured against the cumulative total pre-development on-site habitat biodiversity value (this is all land within the red line plan[8]), irrespective of whether or not that specific habitat will or might be impacted by the development.[9] Because the 10% is a "net" gain, in reality post-development developers have to provide 110% of the pre-development biodiversity value of the site.

In addition to exemptions, there are transitional arrangements which disapply the biodiversity condition from certain planning permissions, as well as special modifications for other planning permissions or where irreplaceable habitat is present on the development site.

As noted above, there are three ways to achieve BNG under the condition in order to satisfy the gain objective. First, generating on-site units (a quantified biodiversity value uplift within the red line boundary of the development site); second, generating off-site units (biodiversity gains created on land outside the red line plan); and thirdly and finally statutory biodiversity credits (buying credits from Natural England as a measure of last resort if on-site or off-site options are not feasible). This is known as the biodiversity gain hierarchy. It is as central to the BNG regime as the biodiversity gain condition and objective: the condition achieves the objective through application of the hierarchy. Article 37A of the Town and Country Planning (Development Management Procedure) (England) Order 2015 gives the definition of the hierarchy, which is, in sum, on-site first, then offsite, then statutory credit as a last resort.

In each case, the statutory metric is used "for measuring, for the purposes of [Schedule 7A], the biodiversity value or relative biodiversity value of habitat or habitat enhancement" (Schedule 7A, paragraph 4(1); see also Schedule 7A, paragraph 3). The statutory metric uses habitat as a proxy measurement for biodiversity value in order to generate numeric biodiversity units in one of three non-interchangeable types of habitat comprising either area of habitat, watercourse, or hedgerow units. The minimum of 10% BNG must be achieved for every one of the three types of habitat; in other words, gains in one type of habitat cannot offset the provision of less than 10% net gain in another form of habitat type.

Enforcement

Failure to comply with the biodiversity gain condition is a breach of planning control. On-site provision of habitat is the first priority (of the hierarchy) of the BNG regime as described at the beginning of this report. LPAs, accordingly, have a crucial enforcement role within the entire BNG regime. However, the extent to which LPAs have the capacity and will to enforce small areas of on-site provision, remains to be seen but, if previous decades of experience of failure to monitor and then enforce mitigation works is anything to go by, the same environmental enforcement gap is likely to appear in relation to on-site BNG.

Remediating failed BNG works can be extremely costly and require specialist expertise, neither of which LPAs have freely available. While it is not uncommon for planning authorities to require security for BNG maintenance obligations where there are legitimate concerns over the long-term ability of a party to deliver the biodiversity gains, there are regular disputes over whether the sums ought to decrease each year as relevant monitoring contributions are paid and actions required by the habitat management and monitoring plan (or similar document) are delivered (and if so, by how much), while also providing security in the event of a catastrophic loss of biodiversity value at the end of the relevant 30-year period requiring remediation which the remaining bond sum would not cover. How are LPAs to recognise and

8 The DEFRA guidance confirms "onsite" means within the red line plan: https://www.gov.uk/guidance/understanding-biodiversity-net-gain. Last accessed 1 September 2024.

9 DEFRA guidance https://www.gov.uk/guidance/understanding-biodiversity-net-gain. Last accessed 1 September 2024.

reflect in the security sum the realisation of benefits as well as the ultimate result? A scheme which fails at year 29 will have delivered 28 years of benefit. At the same time, a catastrophic loss at year 29 for which no restitution is secured means the aim of BNG policy, to measurably improve the nation's biodiversity for present and future generations, has not been achieved.

Another issue is that all enforcement tools granted to LPAs relevant to BNG are discretionary. For this reason, fears over the lack of capacity of overstretched enforcement teams within LPAs have accompanied the development of the BNG regime from its very conception. This lack of capacity means enforcement action is often initiated by complaints from local residents. However, local residents may well be more likely to complain about "messy" BNG scrub and grassland within the development than about that on-site grassland achieving moderate condition instead of good condition by year 25, for example. And this is assuming local residents are even aware of the contents of the biodiversity gain plan: for that to be the case local residents will have to know (1) there is such a thing as a planning permission register and biodiversity gain plan, (2) what the planning permission reference number of their development is, (3) how to navigate the register, which often includes hundreds of documents uploaded in no particular order other than chronologically, (4) locate the BNG plan, (5) understand what that plan says - when it might refer to metric calculations which can perplex even trained ecologists, and (6) interpret whether it is being delivered as required. It is a key task for developers to ensure their home buyers are made aware of and understand the biodiversity gain plan and their role in maintaining BNG on-site. Whilst this ought to be achievable in theory, in practice the position is very different.

Because the on-site BNG plan is secured by condition, the obvious enforcement route for a LPA is a breach of condition notice issued under s.187A of the Town and Country Planning Act 1990. But because habitats may take decades to establish, by the time a breach is apparent the developer is likely to have passed on any ongoing legal liabilities under the BNG regime (eg. to a management company or residents' association). This leads to questions of who is then liable for the breach, and then whether they have the funds and/or expertise to secure compliance with the breach of condition notice. Further, a breach of condition notice must specify the steps which the LPA consider ought to be taken, or the activities which the authority consider ought to cease, to secure compliance with the conditions specified in the notice (s.187A(5)) (R. v East Lothian Council Ex p Scottish Coal Company Ltd [2001] 1 P.L.R. 1 at [12]). This means LPAs could require highly specialist ecological expertise in order to specify the requisite terms of the notice so as to secure compliance with the enforcement regime for breach of condition notices. If the breach of condition notice is not complied with, it is a criminal offence punishable by an unlimited fine (s.187A(9) and s.187A(12)). There is a statutory defence that the recipient of the notice took all reasonable measures to secure compliance with the conditions specified in the notice or was no longer in control of the land (s.187A(11)). Criminal proceedings and a hefty fine will not secure BNG. Section 187A does not grant LPAs step in rights to remedy a breach of condition.

Another option is for LPAs to instead serve an enforcement notice, as they would then have the option under s.178(1) to enter the land, carry out the steps which were not carried out within the period for compliance specified in the enforcement notice, and recover the costs of carrying out those steps from the landowner. There is however a statutory right of appeal, and the risk of an application for costs to be awarded against the LPA if they lose the appeal.

The enforcement position in relation to off-site units, on the other hand, is absolutely clear. Any failure to comply with the terms of that agreement is an obvious breach of the contract and can be enforced in accordance with the terms of that agreement.

There is additional protection for LPAs in the case of a s.106 agreement, because step-in rights are automatically granted to the enforcing LPA by s.106(6)-(7), which provide:

"…if there is a breach of a requirement in a planning obligation to carry out any operations in, on, under or over the land to which the obligation relates, the authority by whom the obligation is enforceable may-

(a) enter the land and carry out the operations; and

(b) recover from the person or persons against whom the obligation is enforceable any expenses reasonably incurred by them in doing so.

(7) Before an authority exercise their power under subsection (6)(a) they shall give not less than twenty-one days' notice of their intention to do so to any person against whom the planning obligation is enforceable."

It can be seen that the LPA's expenses are recoverable from those against whom the planning obligation is enforceable, which, in the case of a s.106 agreement, means not only the current owner but also the original covenantor and all intervening owners, unless the obligation exempts liability once the owner has disposed of their interest.

There is no statutory right of appeal when a s.106 agreement is breached, rather, the standard approach is for the matter to go to arbitration, a much quicker and cheaper route than litigation.

Conservation covenants are subject to an extremely flexible, yet clear regime set out in the Environment Act 2021, and are likely to be the legal agreement of choice for parties providing off-site units where there is an available and willing responsible body.

However, under the regime as it presently stands enforcement of the terms of a s.106 agreement or conservation covenant will not be an option in the vast majority of BNG failure cases due to the on-site-first priority (noting that where on-site BNG provision is "significant" that does have to be secured by way of condition, s.106 agreement, or conservation covenant under Schedule 7A, paragraph 9(3) of the Town and Country Planning Act 1990, providing some additional enforcement teeth for on-site BNG).

In short, whilst government has so far designed BNG with a preference for on-site BNG delivery, there are significant issues with respect to enforcement. The powers of LPAs to enforce off-site BNG delivery are much more legally straightforward and hence more robust, thereby offering lower risk of challenge to LPAs than on-site provision.

Developer perspective

The introduction of mandatory BNG for major developments from February 2024 presents a range of commercial, practical and delivery challenges for the residential development sector. Despite this, the sector has embraced the arrival of BNG in a broadly positive light, recognising the wider environmental and societal benefits it promises.

From a planning perspective, the supporting BNG statutory framework provides a long overdue assessment 'leveller', which speaks the language of both developer and ecologist, meaning outcomes for biodiversity, in theory at least, are more transparent, palatable and defensible.

Residential development is already an extremely complex process and therefore a key measure of the success of BNG will be its ability to fully integrate into the development process without creating

significant constraint and disquiet. Any measure for success will therefore be vested in the ability of BNG to deliver upon its key aims in a manner which is legally compliant, demonstrable to planning authorities and that is understood and accepted by its long-term custodians – the homeowner. Much of the debate around on-site vs off-site solutions has derived from considering only residential development as stated above. Commercial developments (office, retail, warehousing, distribution centres etc.) do not have the on-site space to accommodate BNG and so off-site solutions are critical for them.

Positive intent and a robust structure are important to the lasting legacy of BNG. However, in the shorter term it is essential that BNG quickly settles into the rhythm of the existing development structure. The initiation of any new housing development is a significant financial investment for the residential developer. BNG must therefore integrate with rather than disrupt this process. If prohibitive costs, delivery practicality and a lack of understanding start to derail the development process, then the future of BNG will quickly be called into question.

The 'Green-Thread'

The nature of development is changing. BNG is the most recent of a suite of environmental, infrastructure and societal delivery requirements placed upon the residential development sector. Achieving a minimum 10% gain on-site is an ambitious target for many developers. It's therefore imperative that the BNG delivery solution, and most critically the associated costs, are identified at an early stage. Ensuring that biodiversity sits at the top of the priority list is a mindset shift for many in the industry, but an essential step in ensuring the development can proceed in a compliant manner.

This increasing complexity and its associated cost places an onus on the residential development sector to have regard for the 'Green-Thread'. This critical thread runs throughout the development process as a point of reference and consistency from the initial site searching and contractual phase, through design, planning, construction and ultimately to the long-term management of the site and creation of a new community. Development must ultimately deliver for both nature and people though the sector does need to further recognise the ultimate existential threat posed by biodiversity loss and to do its part to address the issue.

For many sites physical constraints, such as slope, flood zones, or overhead obstructions mean that a development can only proceed in one particular direction. The recognition of such constraints and the ability to frontload delivery can therefore be challenging and have adverse impacts on scheme viability. It is vital therefore that in addressing such restrictions, master planners always retain reference to BNG and its requirements. Review of opportunities and constraints at an early stage will identify areas best suited for development and areas which should be allocated for habitat retention, protection and enhancement. On small development sites this is almost always impossible, however.

BNG imposes a level of importance linked to biodiversity never before seen by the development sector. Being a requirement derived from statute, it is impossible for the developer to overlook their need to deliver. Despite this, BNG delivery must still be in balance with other key deliverables such as highways, drainage and wider community benefits delivered via a s.106 legal agreement or Community Infrastructure Levy (CIL).

The strict adherence to the Green-Thread and awareness of its significance is therefore critical.

Securing land and site delivery

The process of securing land for development is complex. Space is extremely competitive with developers

all competing for an ever-reducing resource, while navigating an ever-increasing range of challenges such as green belt restrictions, local authority allocation parameters and the aforementioned environmental restrictions.

It is often overlooked that the core business of any housing developer is the sale rather than construction of new homes. This core aim brings significant commercial pressure to realise the greatest return on the investment made in land, by delivering the greatest number of houses. Equally vendors, those selling the land, are generally driven by a desire to realise the best financial return from their land, which in broad terms also equates to the number of houses delivered.

The ultimate number of plots delivered is a complex contractual position usually driven by local plan allocation limitations, and many factors – practical, commercial, contractual, community and physical constraints (eg. flood zones and buried services to name two) – dictate how many houses can ultimately be built. Space therefore within a development for purposes other than housing is at a premium. The delivery of BNG on-site places even greater pressure on this already challenging balance. There are examples in which housebuilders are screening sites before purchase, rejecting those that won't support on-site delivery perhaps because they see risk in pursuing off-site solutions because of the preference by the LPAs for on-site provision. Removal of the presumption in favour of on-site BNG first would enable developers to consider a wider range of sites and thereby increase the rate of house building.

For land to be progressed for housing, the developer must be able to exercise contractual control over the land. The purchase of land is a significant financial investment, and therefore this process is often made more palatable by dividing the sale of the land into a number of separate 'options' to be drawn down and delivered over several phases. In the absence of such an approach a key marker of profitability such as the Return On Capital Employed (ROCE) (see below) would render many developments unviable due to the lag between investment and return. The delivery of BNG represents a significant additional cost, therefore, to ensure this is not prohibitive it is essential that BNG to also delivered in this phased manner.

Return on Capital Employed (ROCE)

The development ROCE, in simple terms, is key to how attractive will be the decision to invest in land to develop. It is in essence a measure of investment efficiency, and broadly speaking, the higher the percentage ROCE the better the overall profit margin.

The ability of a developer to manage the ROCE through the course of a development is critical. Many infrastructure costs, such as the creation of main access roads and drainage infrastructure will need to be in place before house building can commence, and this therefore means before any incomes from house sales. Development costs therefore need to be balanced to ensure the site performs well financially. This includes the delivery of BNG, which can represent a significant cost to development in some cases.

The delivery of BNG in phased-development scenarios

Residential development sites are often built in distinct phases. This approach provides a range of significant commercial advantages, allowing the developer to keep a much tighter control on factors such as commercial risk, expenditure and capital outlay, sales rates and market forces and a wide range of planning constraints.

Phased developments will often benefit from an Outline Planning Permission (OPP) secured in principle with the LPA. Multiple Reserved Matters (RMs) applications will then be submitted by a developer to provide vital pre-commencement details (and comfort) to the LPA on matters such as site design,

landscaping, phase composition and more recently BNG.

Securing consent to permit development is a technically challenging and costly process. The decision to commence development carries with it a significant financial risk to the developer; a risk which relies on the sale of homes before a return on investment can be realised.

BNG represents a potential imbalance with what is now a well-established approach to delivering residential housing. To resist this, the delivery of BNG must work with rather than against this approach to challenge any destabilising effect while still delivering the statutory requirements.

On-site BNG delivery can involve significant capital works and its associated costs. The BNG statutory framework dictates that the BNG 30-year delivery period does not start until the end of the development phase. This means in practice that for larger multi-phase developments the significant habitats within a development may need to be created and then managed for far longer than the minimum 30 years. This cost, in the absence of plot sales, has to be borne by the developer, disincentivising the early creation of BNG habitats. Hence on-site BNG results in a significant time gap between loss of habitat/biodiversity and provision of biodiversity within the site, even where it can be provided; as stated previously, for most smaller sites BNG cannot be sited within the development site boundary.

The BNG statutory framework rewards developers for the retention of existing habitats. However, in reality the process of house building will impact an area far greater than the housing plots, and therefore provision for site compounds, material storage and work force welfare facilities must all be accommodated and weighed against the benefits of retention within the metric assessment.

Location of and phased delivery of open space

Green space, or the areas now used to deliver the majority of the on-site BNG, is usually strategically located to balance the overall project objectives, such as community needs, s.106 obligations, site constraints, ecological restrictions, connectivity to existing habitats, wildlife licences and cash flow. This provision is generally delivered on a phased basis, paired with adjacent housing development. This ensures that residents in each phase have the ability to access greenspace. The delivery of this green space is often considered in s.106 agreements with triggers placed on delivery, linked to number of housing completions / occupations and the income delivered from service charges. This approach is tried and tested over many years.

For on-site BNG integration to be a success there are a number of critical commercial considerations which must be addressed.

The Defra BNG metric incentivises frontloading should developers be able to and wish to use it. It should not however penalise developers if gains cannot all be delivered in early phases or indeed if the best solution for biodiversity lies in a hybrid of both on-site and off-site delivery.

Practical constraints

The creation, delivery and long-term management of BNG will present a range of new practical challenges, the solutions to which will take time to refine and embed. BNG pushes developers (large residential only) towards creating more diverse, better managed and more locally appropriate habitat types.

Any approach to habitat creation comes with seasonal constraints and a need to be created at certain times of the year (e.g. woodland created during the winter, grassland during spring/autumn) with reliance

on appropriate weather conditions and supply of both suitable nursery stock and labour. There is likely to be a significant shortage of both stock and labour if all major schemes in the country seek to deliver the bulk of BNG mitigation wholly on-site. This is especially true in light of the current government's stated aims of delivering 1.5 million new homes within the current parliament.

It is also critical to be realistic about what can be achieved by those tasked with managing on-site land for the required 30 years. The reality for BNG delivery will be that once a development is complete, the responsibility to deliver the BNG management will be passed from the residential developer to the site's incumbent Resident Management Company (RMC). The RMC is an entity specific to the development and comprises a committee populated by residents, representatives from the developer and other groups critical to the maintenance of the site and its community. The RMC is charged with a range of critical tasks to ensure the upkeep and maintenance of the new housing development, tasks which are funded by the yearly service charge levied upon each new household. These tasks include the management and upkeep of the landscaping (the space which delivers the majority of the BNG on-site provision). This structure is well established and accepted. It does however represent a limiting factor in terms of quality and complexity, with RMC personnel largely not having the appropriate skills set.

In most cases habitats will have to be managed for the RMC by managing agents. These are more specialised contractors who are tasked with the day-to-day maintenance of the site. While the managing agents are all competent and able to deliver basic habitat management and maintenance, they are generally less experienced in creating and maintaining more complex, specific and species rich habitats, the basis of which formed the agreement to provide planning permission. Although the industry is at the beginning of a journey to improve and develop its skillset in this area, it will take time. As such, off-site habitats designed and maintained by professional conservation management specialists are likely to provide more sustainable positive outcomes for biodiversity.

The community conflict

By its nature, BNG is a highly prescriptive process. For a habitat to achieve its target condition it must meet demonstrable standards set out in the BNG statutory framework. Such a strict and prescriptive process will often be at odds with the design, function, and management of a residential development.

Highly ambitious conservation targets for most development sites cannot readily be achieved in balance with the needs of the community to be provided with recreational spaces. Recreational spaces must be available to the community year-round, for formal and informal use and which do not detract from the visual appeal and acceptability of the space to the residents. These aims are seldom compatible with the higher distinctiveness habitats encouraged by the BNG process. In other words, biodiversity can tend to be 'messy' whereas homeowners want tidiness.

This issue is most pronounced on smaller sites (eg <25ha) where the need to provide recreational space must be balanced against contractual and commercial pressures, local policy drivers and the costs associated with management for the 30-year period. Therefore, to make effective space for biodiversity, which delivers genuine improvement, a hybrid of on-site and off-site delivery must be considered with distinct preference for the latter with development sites below 25ha.

Selling the BNG dream

Perhaps the most overlooked, but critically important group within the residential BNG context are residential homeowners. They will not only need to accept and bear the increased costs of delivery (albeit that initial assessments indicate that any increase in yearly service charge cost to deliver BNG on-site is

relatively small) but also accept that the development may look different to their expectations and there is no mechanism to change this as BNG is a mandatory legal requirement.

To view BNG in a truly holistic light, one must also address an uncomfortable truth that a willingness to engage with and accept change on behalf of the natural world is not universal. While it is reasonable to suggest that a significant proportion of new residents will accept the aims of BNG, there are others unwilling to do so. Developers have a key role to play in the education of customers regarding the importance of BNG delivery, but there are those who will always seek a very managed environment with little room for or tolerance of the less obviously managed habitats that provide the most for biodiversity.

Despite this, anecdotally, housing plots overlooking green space are often among the first to be reserved by prospective buyers, with customers often willing to pay a modest premium to ensure their outlook is green and 'natural'. As BNG evolves the degree to which customers will pay to be closer to more natural greenspace will become clearer. However, for such a value to be truly realised a shift will also be required on behalf of mortgage lenders who do not routinely assign any value to such a factor and therefore will not lend more to a prospective home buyer to facilitate a green outlook.

For communities to truly co-exist with a more naturally rich environment there is a critical need for society as a whole to review the way it interacts with biodiversity. Developers should not be expected to deliver this change in isolation. However, through their duty to deliver BNG they have the opportunity to engage with customers and provide information to help address change in three critical ways:

- To create awareness and broad acceptance with customers, and to support their ability to access further information should they require.

- To provide reassurance and trust that the BNG being delivered both on-site and off-site in their name is being delivered by those with a clear purpose and the necessary expertise.

- To engender a sense of relevance, and the ability to identify their role within its delivery.

It is considered critical that for an off-site BNG option to be accepted, this must include the views of homeowners. This includes transparency on where off-site units are being delivered and by whom.

In summary, BNG delivery is complex for residential developments, but more straightforward for commercial developers who don't have the space and capacity to deliver BNG on-site. Much of the current bias towards on-site provision is framed by perceptions of:

a. greater control

b. political risk (risk of local members/councillors being upset that BNG isn't being delivered more locally and so being turned off schemes that they might otherwise support)

c. lower cost (full cost analyses would need to include price paid for the land and profit foregone)

d. on-site BNG doesn't require any financial investment by them until planning is granted

e. the cost of on-site BNG can be treated as a deduct from the price paid for the land (but so can off-site BNG costs)

f. limited or no formal enforcement by the LPA hence no comeback if not delivered

g. longevity risk - handover of financial and management liabilities once they have left the site

h. mitigation hierarchy risk (more hurdles to jump through to demonstrate to LPA and councillors that off-site BNG is appropriate)

i. planning risk (risk of breaching local/emerging BNG policy)

j. development density often being determined by local design guidance restricting flexibility.

Since cost and margins are the ultimate factors considered by developers, a more thorough analysis of the comparative costs of delivery is required, the focus of the next section.

Comparative costs of BNG delivery

Evidence suggests that developers are choosing to deliver as much of the BNG requirement as possible via the on-site solution but one of the key deciding factors relates to the perception of it being cheaper, and developers are likely to take the least cost option and path of least resistance. However, there have been no rigorous analyses of the residential sector to determine the actual costs of on-site delivery. The analysis below attempts to rectify that position.

Clearly, there are a number of approaches that developers can deploy to demonstrate adherence to the BNG compliance mandate whilst minimising costs, the two main ones being to forego the true cost of the use of the development land for BNG and to forego profit from the houses that are prevented from being built as a result of needing space for BNG. A further mechanism is to co-locate BNG with provision of greenspace for amenity access; however, the use of sites for recreational purposes removes the majority of any potential biodiversity uplift that might be claimed by the development application.

Costs of off-site BNG relative to gross development value

Using data from requests to Environment Bank for BNG units (ie these are requests for the off-site component of BNG delivery where, in addition, an undisclosed amount of BNG will be placed on-site) spanning the period June 2020 – September 2024 it is possible to evidence the extant costs of off-site BNG to a range of residential developments (Table 2). These analyses are based on 265 residential development site requests over the period ie. both prior to and immediately after the mandatory regime becoming effective in February 2024. These are requests for off-site provision and ignore the costs of any on-site delivery proposed by the development.

Figure 5 presents the relationship between size of residential development (gross area in hectares) and the costs of off-site BNG as a percentage of gross development value from the 265 enquiries received. At present, the majority of development sites are relatively small. The larger more strategic sites will always be fewer, and they can also absorb some of the BNG requirement within the development site because they cover a larger area. It is understood that developers need to seek a balance between adhering to

the mitigation hierarchy (that requires compensation to be delivered as close to where the impact has occurred as possible) and being cognisant of project viability and the need to maximise developable area (for which development land prices have been paid). Having the option of off-site provision provides a safety net or pressure valve to facilitate the development and also provides the best gains for nature as described in a previous section of this report. Ultimately it is the developer who will decide how to structure where to deliver BNG ie on-site vs off-site, at the same time as demonstrating adherence to the mitigation hierarchy and presenting that information to the LPA within the biodiversity gain plan that must be submitted to discharge their BNG related pre-commencement conditions following planning permission.

The key point from this analysis is that off-site BNG costs, on average, are only 0.68% of gross development value. This figure will vary depending on how much is placed on-site versus off-site as detailed cost modelling will show.

As a further example, Greater Manchester recently had a housing allocation of 55,000 homes to be built over a given five-year period. Table 3 illustrates relative costs of BNG based on predicted demand for BNG Credits.

Table 2. *Relative costs of BNG delivery for residential development, determined via actual enquiries to Environment Bank between June 2020 – September 2024.*

Number of requests/enquiries for BNG unit purchase	265
Average size of development (ha)	2.78ha range 0.02ha – 81.3ha
Average number of housing units @ 48/ha	133
Average house price in England used to calculate gross development value (GDV)	£296,000
Average GDV per site	£38.7m range £0.03m - £1.13bn
Average BNG price per site	£159,216 range £225 - £3.01m
Average BNG price as % of GDV	0.68% range 0.002% - 40.8%

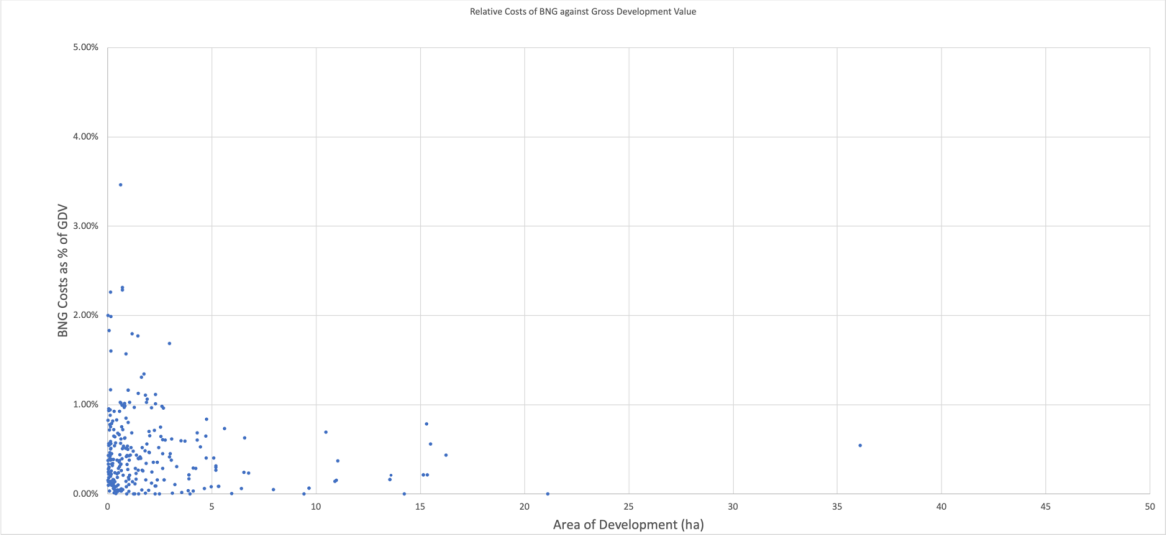

Figure 5. *Relationship between the size of residential development and BNG cost as a % of gross development value. Two outliers removed.*

Table 3. *Relative BNG costs for a recent Greater Manchester 5-year housing allocation based on predicted demand (pre-BNG implementation analysis).*

Parameter		Note
Housing demand	55,000	5 years
Housing density	48	Per ha[10]
Net developable area	80%	
Area of land-take	1,432ha	
Mean no. BNG units per ha	3.57	Based on land cover statistics and Defra 3.1 metric
BNG units/ha with 10% gain	3.93	
Potential BNG requirement	5,637	BNG units
Average house price England	£296,000	Rightmove October 2022
Gross development value (GDV)	£16.3bn	
BNG Credit price (mean)	£19.5k	Lower than the £27k used in the modelling below as relates to a period before market pricing was determined
Total cost of BNG Credits	£110m	Over 5 years

10 A good background paper to housing density is provided by Havant Borough Council (January 2019) Residential Density Evidence Paper in respect of the Havant Borough Local Plan 2036. Densities of 40 dwellings per hectare to 70 dph are stated. For the purposes of the above analyses we used a mean density of 48dph though this is greater than the cost model scenarios where 35 dph was used.

Parameter		Note
BNG costs as % of GDV	0.68%	
BNG costs if 40% delivered onsite	£66m	Assumes no impact on net developable area
BNG costs as % of GDV (40% delivered onsite)	0.41%	

Off-site BNG costs are therefore a small percentage of average gross development values, with ranges of 0.41% – 0.68% of GDV. As developers gain understanding of the means of delivery and the costs thereof, they should factor that into the residual land values ie. the amount paid for development land, so ultimately, it will be the windfall landowner selling land for development that is most likely to pay for the BNG. However, even if the developer ultimately pays, BNG costs are well within the typical margins of variation that are allowed in overall development costs.

There have been some claims that uncertainty over BNG costs is preventing land being brought forward for development. Given the fact that off-site BNG costs are less than 1% of GDV, it seems unlikely to be the case that BNG costs are impacting on development and therefore creating a barrier to house building targets. However, if the full cost of on-site delivery were properly calculated and visible, BNG costs can be significant, as we shall show later.

Developers currently favour on-site delivery as described earlier because they then remain in control in the event that they cannot find off-site solutions and because that is the expectation of the LPA who permit the development scheme. However, until now the specific costs of 'sacrificing' land to on-site BNG appear not to have been calculated or made visible. Doing so is likely to materially change the preference for on-site provision when compared to an off-site solution. Being able to source an off-site solution is a material benefit for small developments, especially those that currently receive an exemption on the basis of development size, were those exemptions overturned in the future by a change in policy.

Comparing total on-site and off-site costs

Given the poor performance of on-site BNG to biodiversity and communities, the lack of accountability on the part of the developer, poor governance and lack of effective long-term financial security and the inherent lack of enforcement capacity by the LPA or national government, as explained above, does on-site BNG provide significantly more favourable cost implications for developers ie. does on-site BNG cost significantly less to deliver than off-site BNG? To test this point, the panel developed a detailed costing model, comparing delivery costs of on-site BNG with the purchase of off-site BNG units provided by third parties.

Parameters used in the model are described in Table 4.

Table 4. *Parameters used in the comparison of cost of delivering BNG on-site vs off-site.*

Parameter	Value
Area of development site (ha)	100
% public open space (POS)	30%

Parameter	Value
Net developable area after POS and infrastructure (ha)	70
House unit density / ha (applies only to developable area)	35
Number of houses	2,450
Assumed average house price (based on Bellway new build)	£310,000 (compared with average of all house types of £296,000 from Rightmove)
Gross revenue for the site	£ No. houses x average price
Developer profitability applied	20%
Net profit for site	£ Gross revenue x profitability
Residential land value £/ha	£2,687,000
Biodiversity unit loss for the development (average / ha)	2.5
Biodiversity unit loss for the development	Average per ha x area
% BNG uplift required by government	10%
BNG units required	10% added to the biodiversity unit loss
Cost / BNG unit (to establish & manage over 30 years), based on delivery evidence	£13,000
% of BNG delivered onsite	10%
Type of BNG habitat	Neutral grassland
BNG units generated / ha	5.5
Area of BNG habitat required (ha)	Units required / units generated per ha
Number of BNG units provided on-site	Units required x % on-site
Area of the development site used to accommodate the BNG requirement (ha)	Units provided on-site x units generated per ha
% of the development site used to accommodate the BNG requirement	Area used to accommodate BNG on-site / area of development
Lost revenue from house sales due to on-site BNG	No. houses 'removed' to accommodate BNG x average house price
Lost profit from house sales due to on-site BNG	Lost revenue x profitability
Cost of land bought which is used for on-site BNG	Area of land used to accommodate BNG on-site x residential land value[11]

11 In reality, more complex as many factors influence non-developable area eg. flood zones, overhead obstructions etc., making the 30% public open space as BNG-friendly as possible.

Parameter	Value
Total cost to establish and manage	Area of land used for BNG on-site x no. units generated x cost of creating and managing one BNG unit for 30 years[12]
Cost of locating BNG onsite	Cost of land + cost of profit lost + creation and management costs
- cost of locating BNG on-site (£ / BNG unit)	Total cost of locating BNG on-site / no. BNG units provided on-site
Number of BNG units provided off-site	90% of total BNG units re-quired
Sale price to developer of BNG unit (£ / unit)	£27,000
Area needed off-site for the BNG requirement (ha)	No. BNG units provided off-site / BNG units generated per ha
Total cost to buy off-site BNG requirement	No. BNG units provided off-site x average price
Total cost of BNG required	Cost of providing on-site + off-site BNG
- as % of gross revenue for the site	Total cost / gross revenue
- as % of net profit for the site	Total cost / net profit

This comparison is made solely for residential development as that is where most of the on-site/off-site debate has occurred. Most other developments such as commercial/logistics and other large infrastructure, as stated previously, do not normally have the space to incorporate biodiversity and hence most of these types of developments are likely to have to use third party off-site BNG providers.

Further, the above model is essentially concerned with the larger developments – in this example, a site of 100ha is used. SME developments are unable to place anything other than a token amount of BNG on-site because it impacts on net developable area and hence viability. Before running the model, it is important to evidence the costs of off-site BNG in relation to gross development value (gross revenue) since large developments appear only to apply for off-site BNG once they have exhausted on-site delivery, largely because planning policy favours that approach. In doing so, there is a significant likelihood of misrepresenting the economics of the development as well as the value to biodiversity, as we shall identify below.

The current off-site costs of c.0.6% of gross development value (revenue) described above don't include the actual costs of delivering BNG within the development site boundary. As explained, the majority of BNG appears to be being delivered on-site in preference to off-site yet there is a lack of clarity around how developments are managing to site up to 90% of the BNG requirement within the development given site constraints.

For the purposes of the cost modelling exercise a suite of parameters were included in order to test five scenarios (see Table 4 for description of the model parameters and which relate to the scenarios tested). Four key parameters were altered in the model:

12 Only significant on-site habitat has to be secured by condition or legal agreement for 30 years. Most on-site habitat is not significant so costs are likely to be lower than stated here.

a. Baseline biodiversity unit value of pre-developed site – usually highly impacted arable or grassland farmed sites with relatively poor biodiversity compared to a model average parcel of land based on land cover statistics;

b. Average house price;

c. BNG uplift % determined by the LPA;

d. Inclusion and exclusion of the cost of land purchased at residential development land prices. It is more appropriate to include the cost of this land whereas it is evident that many developers 'lose' this cost when siting BNG. Other delivery models include developers purchasing land specifically for BNG adjacent to the development or buying more land than is needed for the development. However, this gives a false account of the true cost of BNG delivery on-site – a factor we have attempted to address by including land costs in the model.

The model assumes just 10% of the BNG requirement is placed on-site.

Table 5 shows the cost comparison results for the five scenarios. The model suggests that even if only 10% of the overall BNG requirement is delivered on-site, the costs of BNG delivery range from £24m - £35m, to which needs to be added the remaining 90% being delivered off-site at a cost of around £6m - £10m. This represents a cost of between 4% and 6% of the gross revenue of the development, and between 20% and 30% of net profit. The cost of delivering one BNG unit if on-site, taking into account the potentially 'hidden' costs (ie the loss of housing units and hence loss of profit, in addition to the development land price paid for the land) is £896,000 compared to the purchase of one BNG unit off-site from a third-party provider of £27,000.

Even if the cost of land on which the on-site BNG is placed is ignored (ie. netted off at zero) and loss of profit of only 5% is applied to the houses that would have occupied the BNG area, the total cost of on-site delivery is £3.1m or £9.8m once the remaining 90% has been delivered by purchasing off-site BNG units. This represents 1.32% of gross development value and 6.4% of net profit. This compares to £7.4m if all the BNG is placed off-site, representing 1% of gross development value and 4.9% of net profit.

Table 6 summarises the outputs of 10% on-site BNG provision based on a 10% and 25% requirement by the LPAs and compares those figures with the case in which 100% of the BNG required for the development to proceed being placed off-site by the purchase of BNG units from a third-party provider. Total costs of BNG delivery are £13m - £35m if 10% of BNG is placed on-site compared to £7.4m where all the BNG is delivered off-site. This equates to 4% - 5% of gross development value, compared to only 1% when all the BNG is delivered off-site (which is broadly comparable to the 0.6% value stated from an analysis of enquiries to Environment Bank for off-site units).

Putting this into the context of what it means for the individual average house price, delivering 10% or 25% BNG uplift with 10% of the total BNG requirement on-site, adds a cost of c. £12,000 - £15,000 (or £400-£500 per year) onto each house, compared to £3,000 (or £100 per year) when all the BNG requirement is delivered off-site.

Table 5. *Cost comparisons for delivering on-site BNG based on 5 scenarios*

Parameter	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Area of development (ha)	100[13]	100	100	100	100
Public open space (ha)	30%	30%	30%	30%	30%
House density (n/ha)	35	35	35	35	35
No. houses	2450	2450	2450	2450	2450
Average house price (£)	£310,000	£310,000	£310,000	£310,000	£413,000
Profitability	20%	20%	20%	20%	20%
Loss of biod. units to development/ha	3.58	2.5	2.5	2.5	3.0
Biodiversity loss for site (units)	357.8	250	250	250	300
BNG uplift rate	10%	10%	25%	10%	25%
BNG units generated/ha	5.5	5.5	5.5	5.5	5.5
Area site used for BNG (ha)	7.2	5.0	5.7	5.0	6.8
Loss of profit from house sales by on-site	£15.53m	£10.9m	£12.3m	£10.9m	£14.8m
Total cost BNG inc. land price	£35.3m	£24.6m	£28.0m	£11.2m	£33.6m
Cost of on-site BNG per unit	£896,000	£896,000	£896,000	£407,545	£896,000
Total cost to buy off-site units	£9.6m	£6.7m	£7.6m	£6.7m	£9.1m
Total cost of delivering BNG	£44.8m	£31.3m	£35.6m	£17.9m	£42.7m
As % of gross revenue for site	5.9%	4.1%	4.7%	2.4%	5.6%

13 It was decided to run the model for the large residential scenario of a 100ha site. Small sites could also be modelled.

Parameter	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
As % of net profit for site	29.5%	20.6%	23.4%	11.8%	28.1%

Scenarios:

1. Biodiversity units for baseline land based on application of metric to land cover statistics 'average' 100ha of land in England; 10% BNG uplift; average house price (£310,000) based on Bellway figures for their new builds.

2. As scenario 1 but with baseline biodiversity units reduced to 2.5.

3. As scenario 2 but with BNG uplift applied increased to 25% by LPA.

4. The minimum base case. As scenario 2 but with cost of land used for BNG netted at zero.

5. The maximum base case. As scenario 2 but with BNG baseline units set at 3.0, 25% BNG uplift requirement, cost of land used for BNG included, average house price for new builds in the UK used (£413,000) rather than the Bellway specific figure.

Table 6. *Key parameter comparisons for two on-site delivery scenarios (as per scenarios 2 and 3 in Table 5) and where 100% of BNG is delivered off-site.*

Parameter	10% On-site		100% off-site
	10% BNG uplift	25% BNG uplift	10% BNG uplift
Cost of BNG on-site inc. redundant costs of development land purchased	£24.6m	£28.0m	£0
Cost/BNG unit	£896,000	£896,000	£0
Cost of off-site purchase	£6.7m	£7.6m	£7.4m
Total cost of BNG delivery (on-site + off-site)	£31.3m	£35.6m	£7.4m
Cost as % of gross development value/revenue	4.1%	4.7%	1.0%
Total cost of BNG required per house	£12,786	£14,529	£3,031

The costs of delivering just 10% of the total BNG requirement, when properly determined through inclusion of land cost at development land prices and the loss of profit from the reduced number of dwellings that might otherwise have been built on that land, are substantial at about 4x the cost of delivering all of the BNG requirement off-site. Most developers might expect to deduct BNG costs from

the price paid for the whole land parcel (as per a number of other delivery costs) and so these overall cost predictions are maxima. The key to how a developer attributes the BNG delivery between on-site and off-site solutions is directly a product of whether or not the land cost and loss of profit are fully acknowledged.

Comparison of factors contributing to successful BNG outcomes

The following comparison (Table 7) is based on the range of attributes and specific themes outlined in this report covering ecological principles of successful biodiversity conservation/nature restoration, potential relative contribution to the Global Biodiversity Framework and objectives of the Convention on Biodiversity[14], type of development, governance including developer, landowner and LPA liabilities, financial security, relative costs and commerciality, ease of delivery in the planning system, legal aspects, planning aspects, development benefits and constraints, and social and community value.

Table 7. *Comparative summary analysis of on-site vs off-site BNG delivery measured against key criteria explored in the report. Each attribute is scored 1-5 (1 being limited value, 5 being greatest value).*

Criterion	On-site BNG	Off-site BNG
Ecological principles for maximising biodiversity value and wider contribution to nature restoration		
Habitat area, extent of ecosystem	Small <0.5ha (1)	Bespoke sites small but those serving multiple developments in an area can be large, typically 20ha -100ha (5)
Fragmentation and fragment size	Fragmented, unconnected to wider landscape (1)	Fragmentation should not be an issue. Can be located so as to abut areas of existing biodiversity value to deliver enhanced gains (4)
Ecotones/messy edge	None. Usually next to hard standing (0)	Opportunities for designing in ecotones – rich boundaries between adjacent habitat types (4)
Disturbance	High (1)	Can be low – access can be spatially arranged to minimise disturbance. Disturbance greater where public access is allowed. (4)

14 The objectives of the Global Biodiversity Framework and Convention on Biodiversity, underpin the intentions of nature restoration towards which the BNG mandate is expected to deliver and so provide useful context for framing the potential contribution of on-site and off-site BNG.

Criterion	On-site BNG	Off-site BNG
Timescales	Short but initial 'value' degraded through transition to preferred amenity areas (3)	Opportunity to plan long-term with secure funding, enables higher successional stage habitats to be created under long-term management arrangement (4)
Global Biodiversity Framework and Convention on Biodiversity themes		
Improving species status	None – too small and disturbed (0)	Opportunities to present higher distinctiveness because of greater size (3)
Increasing nature-friendly farming, forestry and fisheries	None – cannot be farmed (0)	Can support nature-friendly farming in the vicinity eg juxtaposed next to regenerative agricultural system; traditional habitat types (4)
Expanding and managing protected areas	None (0)	If sited within protected landscapes (eg National Parks) can contribute to objective if done at large size (3)
Increasing ecosystem restoration	Limited apart from comprising a sustainable urban drainage system (1)	Significant opportunities for largest of sites such as habitat banks (5)
Type of development		
Residential	Some potential value over other types of development but almost entirely for landscaping and planting benefits not biodiversity (3)	Better for biodiversity, rural community revenue streams, climate resilience if done at scale by house builders buying into off-site projects. (4)
Commercial/logistics	Limited because no material space (1)	Better for biodiversity, rural community revenue streams, climate resilience if done at scale by commercial developers buying into off-site projects (5)
Retail	Limited because no material space (1)	Better for biodiversity, rural community revenue streams, climate resilience if done at scale by retail developers buying into off-site projects (5)

Criterion	On-site BNG	Off-site BNG
Solar/wind	Limited value to biodiversity and communities because of access issues. Any unused larger areas within the development foot-print could be rewilded etc. (3)	Better for biodiversity, rural community revenue streams, climate resilience if done at scale by solar/ renewables developers buying into off-site projects (5)
Linear infrastructure	Limited space within the footprint and significant management issues because of health and safety (2)	Better for biodiversity, rural community revenue streams, climate resilience if done at scale by linear infrastructure developers buying into off-site projects (5)
Large infrastructure – ports, airports, energy plants	Whilst large sites have more space that could be utilised for BNG, there are no community benefits because of access issues. Airports and some ports have safeguarded zones to prevent habitation by species that could cause major health and safety risks (eg bird collision risk at airports) (2)	Better for biodiversity, rural community revenue streams, climate resilience if done at scale by large infrastructure developers buying into off-site projects (5)
Governance		
Monitoring and reporting	Rare to have monitoring and reporting since lim-ited to no enforcement from LPAs and no requirement in BNG guidance (1)	Provided by site developer as part of delivery – regular monitoring and reporting on actions provided as a requirement through BNG guidelines (4)
Expertise deployed	None once developer leaves the site; management co./residents associations do not contract in the skills required (0)	Likely to involve profes-sional oversight from ecologist; landholder may undertake themselves with potential for variable outcomes (3)
Developer liabilities	None once site vacated. Long-term liabilities handed to management company or residents associated with very limited evidence of success; nor do such bodies understand their liabilities and since no enforcement there is no incentive to maintain the BNG habitat (0)	Liabilities accepted by habitat bank/off-site BNG provider, for full 30 year term (5)

Criterion	On-site BNG	Off-site BNG
LPA liabilities	None because no enforcement though open to legal challenge if they are not discharging their legal duties under the Environment Act (0)	Only applies to habitat banks or off-site BNG where provided by the LPA. But LPA has no liabilities in relation to main off-site providers. However, easier for LPAs to discharge their legal duties where BNG delivered off-site by third party (4)
Financial security		
	Only exists if developer places full 30-year creation, management, monitoring and reporting funding into independent Escrow account or similar. Funds can be provided to management company (eg. via charges on residents) but no long-term contractual arrangement hence high likelihood of failure (1)	Guidelines require proof of 30-years of creation, management, monitoring and reporting funding being made available at start of habitat bank/off-site area. Required for inclusion on gain site register (4)
Relative costs and commerciality		
	Developers consider that delivery on-site may be preferable for cost reasons though details are opaque as land price and profit loss not included in developers' analysis. However, doesn't account for impact on net developable area. Attempts to pass on on-site BNG costs to landowner often not accepted or landowners inflating land price to accommodate BNG charges (2)	Most cost-effective option for all but very large residential sites where developer attempts to conflate public open space provision with biodiversity value – a position which is flawed (see above). Costs of ongoing liabilities discharged by developer through buying off-site BNG units (5)
Ease of delivery in the planning system		

Criterion	On-site BNG	Off-site BNG
	For large sites easier for developer to deliver on-site because no enforcement. Not possible for small sites irrespective of enforcement. Limited opportunity for commercial, logistic, retail or linear/large infrastructure because of space con-straints or management difficulties (2)	Various barriers to BNG delivery need to be addressed to make it easier to use off-site areas (see Annex 1). None are insurmountable (3). Would scale to score of (5) with a preference for off-site by government/LPA
Specific legal aspects		
	Legal duty on LPA to enforce whole BNG policy but have limited capacity and will to enforce on-site – often very small areas. Historically, LPAs poor at enforcing developer mitigation. Habitat maturity issues – takes decades to establish – by which time developer moved on. LPA doesn't have step-in rights. Cost risks to LPAs (via right to appeal) if they serve enforcement notice on developer, therefore unlikely to do so (1)	Enforcement position clear: failure to comply with the terms is a serious breach of contract on part of the landowner. S106 do have step in rights for the LPA if needed. Conservation Covenants have greater flexibility (4)
Specific planning aspects		
	Lack of enforcement and conflation of BNG delivery with public open space (with major conflicts) drives on-site provision. Changes to development masterplan to 'accommodate' BNG to then have BNG promises degraded on variation post-permission (1)	Need for easier governance through Section 106 agreements on the off-site land. Potential challenges where LPA (as the planning regulator) sells BNG units to developer. Overall, easier for planning, clarity, delivery and discharge of liabilities if BNG provided off-site by a specialist provider (4)

Criterion	On-site BNG	Off-site BNG
Developer benefits/disbenefits		
	Given no enforcement, on-site provides a relatively easy solution to BNG delivery given a large residential development site but not for other types of development. Future possible changes to the guidelines regarding liability, inability to pass on liability to third party, scrutiny showing highly limited or no ultimate value to biodiversity recovery etc, means that off-site solutions will likely become mainstream. Ultimately failure of on-site provision could lead to legal challenge to a permission – though probably too late to invoke restorative action (2)	Financial and operational liability discharged through purchase of off-site BNG units using robust legal documents. Delivery provided by professional operators with greater probability of positive delivery and transparency. Better reputational outcome for developer – being party to a major restoration scheme rather than providing fragmented small pockets of amenity grassland and planting on-site (5)
Social and community value		
	Small-scale value to residents on residential developments (larger for large sites) but unlikely tailored to residents needs or wishes. No such value for non-residential developments as no space or access available (2)	Significant community value through support to rural communities, ability to create new nature reserves that can be visited by people, diversification of small farm businesses otherwise financially challenged, major contribution to wilder landscapes that can attract further revenue streams (such as sensitive eco-tourism) (5)

The above categorical analysis (based on a score) provides a qualitative comparison of the alignment of BNG siting with a detailed set of criteria relating to ecological integrity/biodiversity value, financial security, appropriate governance to underpin site integrity, and economic and social value to communities. Comparing the two delivery mechanisms against a maximum score achievable of 130 across the 26 criteria (5x26), on-site scored 31 (24%) compared to off-site which scored 110 (85%). Although this is a relatively simple evaluation, it suggests that off-site delivery provides more than three times the value of on-site when measured against a detailed set of outcome criteria.

Conclusions

Despite the fact that the BNG policy is starting to work well, especially given that it has only been implemented for a year, its potential to meet the original objectives of faster development, facilitating growth and contributing substantial funding into nature restoration at limited cost to the developer, is being hampered by a preference for on-site delivery. The policy preference is also creating a number of perverse outcomes:

a. Reports that 90% of BNG is being delivered by developers within the boundary of the development site where its contribution to effective nature restoration is severely challenged and yet the unit costs of delivering BNG on-site are far in excess of off-site solutions if land costs and profit foregone are properly accounted for;

b. Land providers bringing forward large-scale habitat restoration sites to supply perceived demand for off-site BNG units at the time of policy implementation, which was encouraged by government, but which has not materialised because of the on-site preference, are at severe risk of having their land assets stranded, including the many hundreds of millions of pounds already invested. Further investments, and the entire market for BNG units, is at significant risk of rapidly drying up, bringing to a halt the country's green finance ambition, so critical for rebuilding ecosystems and facilitating resilience against environmental shocks;

c. Failure of the world's first compliance market for biodiversity will curtail interest in the global biodiversity restoration market, preventing the nature finance needed to protect our economies and quality of life.

The solution is for a policy preference to increase the proportion of BNG delivered off-site since this offers the smoothest, fastest path to enabling development through the planning system and hence contributing to economic growth. Rapid scale up in private investment into 'oven ready' habitat banks will deliver meaningful, large-scale and significant nature restoration at no cost to the taxpayer. An evolution of the policy to this end will result in far better biodiversity outcomes providing significant savings in time and cost for developers and local planning authorities, supporting the economy of rural communities whilst still providing high quality greenspace in urban environments.

Recommendations

1. The government should reconsider the sequential preference for on-site BNG delivery, and favour developers purchasing off-site BNG units from professionally managed off-site providers. This would enable multiple developments to purchase BNG units from large habitat banks, aggregating the value from a number of development sites, to deliver far greater benefits for nature through the restoration of ecosystems, supporting landholder income, providing bigger and better areas that would contribute wider community benefits, and be quicker, cheaper and easier for developers to implement. It would stimulate the rapid expansion of habitat banks, giving developers greater choice based on market principles. Housebuilders are screening sites before purchase, rejecting those that won't support

on-site delivery because of risk in pursuing off-site solutions as a result of an on-site preference by the LPAs. Removal of the presumption in favour of on-site BNG first would enable developers to consider a wider range of sites and thereby increase the rate of house building. Although we acknowledge the inherent value to communities in creating better quality green spaces remains an important factor but again, biodiversity restoration and greenspace provision must not be conflated.

2. LPAs should take up this policy evolution by championing off-site BNG delivery in their area (through both local plan policy and a development management approach), providing a better, faster, more frictionless, and less onerous approach for developers and the LPAs themselves.

3. LPAs should be held more to account, by requiring more stringent and effective compliance monitoring of on-site BNG and given resources to enforce restorative measures where on-site BNG fails.

4. If an onsite approach to the delivery of BNG is to be retained in some form, it is essential that a level playing field for on-site and off-site BNG is created. The two factors needed to ensure compliance are a) that all on-site BNG must be transparently registered in the same way and place as off-site BNG, b) that on-site areas are also financed for the full 30-year term through, for example, the appropriate use of the service charge which would include restorative measures should the on-site BNG be found to be failing, and the upskilling of the managing agent or management company responsible for the development once the developer has handed over the site. Both on-site and off-site BNG should be expected to adhere to the Defra/BSI nature standard.

5. That the communications around BNG from central government are reviewed and the benefits of the approach to both society and biodiversity are more clearly and widely publicised.

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Annex 1. Barriers to both on-site and off-site BNG delivering for nature.

- Policy preference for on-site rather than off-site BNG delivery, being promoted by LPAs on the 'front-line'. This is resulting in only 10% of BNG delivery being off-site, far less than the figure of 50%+ expected by government and their advisers.

- Developers controlling the BNG destiny by siting BNG within the development site boundary, potentially making unsubstantiated claims as to the uplift in biodiversity, reducing the risk of unavailability of off-site BNG units in a required location (LPA area) or delay associated with off-site solutions.

- Unlevel playing field between on-site and off-site BNG in relation to ecological value, governance of delivery, financial security and hence longevity, community engagement and benefits, monitoring and reporting, and enforcement.

- The BNG metric has too much flexibility that facilitates poor quality BNG on-site being seen as acceptable. A small tweak to the metric would rectify that position.

- Limited/no enforcement – developers prepared to risk breaching the Regulations.

- LPAs reluctant to issue Section 106 agreements for habitat banks within a reasonable timeframe, creating nervousness within the developer community of proposing off-site solutions.

- LPAs creating habitat banks and selling BNG units themselves from their own land, without issuing themselves a Section 106 agreement.

- Developers engaging in establishing habitat banks/offset sites on undevelopable areas on their own land.

- Developers partnering with LPAs to fund the LPA habitat bank, creating certainty for the developer (by financing the regulator) and securing the BNG units they need at a discount.

- Developers partnering directly with landowners/farmers to fund habitat banks, raising the BNG units they need for their developments with the potential for selling excess units to other developer buyers.

- Oversupply of land in the habitat restoration market through speculative creation via landowners, farmers, wildlife trusts and other conservation bodies, local authorities vis special purpose vehicles, developers, specialist delivery organisations, habitat brokers, and land agents leading to a wide diversity of delivery options and a wide diversity in quality and cost to the developer.

- Insufficient standards and controls on delivering consistency, certainty and clarity.

- Limited or no support or resource within the LPA leading to delays and confusion.

- Threat of LPAs charging a tariff rather than requiring the purchase of BNG units from a bona fide provider, especially under new government's deregulation agenda.

- Insufficient support from Natural England and Defra as a result of a recent major reduction in staff.

- Mortgage lenders not accepting uplift in house prices to cover BNG requirements (price uplift placed

by the developers), leading to fewer house buyers being able to secure a mortgage, and also presenting a potential negative equity risk.

- Potential land sterilisation of value where a landowner signs over 30-year lease on a site for the creation and management of a habitat bank, according to land valuers.

Annex 2. Initial comparison of on-site vs off-site delivery to form the basis of independent review.

On-site delivery	Off-site delivery
• Usually too small for significant biodiversity enhancement, fragmented/unconnected to wider environment • Section 106 agreement restrictive on the land • No real biodiversity uplift • Reduces net developable area • True delivery costs opaque • Logistics/commercial can't achieve it on-site • Developer liable for management and monitoring for 30 years though currently not enforced • Disturbance from development impacts any biodiversity • Preference bias • Exemptions re de minimis point being exploited	• Bigger, better, joined biodiversity – far greater value • Removes developer liabilities entirely • Regulated through Government registry • Improved ecosystem function and resilience • Next to Regen agriculture (big wins!) • Income diversification into the rural economy • Creates large number of new nature reserves • Drives private finance into nature restoration by giving certainty • Provides framework for nascent corporate accounting biodiversity credit market • BNG unit pricing – is it really an issue once all costs from different delivery options are understood?

Annex 3. Environment Bank timeline of Biodiversity Net Gain

2004. IEEM Fellows lecture published in IEEM In Practice Journal December 2004, setting out a new way to treat biodiversity within the planning and development control system via mitigation banking, referring to gains in biodiversity.

2006. Established the Environment Bank Ltd to lobby for, and undertake, biodiversity offsetting projects.

2008-2011. Substantial internal lobbying for biodiversity offsetting within Natural England as NE Board member, leading to 2011 Natural Environment White Paper in which biodiversity offsetting is presented as a direct policy intervention. Key meetings in 2010 with shadow (Conservative) ministers Nick Herbert (shadow SoS for Defra), Bob Read (planning), Richard Benyon. Directly involved in writing the 2011 Natural Environment White Paper text via NE role.

2012. Ecosystem Markets Taskforce established by Conservative government. DH a member. Reported in 2013 with the no.1 recommendation being for biodiversity offsetting to be made mandatory.

2012. Biodiversity offsetting pilots launched as an outcome of the Natural Environment White Paper, reporting in 2014. Environment Bank involved in two of the pilots and was part of the original team that developed the metric.

2014. DH suggests to NE Chair (as a result of the Conservative majority in the 2014 election such that Defra and arms-length bodies were being scrutinised in relation to the new government's growth agenda) that Natural England establishes the Developer Industry Group and Board Innovation Group, DH chairing both groups. The groups were therefore set up, to engage effectively with industry and demonstrate that nature is not a burden to developers. James Cross joins NE as CEO. DH and JC work together on pushing the gains for nature agenda (biodiversity net gain) through numerous meetings with Ministers, officials in DCLG and Treasury. Small executive team set up to promote the work. The two groups pioneered and pushed through a range of initiates and innovations including BNG (as it became defined, modified from biodiversity offsetting), District Licencing for great-crested newts, and others.

2017. National Planning Policy Framework formally embeds BNG; DH held a number of meetings with John Rhodes (JR) the author of the 2012 NPPF – DH worked with JR for a number of years when RPS Group purchased Town Planning Consultancy, eventually persuading via NE that BNG should be formally included in the NPPF.

2018. DH and JC worked on the 25-year Environment Plan at NE, published in 2018 after DH had left the Board, in which government prioritises BNG from development, alongside launching the 500,000ha nature recovery ambition.

2019. A number of meetings with Michael Gove followed by the Chancellor of the Exchequer announcing, in the Queens speech, that BNG was to be made mandatory in the Environment Bill.

2021. Environment Bill enacted. BNG becomes a mandatory requirement under planning law with a legal duty of local planning authorities to deliver the scheme. Two year implementation period, so finally implemented into law in February 2024.

2021. Environment Bank secures £240m investment funding to create large scale habitat banks – 26 in existence by May 2024.

2024. February. Mandatory BNG finally implemented.

Some key articles:

Hill, D.A (2004). Mitigating circumstances. What will we leave behind? IEEM Fellows lecture. Bulletin of the Institute of Ecology and Environmental Management. 46 December 2004.

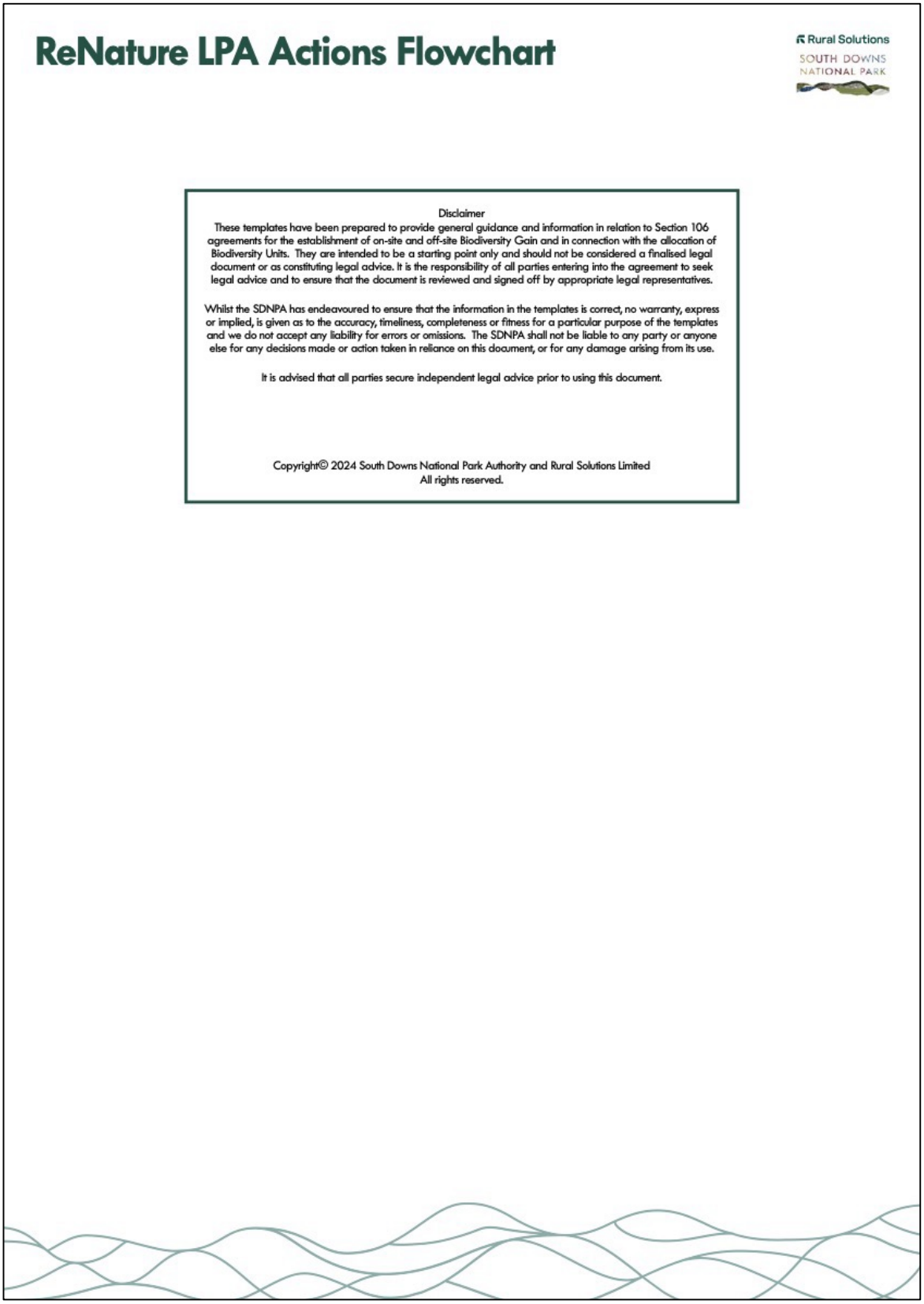
Hill, D. with Gillespie, R. (2007). Habitat banking – nature and development mitigation. Town and Country Planning. 76, 4. April 2007.

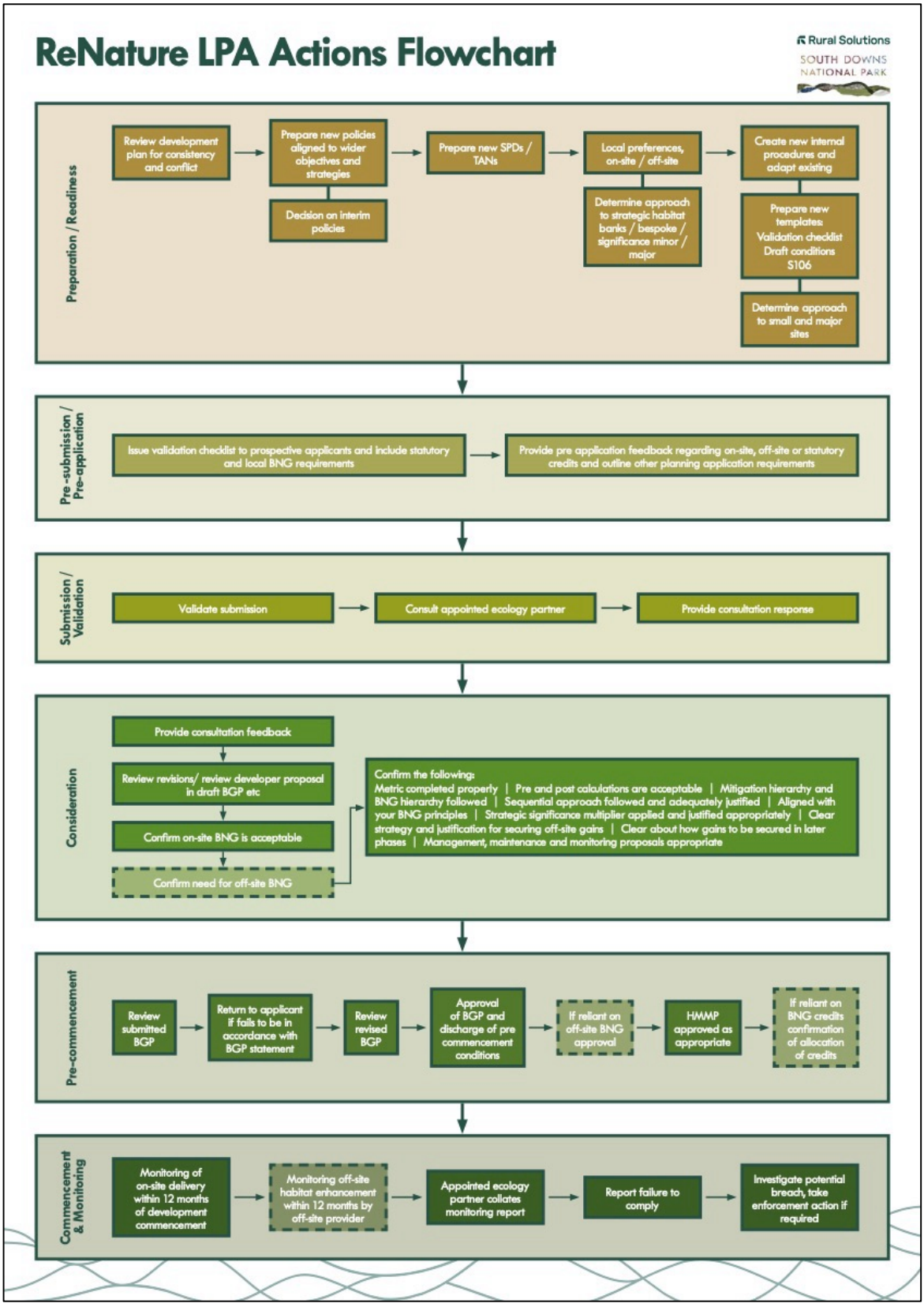
Hill, D. (2013). Biodiversity offsetting. In Practice. Bulletin of the Chartered Institute of Ecology and Environmental Management. September 2013.

Hill, D. (2018). Restoration of biodiversity. In Practice. Bulletin of the Chartered Institute of Ecology and Environmental Management 100. June 2018.

Hill, D. (2019). Biodiversity net gain must lead to proper biodiversity restoration at scale. In Practice. Bulletin of the Chartered Institute of Ecology and Environmental Management 104. June 2019.

Annex 4. Example flowchart of the application of BNG in the planning system. Courtesy of Rural Solutions.




ReNature LPA Actions Flowchart
Rural Solutions
SOUTH DOWNS NATIONAL PARK
Preparation / Readiness
Review development plan for consistency and conflict
Prepare new policies aligned to wider objectives and strategies
Decision on interim policies
Prepare new SPDs / TANs
Local preferences, on-site / off-site
Determine approach to strategic habitat banks / bespoke / significance minor / major
Create new internal procedures and adapt existing
Prepare new templates: Validation checklist Draft conditions S106
Determine approach to small and major sites
Pre-submission / Pre-application
Issue validation checklist to prospective applicants and include statutory and local BNG requirements
Provide pre application feedback regarding on-site, off-site or statutory credits and outline other planning application requirements
Submission / Validation
Validate submission
Consult appointed ecology partner
Provide consultation response
Consideration
Provide consultation feedback
Review revisions/ review developer proposal in draft BGP etc
Confirm on-site BNG is acceptable
Confirm need for off-site BNG
Confirm the following:
Metric completed properly | Pre and post calculations are acceptable | Mitigation hierarchy and BNG hierarchy followed | Sequential approach followed and adequately justified | Aligned with your BNG principles | Strategic significance multiplier applied and justified appropriately | Clear strategy and justification for securing off-site gains | Clear about how gains to be secured in later phases | Management, maintenance and monitoring proposals appropriate
Pre-commencement
Review submitted BGP
Return to applicant if fails to be in accordance with BGP statement
Review revised BGP
Approval of BGP and discharge of pre commencement conditions
If reliant on off-site BNG approval
HMMP approved as appropriate
If reliant on BNG credits confirmation of allocation of credits
Commencement & Monitoring
Monitoring of on-site delivery within 12 months of development commencement
Monitoring off-site habitat enhancement within 12 months by off-site provider
Appointed ecology partner collates monitoring report
Report failure to comply
Investigate potential breach, take enforcement action if required