BNG in Small Developments

Final report

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Disclaimer

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Summary

Biodiversity Net Gain requirements

In February 2024, Biodiversity Net Gain (BNG) became mandatory under the Town and Country Planning Act. The intention is to have a net positive effect on biodiversity in England and contribute to the Environment Act target of halting the decline in species populations by 2030.

When introduced, BNG included a number of exemptions. Until the 2nd April 2024, all small sites (of less than 1 ha for sites with up to nine dwellings, or up to 0.5 ha for sites with an unknown number of dwellings) were exempt. A de minimis exemption applies to sites that do not impact a priority habitat and impacts less than 25 square metres (5 m by 5 m or 0.025 ha) of on-site habitat. Self-build and custom build applications (for sites less than 0.5 ha and with nine houses or fewer) are also exempt.

The BNG requirement can be complied with through mitigation and enhancing biodiversity at development sites, or by enhancing biodiversity at another site – which can be managed by a third-party provider. This latter option creates the structure for a market in which developers purchase Biodiversity Units (BUs).

This work

The purpose of this work is to understand, a year after BNG became a requirement:

- **Current BNG implementation**: looking at the current pattern of planning applications and use of exemptions, estimating the BUs and area of development subject to BNG, and the probable BU market demand after on-site mitigation.
- **Market effects of exemptions:** looking at the trend of exemptions over time (e.g. the temporary small site exemption when BNG was introduced), and exemptions relating to de minimis impacts, self-build, and size of development.

Data was provided by The Planning Portal on the pre-development biodiversity units of planning application sites from 12 February 2024, when BNG became mandatory, to the end of February 2025. This data was cleaned to exclude infeasible data (e.g. negative BU scores) and to cover the 52 weeks from March 2024 to February 2025 to allow better comparison to future scenarios. The Planning Portal data gives good insight to the market. It is used in this analysis in combination with assumptions primarily from previous eftec work and a recent survey of BNG applications by the BNG500 Group (eftec, 2021 & BNG500, 2025[1]).

Key findings

The data from the first year of BNG give insights to its operation:

- The proportion of exemptions in smaller site developments is much higher than in the larger site sizes. This is as expected, reflecting the larger number of exemptions available to smaller sites.
- The annual planning applications were estimated to be 101,728. Of these, 87,981 (86%) were exempt from BNG, leaving 13,747 applications subject to BNG with a combined pre-development

[1] Available at: https://www.linkedin.com/posts/francis-hesketh-a733191a_bng500-learnings-from-500-planning-applications-activity-7306301210817384448-yVjP/, for info on the research contact francishesketh@tep.uk.com

biodiversity unit (PDBU) value of 94,376 (Table S.1).

- The annual spatial footprint of all these planning applications is estimated to be 57,891 ha. 10,862 applications covering 23,160 ha are approved and subject to BNG, with 74,572 PDBUs. The off-site mitigation demand of these applications is estimated at 7,339 BUs.
- As highlighted in the Planning Portal[2] (blog post, Oct 2024), the use of exemptions by size of planning application site shows a much larger-than-expected proportion (around 60%) of exemptions de minimis exemptions in sites over 0.5 ha. A very small (de minimis) impact on nature at a relatively large development site is not credible in more than a tiny number of exceptional circumstances. However, de minimis is being claimed by approx. 35% of developments over 0.5 ha in size, including those covering several hectares. There is no data on the monitoring, evaluation or the reasons for the use of this exemption.
- The current use of exemptions in BNG implementation will act as a deterrent to potential suppliers of BUs into the market. Given that inadequate supply was identified as a policy risk for BNG, better and more consistent enforcement should be seen as a way of addressing this risk and giving confidence to those willing to invest in BU supply.
- There is no evidence of developers reducing the size of the sites on their applications (a 'cascade effect') to avail themselves of BNG exemptions. The high number of de minimis exemptions could be due to poor understanding, poor monitoring, intentional misuse**.** Regardless of the reasons, the scale of use of the de minimis exemption suggests a widespread compliance failure.

Scenarios for future BNG implementation

In addition to Year 1 of BNG implementation, five future scenarios are analysed to provide insight into how the BNG system could respond to changes in regulation, and how this would influence the off-site BU market:

- Scenario 1: no exemptions to BNG requirements
- Scenario 2a: All sites up to 0.1 ha exempt, no other exemptions for larger sites
- Scenario 2b: All sites up to 0.1 ha exempt, current use of exemptions continues for larger sites
- Scenario 3: de minimis & self/custom build exemptions removed
- Scenario 4: All sites up to 1 ha exempt, and current use of exemptions continues for larger sites

[2] https://blog.planningportal.co.uk/2024/10/10/application-system-update-ensuring-eligibility-for-the-most-used-biodiversity-net-gain-exemptions/

Table S.1 Scenario analysis showing the estimated Year 1 baseline and five future scenarios (from Year 2) indicators per year

Scenarios and descriptions	Baseline Year 1 situation, current use of exemptions	Scenario 1 No exemptions	Scenario 2a All sites up to 0.1 ha exempt, no sites >0.1 ha are exempt	Scenario 2b All sites up to 0.1 ha exempt, current exemptions for sites > 0.1ha	Scenario 3 de minimis & self/custom build exemptions removed	Scenario 4 All sites up to 1 ha exempt, current exemptions for sites > 1ha
Planning applications submitted						
Number of applications	101,728	100,347 (following removal of pre-BNG exempt applications)				
Spatial footprint of all development (ha)	57,891	57,105 (following removal of pre-BNG exempt applications)				
Number of applications with BNG exemptions	87,981	0	66,342	90,321	18,660	97,167
Number of applications subject to BNG	13,747	100,347	34,006	10,026	81,687	3,180
Number pre-development biodiversity units (PDBUs) in applications subject to BNG	94,376	191,359	171,869	93,519	160,719	83,637
Planning applications approved						
Number of applications approved	80,381	79,291				
Number of approved applications with BNG exemptions	69,519	0	52,421	71,368	14,745	76,778
Number of applications subject to BNG after approval	10,862	79,291	26,870	7,922	64,546	2,513
Spatial footprint of approved development subject to BNG (ha)	23,160	45,122	41,454	23,013	38,039	20,902
Number of PDBUs subject to BNG	74,572	151,204	135,804	73,895	126,994	66,087
BU Market Demand						
Estimated amount of BUs	7,339	14,880	13,365	7,272	12,498	6,504

Table S.2 shows the percentage change in key indicators under the scenarios compared to the Year 1 data.

Table S.2 Comparing actual results in Year 1 to future scenarios (% change in key indicators)

Indicator	Scenario 1	Scenario 2a	Scenario 2b	Scenario 3	Scenario 4
Number of applications subject to BNG	+630%	+147%	-27%	+494%	-77%
Number applications with BNG exemptions	-100%	-25%	3%	-79%	+10%
Spatial footprint of development subject to BNG	+95%	+79%	-1%	+64%	-10%
BU Market demand	+103%	+82%	-1%	+70%	-11%

These scenarios show that:

- Reducing the exemptions for developments >0.1 ha will have the most positive effect on biodiversity gain (approx. doubling market BU demand);
- The government's proposed exemption of sites <1 ha would reduce the area of development subject to BNG by 2,258 ha compared to current activity (Scenario 4 vs baseline), and by up to 20,000 ha compared to ending the current mis-use of exemptions (Scenario 4 vs Scenario 2a);
- A de minimis *size* exemption rather than a de minimis *impact* exemption will avoid administrative burdens on small developers and the planning system, but not weaken the BNG process or market. Scenario 2a shows it could double approx. the size of the BU market (increasing by 6,026 BU).

Implications for BNG policy and its implementation

The comparison of the scenarios suggest that current policy is reasonably well targeted, even though poorly implemented (see above).

The BNG policy could be improved by exempting the smallest developments (defined here as those with a site size of less than 0.1 ha) and by improving the implementation of BNG requirements for all other sites. The government's proposed amendment to offer a full exemption from BNG for all developments under 1 ha (Defra, 2025) and continuing current implementation practice for larger sites will likely have a negative impact on biodiversity.

The government's proposal aligns well with Scenario 4. The analysis in Table S.2 shows this would result in a 77% decrease in the number of applications requiring BNG, and 10% and 11% decrease in development area subject to BNG and BU market demand, respectively. This is a flawed comparison, as it uses a baseline in which there appears to be significant mis-use of exemptions. The appropriate comparison is to a scenario showing BNG being well-implemented, which would be closer to Scenario 2a or Scenario 3. On this basis the government's proposals roughly halve the size of the BU market, compared to its intended size.

There is no data on the assessment and monitoring efforts within local authorities for sites registering for

BNG or for exemptions. Therefore, it is not possible to verify the PDBUs of the applications requiring BNG nor whether the on-site mitigation is being implemented correctly. These factors may influence biodiversity outcomes significantly. This uncertainty, and the current use of exemptions in BNG implementation will act as a deterrent to potential suppliers of BUs into the market.

Better BNG implementation and rules (Scenario 2a) could increase the area of lost to land use development and subject to BNG by 18,294 ha per year from Year 1 (current or actual BNG implementation). Current BNG exemptions and poor enforcement are allowing developers to avoid compensation obligations worth £181m/year (based on the expected price of BUs). If the resulting nature loss is compensated by public money (assumed to be through agri-environment schemes, as an example), the cost to taxpayers could be as much as £144m in the 10 years to 2035.

If developments up to and including 1ha are exempted from the BNG requirement (Scenario 4), 24,220 ha of extra developed land will fall outside the BNG requirement. This will lead to avoided BU compensation payments of a possible £250m/ year and up to £190m in taxpayer money for agri-environment payments over the next 10 years.

The above £ figures are guide estimates only as they are highly dependent on the rates of biodiversity loss in different development sites as well as the on and off-site mitigation rates, which were unknown for this study. More importantly, there is no evidence that spending more in agri-environment schemes (or spending through any other policy) would compensate biodiversity loss due to development.

Contents

Tables

Figures

1. Introduction

This report analyses the data from the first year of implementation of Biodiversity Net Gain (BNG) with regards to the trends in planning applications that apply for an exemption from or register for BNG.

The purpose of this work is to understand the structure of the market demand by size of development site, and to assess the potential market effects of changes in the size thresholds for exemptions or enforcement of exemptions. These effects are then put in the context of wider outcomes for biodiversity in England. The assumptions used in the analysis are primarily from previous eftec work and from a recent survey of BNG applications by the BNG500 Group (eftec, 2021 & BNG500, 2025[3]).

When introduced, BNG included a number of exemptions (shown in Table 1.1). Initially, all small sites (of less than 1 ha for sites with up to nine dwellings, or up to 0.5 ha for sites with an unknown number of dwellings) were exempt. This general small site exemption expired on 2nd April 2024, but self-build and custom build applications (for sites less than 0.5 ha and with nine houses or fewer) are still exempt.

There is no data available on acceptance rates of registered exemptions or approval rates of the applications registering a BNG requirement. This excludes the important dimension of regulatory enforcement in the planning system from the analysis, which assumes the policy rules of BNG are applied.

The analysis of the data to date and future scenarios indicates where the rules around BNG will have the most significant effect on the Biodiversity Units (BU) required to deliver BNG, and the market demand for purchases of BUs.

Following this introduction, the report presents:

- The analysis of the current situation (Section 2);
- The future scenario analysis (Section 3);
- Conclusions and recommendations (Section 4);
- Methodology (Appendix 1), and
- Breakdown of results by site size categories (Appendix 2).

[3] Available at: https://www.linkedin.com/posts/francis-hesketh-a733191a_bng500-learnings-from-500-planning-applications-activity-7306301210817384448-yVjP/, for info on the research contact francishesketh@tep.uk.com

Table 1.1 Exemption categories and definitions[4]

Exemption	Description
Existing planning applications	If a planning application for a development was made before day one of mandatory BNG on 12 February 2024, the development is exempt from BNG. Transitional arrangements also apply for variations to existing planning permissions
Developments below the threshold (de minimis)	A development that does not impact a priority habitat and impacts less than: • 25 square metres (5m by 5m) of on-site habitat (0.025 ha) • 5 metres of on-site linear habitats such as hedgerows
Self-build and custom build applications	Sites must meet **all** of the following conditions to qualify for an exemption as a self-build or custom build: • consist of no more than 9 dwellings • be on a site that has an area no larger than 0.5 ha • consist exclusively of dwellings that are self-build or custom housebuilding
Biodiversity gain site	Developments undertaken mainly for the purpose of fulfilling the BNG planning condition for another development are exempt
High speed rail transport network	An exemption applies to any development forming part of, or ancillary to, the high-speed railway transport network, comprising connections between all or any of the places or parts of the transport network
Other exemptions	• Urgent crown developments • Developments that are granted planning permission by a development order (including permitted development rights) • National significant infrastructure projects (NSIPs) (until May 2026)
Temporary small site exemption (Expired 2nd April 2024)[5]	For residential developments, small sites are defined as those with: • Between 1 and 9 dwellings on a site area of less than 1 ha • Where the number of dwellings is unknown, a site area of less than 0.5 ha

[4] UK Government Guidance: Biodiversity net gain: exempt developments (2024). https://www.gov.uk/guidance/biodiversity-net-gain-exempt-developments

[5] Planning Portal: Small sites no longer exempt from Biodiversity Net Gain regulations (2024) https://blog.planningportal.co.uk/2024/04/09/small-sites-no-longer-exempt-from-biodiversity-net-gain-regulations

2. Analysis of the data on BNG in its first year

This section presents the data used in the analysis, followed by insights from the first year of operation of mandatory BNG. Section 2.1 describes the data available for understanding how BNG has operated within the planning system since its introduction. Section 2.2 looks at the total number of applications across the time period for which data was provided, broken down by application site size. Section 2.3 shows the amount of applications subject to BNG across the first year of operation, while Section 2.4 provides more detailed information about the different exemptions claimed by applications who were not subject to BNG. Section 2.5 presents the results of the analysis estimating the market demand for BUs.

2.1 Data for the analysis

Data on planning applications from October 2023 until February 2025 was provided by the Planning Portal (Pers comm., May 2025). The data set from February 2024 to February 2025 contained 111,575 planning applications in England during this period. The data was organised and aggregated by size of the development site (in discrete size bands), Local Planning Authority (LPA), and month. It contained the number of planning applications, the proportion that required BNG, and the proportion that were exempt. The proportion of each kind of exemption was given for exempt applications. For applications requiring BNG, information was given on pre-development biodiversity unit (PDBU) values, which is the amount of biodiversity present on a site prior to development, calculated using Defra's statutory biodiversity metric tools[6] in BUs (Defra, 2023[7]).

The data received from the Planning Portal showed some discrepancies and anomalies in the PDBU values. There were what seemed to be unfeasibly large estimates of PDBUs for some sites, as well as some negative values (which is not possible to have with the biodiversity metric (Defra, 2023)). As a result, steps were taken to clean the data set. The assumptions and methodology used to exclude applications with implausible data is explained in Appendix 1. In total, 664 applications were removed from the dataset, leaving 110,911 planning applications in the analysis for the period from February 2024 to February 2025.

When exemptions were calculated using the number of applications with a PDBU value subtracted from the overall number of applications, and then again using the data on exemption reason by LPA, there was an absolute difference of 2,885 applications (2.6%) between the two calculations. However, 97% of this difference related to applications in February 2024 and so it is assumed to have been due to the introduction of BNG halfway through this month. The other 3% of the difference (0.08% of the total) is statistically insignificant and so will not affect the analysis.

For applications that required BNG, the PDBU data received from the Planning Portal was aggregated across LPAs, development size band, and by month (e.g., in November 2024, sites between 0-0.1 ha, in Adur District Council). For each of these rows, data was provided on the count of applications, and the average, minimum, maximum, and the sum of the PDBU values, based on what had been submitted in applications. Within this dataset, 57% of applications came from rows containing a single application, meaning the PDBU

[6] For sites ≥1 ha, the full biodiversity metric tool must be used. For small sites <1 ha, and meeting various additional requirements, the simpler "small sites" metric can be used.

[7] https://www.gov.uk/guidance/biodiversity-metric-calculate-the-biodiversity-net-gain-of-a-project-or-development

value of these sites were known exactly, while the remaining 43% came from rows with multiple applications, meaning exact values of PDBUs for these sites were not known. No information was provided on whether the full statutory biodiversity metric or small sites metric was used to calculate the PDBUs.

The planning application data analysis uses all the data for October 2023 to February 2025 (i.e., including the four months prior to the introduction of BNG), to see if there are any changes before and after the introduction of BNG. The analysis of PDBUs and the BNG market uses the cleaned planning application for March 2024 to February 2025 to allow a 12-month analysis and easier comparison with the scenarios.

2.2 Planning applications

The number of planning applications was fairly constant across time, ranging from 7,296 to 10,879 applications per month. Figure 1 shows each size category as a proportion of the total number of applications, in each month, and demonstrates a fairly even distribution throughout the year. The number of planning applications in December of each year is always larger and with a higher proportion of bigger sites, than in other months (Planning Portal, pers comm, May 2025). This is a phenomenon that the Planning Portal has been aware of before the introduction of BNG so the pattern in December 2024 is unlikely to be related to the introduction of the BNG requirement two months later. The size of sites can range from several square metres to over 100 ha (BNG500, 2025).

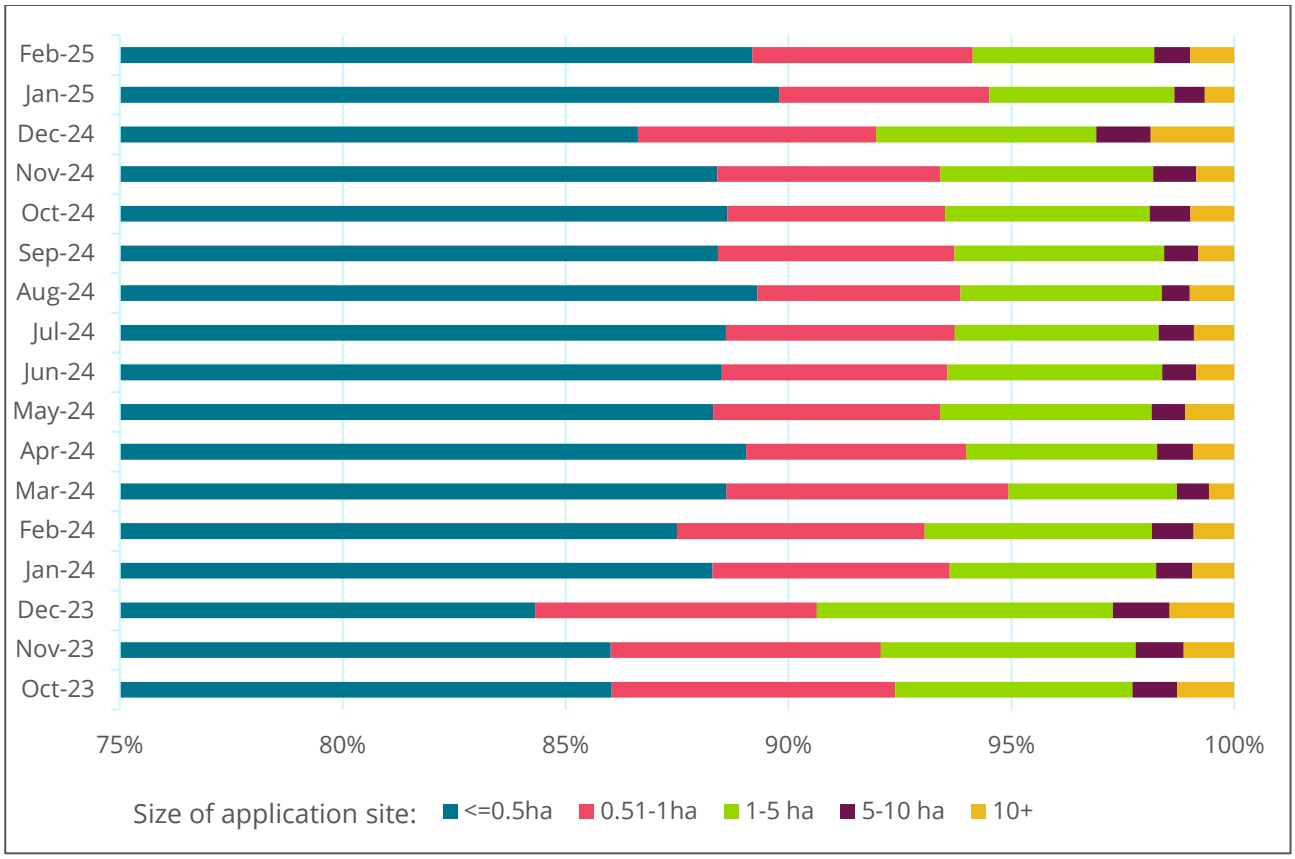


Figure 1 Planning applications by proportion of each site size category over the analysis period

In order to avail of some of the BNG exemptions, developers may be incentivised to split their planning applications into several applications of smaller site sizes. The trend of different size categories over time

can be seen in Figure 2. There are indeed some small changes in the distribution of sites in the month preceding the introduction of BNG and preceding the removal of the temporary small site exemption. This data is useful to investigate the risk, associated with the BNG policy, of a 'cascade effect' – the splitting of sites into smaller applications to take advantage of exemptions. The number of applications of very small sites (0-0.1 ha) as a proportion of the total number of applications, rises by 5.7% from December 2023 to January 2024, although this follows a decrease of 2.8% in the preceding 2 months.

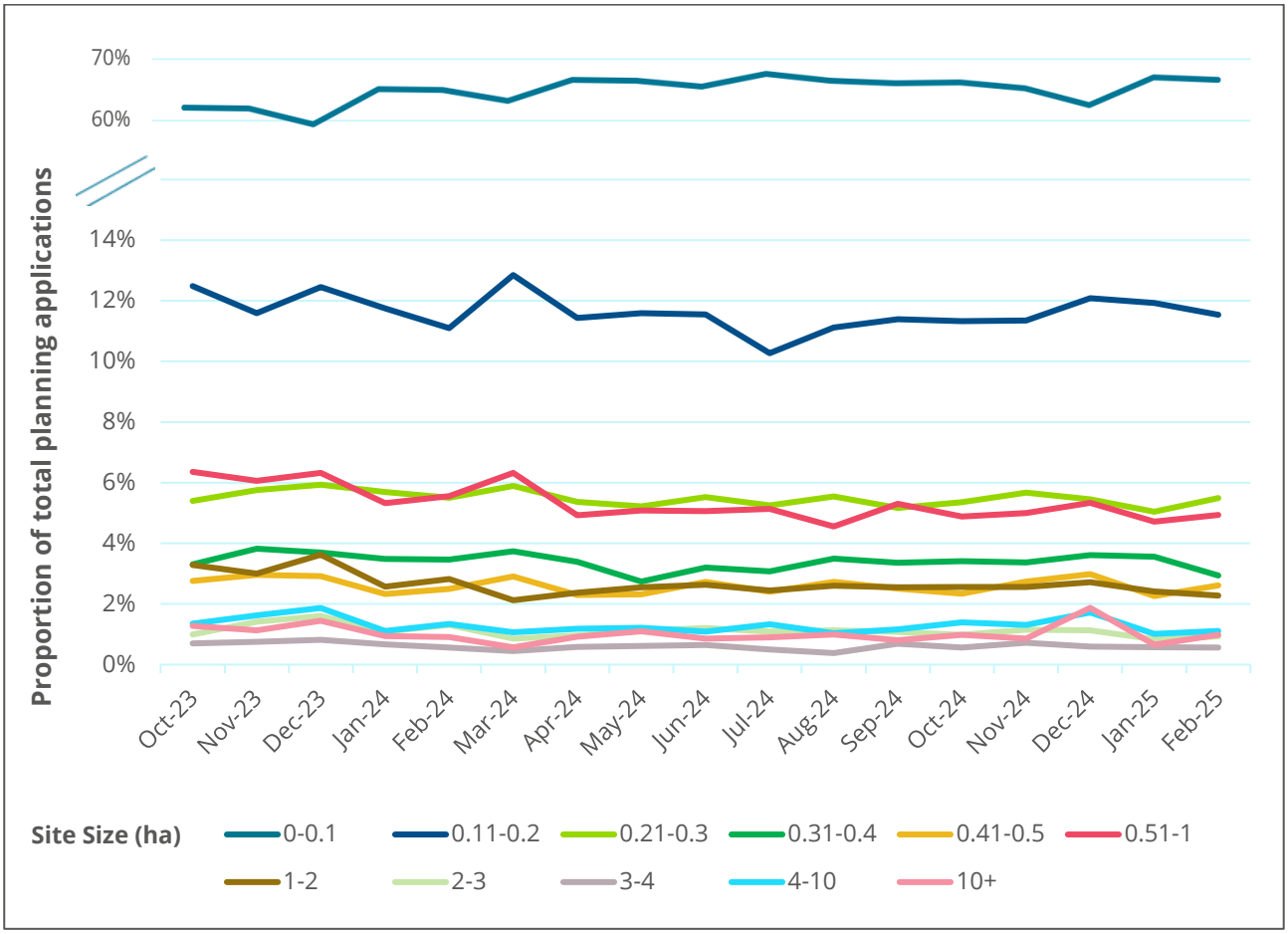


Figure 2 Pattern of applications of each size (ha) category from October 2023 to February 2025

The changes in these smaller categories are better observed when the number of applications in each category is analysed as a proportion of all applications under 1 ha (Figure 3). This shows how variations in very small sites (0-0.1 ha) compare to those in the other categories under 1 ha. The data shows the fluctuations of applications of very small sites are generally inversely proportional to the fluctuations in the combined applications of the remaining categories under 1 ha, in the months around the introduction of BNG.

These fluctuations are apparent in March and April 2024, when the temporary small site exemption was removed. The decrease and increase pattern seen in the months leading up to BNG is seen again in the subsequent December to January period, so may have little to do with the introduction of BNG and more to do with the increase in large development applications in December every year (Planning Portal, pers comm, May 2025). However, the subsequent fluctuations in March and April may indicate that size of sites in planning applications was impacted somewhat by the removal of the temporary small site exemption.

This may be due to developers altering the way they applied for planning by splitting their applications into smaller site sizes when the temporary small site exemption was no longer available to them. However, it could also be due to development plans being changed to have a smaller spatial footprint (i.e., responding to incentives created by BNG). Overall, the changes over time in the size bands shown in Figure 2 and Figure 3 are statistically insignificant, and are not considered to provide any evidence of a cascade effect.

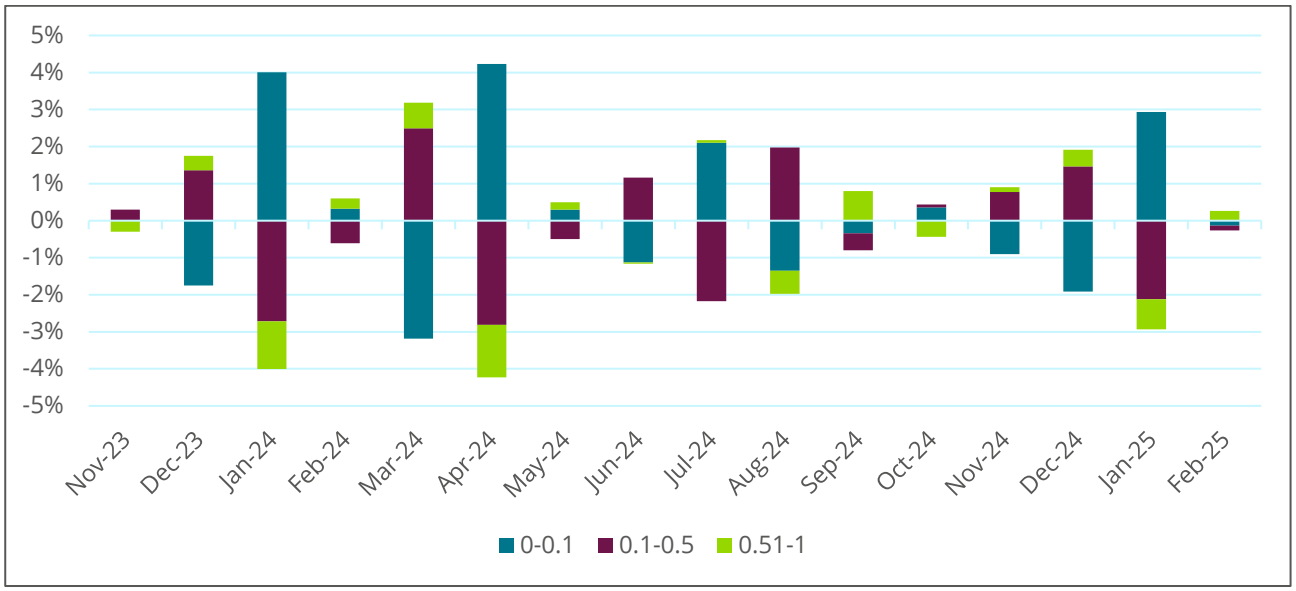


Figure 3 Month-to-month changes in the smaller sites as a proportion of all sites under 1 hectare

From this point on in the report, the data used is from March 2024 to February 2025, to reflect annual values and for better comparison with the scenarios. The number of all planning applications, (following data cleaning), the number of exemptions, and the proportion of exemptions to total applications in each size category, are shown in

Table 2.1. The number of planning applications in the smallest two categories (0-0.1 ha and 0.11-0.2 ha) constitute 77% of the total applications, whilst having 82% of the total number of exemptions. More generally, the ratio of exemptions to applications falls as the site sizes increase. This higher proportion of exemptions in the small site categories is expected. It is due to both the de-minimis exemption being used more in the very small site applications, and the self and custom build exemption only affecting the categories up to 0.5 ha (see Section 1 for exemption descriptions). Until April 2024 the temporary small site exemption will also have contributed to the number of exemptions in the categories up to 1 ha.

Table 2.1 Number of total planning applications, exemptions, and applications subject to BNG in each size category and the proportion of exemptions (March 2024 – February 2025)

Size (ha) of applications	Number of applications	Number of applications exempt from BNG	Number of applications subject to BNG	Exemptions as proportion of applications
0-0.1	66,887	63,166	3,721	94%
0.11-0.2	11,718	9,572	2,146	82%
0.21-0.3	5,523	4,310	1,213	78%
0.31-0.4	3,379	2,469	910	73%
0.41-0.5	2,622	1,874	748	71%
0.51-0.6	1,344	917	427	68%
0.61-0.7	1,085	720	365	66%
0.71-0.8	948	611	337	64%
0.81-0.9	855	524	331	61%
0.91-1	1,001	632	369	63%
1-2	2,519	1,420	1,099	56%
2-3	1,060	558	502	53%
3-4	581	300	281	52%
4-5	410	201	209	49%
5-6	262	125	137	48%
6-7	220	75	145	34%
7-8	142	64	78	45%
8-9	110	45	65	41%
9-10	96	41	55	43%
10+	966	357	609	37%
Total	**101,728**	**87,981**	**13,747**	**86%**

Source: from Planning Portal data

2.3 Applications subject to BNG

The Planning Portal provided data on the number of applications in each LPA, size category, and month that required a BNG application ('BNG sites'), meaning they had submitted an application with a PDBU value. The remaining, exempt, applications were not required to submit a PDBU.

Given the data available, assumptions are required to estimate how these PDBU values from BNG sites' application will translate into demand for offsite BUs that will reach the market. The proportion of sites registering a PDBU value has steadily increased since the introduction of BNG, as shown in Figure 4. The proportion of exemptions will naturally decrease over the first few months as the pre-BNG and small sites exemptions expire, and more applications are thus required to register for BNG.

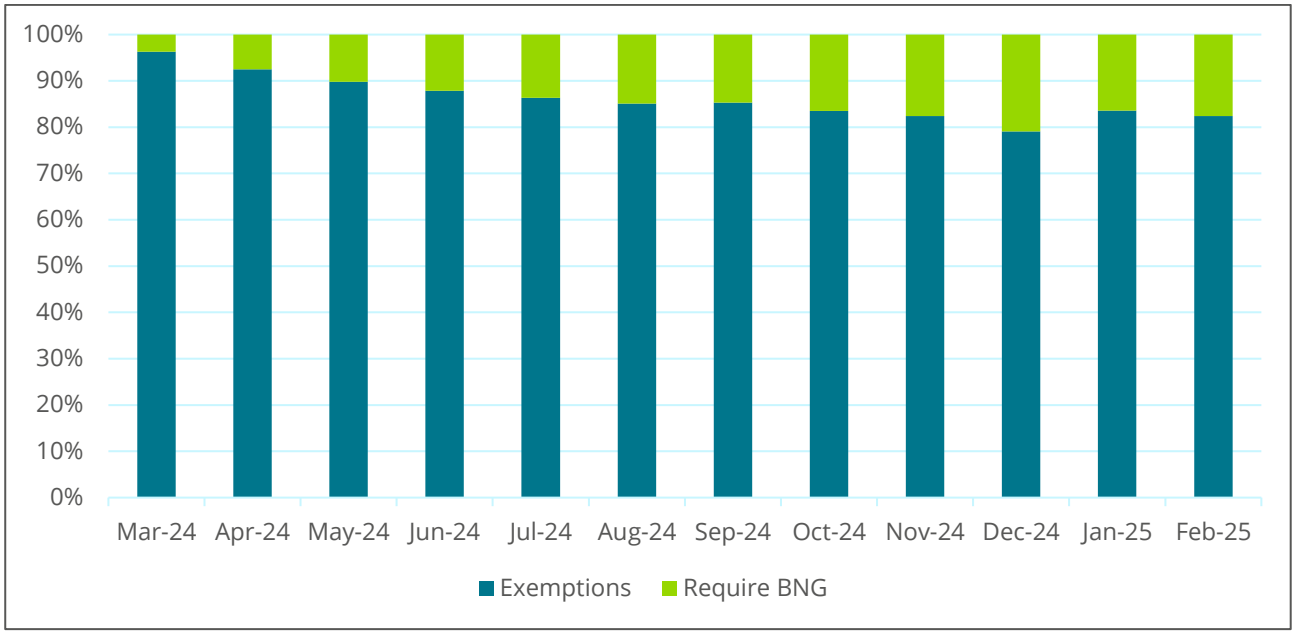


Figure 4 Proportion of sites registered with PDBU values and those claiming exemptions, as percentage of total applications

The same information by number of applications is shown in Figure 5. These graphs both demonstrate a sudden drop in the number of applications registering no PDBU (exempt from BNG) from March to April 2024, when the temporary small site exemption expired. There is then a more gradual decrease in exemptions until the following January, perhaps due to the number of pre-BNG applications slowly phasing out.

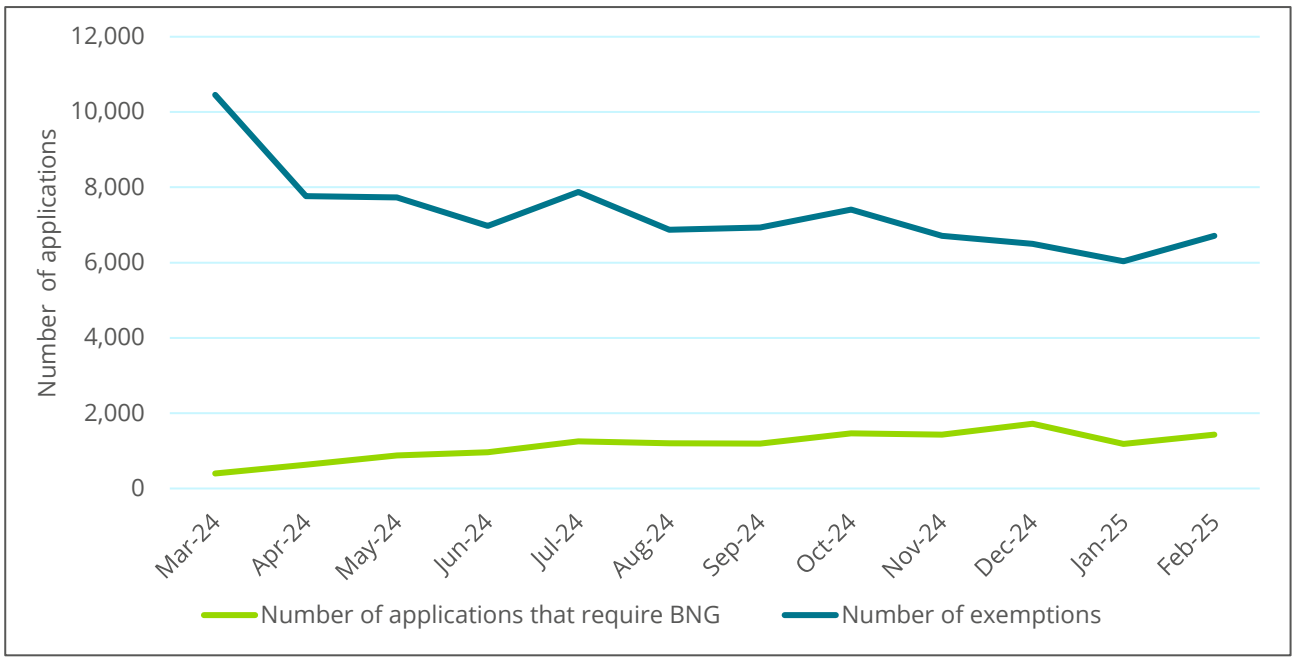


Figure 5 Number of applications registering with and without PDBUs

2.4 Exemptions

As described in Section 1, there are several exemptions from BNG available to developers. The analysis of exemptions used the data from March 2024 onwards, to show a year of the policy in force.

Overall, 86% of planning applications apply for an exemption from BNG. The proportion of planning approvals of those who apply for an exemption is unknown. The number of exemptions from BNG shown in the planning application data from the Planning Portal vary across time, by the size of site applications, and by LPAs. Table 2.2 shows the number of LPAs that have different exemption rates. Although the majority of LPAs have high exemption rates, three have an exemption rate of under 50% and one (Hartlepool Development Corporation) registered 100% of its 15 applications with exemptions.

Table 2.2 Number and percentage of LPAs in each exemption rate band

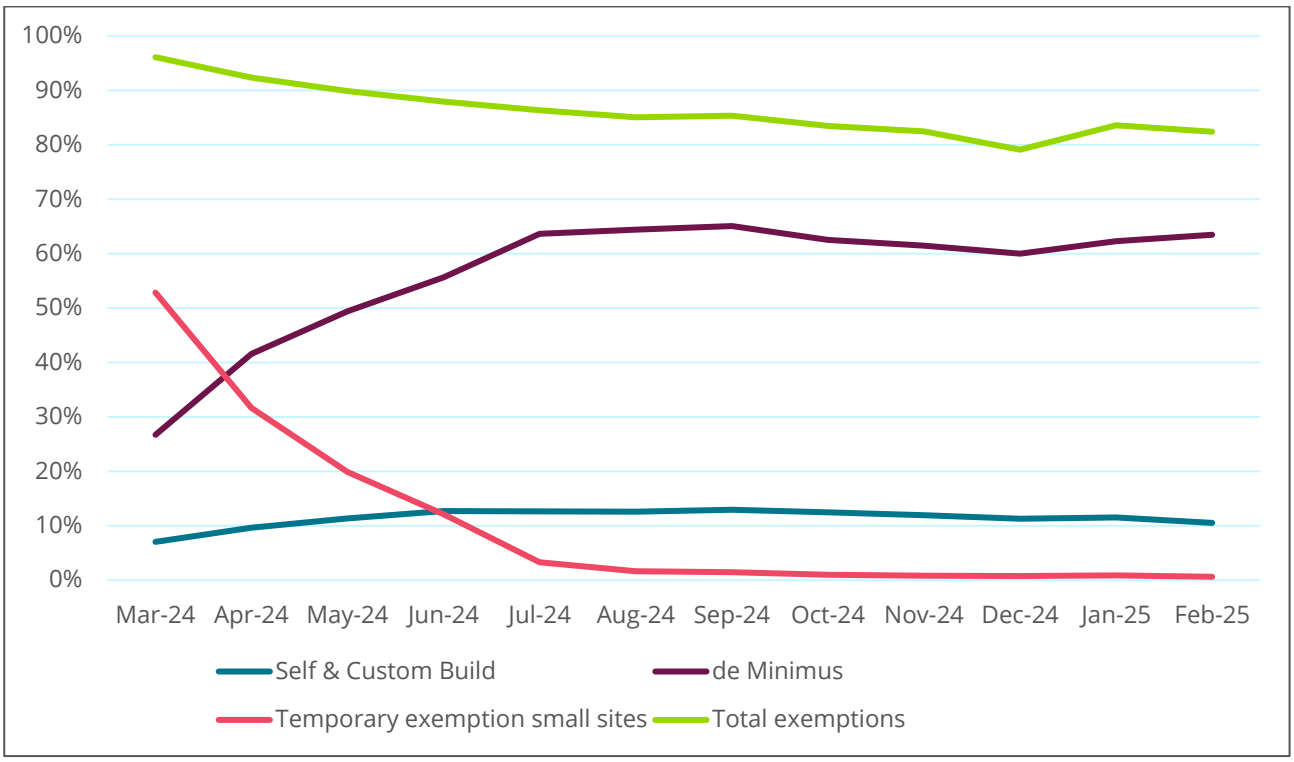
Band of % of applications exempted	No. of LPAs	% of LPAs
100%	1	<1%
90%-100%	79	22%
80%-90%	192	53%
70%-80%	69	19%
60%-70%	10	3%
50%-60%	5	1%
40%-50%	0	<1%
30%-40%	2	1%
20%-30%	1	<1%
10%-20%	0	0%
0%-10%	0	0%
Total	**359**	**100%**

Source: from Planning Portal data

At least 89% of applications are in the size categories up to and including 0.5 ha (see Table 2.1 for a more detailed breakdown), so could potentially qualify for exemption under the "Self-build and custom build" exemption category. The proportion of those applications up to 0.5 ha that are estimated to actually register for this exemption is 13% over the analysis period.

Figure 6 below shows the proportion of the three exemptions that are most relevant to or can only be applied to sites under 1 ha, as a proportion of total applications. These three exemptions make up the majority of all exemptions, reflecting the high exemption rate in these categories compared to exemptions more relevant for applications on larger sites. Data shows that following the introduction of BNG mid-way through February 2024, the proportion of applications claiming the self/custom build exemption increased from 7% in March 2024 to 13% in June 2024, after which it has remained stable between 10% and 13%.

Meanwhile, the temporary small site exemption, which concluded in April 2024, saw a sharp decline after March that year, with an opposite effect in the de-minimis exemption.



Source: from Planning Portal data

Figure 6 Exemptions as a proportion of total applications

Perhaps the most interesting part of the data provided by Planning Portal is that for the de minimis exemptions (Table 2.3). As expected, a large proportion of smaller sites have claimed this exemption, but a surprisingly high proportion of large site applications have also claimed it. De minimis exemptions apply to applications that "do not impact a priority habitat and impacts less than 25 square metres (0.0025 ha) of onsite habitat, and 5 metres of linear habitats such as hedgerows." This implies that a large proportion of sites are claiming on their applications, that only a fraction (0.025% in the case of a 10-hectare site) of development on their site has impacted habitat.

The level of use of the de minimis exemption suggests it is being misinterpreted within the BNG system. This may be due to it being poorly understood by applicants and/or poorly monitored by LPAs. However, the scale of misuse across different sizes of planning applications suggests that the de minimis exemption may be being intentionally misinterpreted.

Table 2.3 Proportion of de minimis and net gain site exemptions by size of planning application

Size (ha)	de minimis exemptions	% of total de minimis exemptions	de minimis exemptions as % of total applications	Net gain site exemptions	% of all net gain exemptions (Planning Portal data)
0-0.1	42,798	76%	64%	503	59%
0.11-0.2	5,177	9%	44%	91	11%
0.21-0.3	2,313	4%	42%	36	4%
0.31-0.4	1,278	2.3%	38%	26	3%
0.41-0.5	903	1.6%	34%	21	3%
0.51-0.6	538	1.0%	40%	16	2%
0.61-0.7	433	0.8%	40%	14	2%
0.71-0.8	361	0.6%	38%	9	1.1%
0.81-0.9	311	0.6%	36%	10	1.2%
0.91-1	366	0.6%	37%	14	1.7%
1-2	885	1.6%	35%	39	4.6%
2-3	361	0.6%	34%	16	1.9%
3-4	189	0.3%	33%	11	1.3%
4-5	119	0.2%	29%	5	0.6%
5-6	75	0.1%	28%	1	0.1%
6-7	45	0.1%	20%	3	0.3%
7-8	36	0.1%	25%	4	0.5%
8-9	29	0.1%	26%	3	0.3%
9-10	26	0.0%	27%	2	0.2%
10+	231	0.4%	24%	21	3%
Total	**56,472**	**100%**	**56%**	**847**	**100%**

Source: from Planning Portal data

2.5 Scale of BU demand

This section uses the planning system data to look at market demand for BUs over the 12-month period from March 2024 to February 2025. Market demand is defined as the BUs that will be sourced from outside the development site, likely from a third-party supplying BUs to the market.

2.5.1 Methodology

The PDBU data provided by the Planning Portal gave the total number of PDBUs and could be used to calculate the spatial area of development subject to BNG. Not all the PDBUs registered on an application will be destroyed by development and part of what is destroyed can be mitigated on-site. Therefore, this data is combined with assumptions, shown in Table 2.4, to estimate the demand for BUs:

- Using the assumed split between residential and commercial categories (Assumption 1), and application approval rates (Assumption 2) the total PDBUs in each size category of development are estimated. These assumptions are based on work on a recent sample of BNG applications by the BNG500 Group (2025). This results in an average 79% approval rate overall across all site size categories and development types.
- From the full sample of 503 sites registered for BNG (across an area of 1,187 hectares), the average PDBU/ha of application area from the BNG500 Group (2025) paper is 3.15. This is similar to the Planning Portal data, which shows a weighted average of 3.9 PDBU/hectare (See Table 2.6) for sites where BNG applies. The BNG500 Group (2025) also found that 33% of planning applications subject to BNG require off-site BUs to achieve BNG.
- For the BNG500 sample of 503 applications, there was total off-site demand for 370 BUs across an area of 1,187 hectares of development, i.e. the average off-site BU demand was 0.31 BU per hectare of the development area. Therefore, the average off-site BU demand is 9.8% of the average PDBU. This is the BU market demand. This 9.8% represents the proportion of the PDBUs in approved applications registering for BNG that are predicted to need compensation after development and after on-site mitigation.
- The required off-site BU mitigation is reverse calculated from this off-site BU demand, using the 10% BNG requirement.
- The spatial footprint of all sites requiring BNG can be estimated by multiplying the mid-point of the site size category by the number of applications requiring BNG in that category.

Table 2.4 Assumptions used to calculate Biodiversity Unit demand

No.	Assumption	Description			Source
1	Residential/ commercial split of applications	Residential: 49.9% Commercial: 50.1%			BNG 500 (2025)
2	Application approval rate		**Major & minor residential**	**Major and minor commercial**	BNG 500 (2025), eftec
		Total	71%	87%	
		Combined approval rate (Assumption 1 & 2): 79%			
3	Off-site BU demand to PDBU	9.8%			BNG500
4	BNG requirement	10%			BNG policy
5	Spatial footprint	Calculated by multiplying the number of applications by the median size of each site size category			eftec calculation

2.5.2 Results

The method and assumptions in Section 2.5.1 result in the BNG market assessment shown in Table 2.5. A breakdown by site size is shown in Table 2.6. Site applications up to 0.3 ha (the smallest three site size categories in the analysis) make up 51% of applications requiring BNG but are responsible for only 4% of the PDBUs. In contrast sites of more than 10 ha constitute only 4% of applications requiring BNG, but have 60% of the PDBUs (with 4,987). This suggests that the current policy is well targeted.

The estimated demand for BUs (7,339), is higher than the eftec et al. (2021) model of 3,564 BUs, due to a much higher estimated average BU per hectare. The eftec model assumed a lower BU/ha score for most developments and ascribed a zero BU score for much of the land developed in urban areas, assuming it was on brownfield sites with no biodiversity value.

Table 2.5 Estimate of Scale of BNG in its First Year

Indicator	Current market	Description
Planning applications		
Number of applications	101,728	
Number of BNG exemptions	87,981	From Planning Portal
Number of applications subject to BNG	13,747	From Planning Portal
Spatial footprint of all development sites (ha in application boundary)	57,891	Estimate from Planning Portal data
Spatial footprint of all development sites that subject to BNG (ha in application boundary)	29,311	Estimate from Planning Portal data
PDBUs in development application sites subject to BNG (BU in application boundary)	94,376	From Planning Portal
Planning applications approved		
Number of applications approved	80,381	Overall approval rate 79% - from proportion of residential and commercial sites and their approval rates. From BNG500 report
Number of approved applications with BNG exemptions	69,519	
Number of approved applications subject to BNG	10,862	
Spatial footprint of all approved development sites (ha in application boundary)	45,743	
Spatial footprint of all approved development sites subject to BNG (ha in application boundary)	23,160	
PDBU on approved development sites subject to BNG (BU in application boundary)	74,572	
BU market demand		
Estimated BU market demand	7,339	9.8% of PDBU on approved sites. From BNG500 report

Table 2.6 Current situation for applications subject to BNG and BU market demand

Site size of applications (ha)	Number of exemptions	Number of applications subject to BNG	Sum of total PDBU subject to BNG (BU)	Number of approved applications subject to BNG	Spatial footprint of approved applications subject to BNG (ha)	BU market demand (BU)
0-0.1	63,166	3,721	857	2,940	147	67
0.11-0.2	9,572	2,146	1,379	1,696	263	107
0.21-0.3	4,310	1,213	1,231	958	244	96
0.31-0.4	2,469	910	1,165	719	255	91
0.41-0.5	1,874	748	1,272	591	269	99
0.51-0.6	917	427	950	337	187	74
0.61-0.7	720	365	811	288	189	63
0.71-0.8	611	337	886	266	201	69
0.81-0.9	524	331	950	262	224	74
0.91-1	632	369	1,238	292	278	96
1-2	1,420	1,099	5,316	868	1,303	413
2-3	558	502	4,293	397	992	334
3-4	300	281	3,230	222	777	251
4-5	201	209	3,184	165	743	248
5-6	125	137	2,438	108	595	190
6-7	75	145	2,789	115	745	217
7-8	64	78	1,961	62	462	152
8-9	45	65	2,034	51	437	158
9-10	41	55	1,599	43	413	124
10+	357	609	56,793	481	14,436	4,416
Total	**87,981**	**13,747**	**94,376**	**10,862**	**23,160**	**7,339**

3. Scenario analysis for future implementation

To investigate how the exemptions affect biodiversity loss and the BNG demand market, five scenarios for future implementation were analysed (see Table 1) and compared to the baseline of implementation in Year 1. Pre-BNG exemptions decreased rapidly from 1,271 in February 2024 to four in February 2025 and are not relevant to future scenarios. The 1,381 applications with this exemption from March 2024 to February 2025 were therefore removed from the application and exemption data for the scenarios. This represents less than 1.5% of all applications during that period, and is less than the fluctuation in application numbers that occurs anyway. Therefore, the exclusion of the pre-BNG exemptions from the data set analysed does not materially affect the results.

The results of the scenarios are discussed in terms of the number of applications that are subject to BNG requirements, number of exemptions, affected hectares, and the resulting BU market demand. The efficiency of each scenario is defined in terms of the percentage increase in BU market demand per 1% increase in planning applications requiring BNG. The cost implications of the different exemptions rules in each scenario are not assessed.

Table 3.1 Scenarios and descriptions

Scenario	Description	Assumptions used for analysis
All	Pre-BNG exemptions are no longer applicable to the data so have been removed from the total applications and exemptions	
1	No exemptions and full compliance due to effective implementation	• All exemptions removed
2a	Exemptions threshold lowered & better implemented	• Exempt all sites up to 0.1 ha from BNG • No exemptions for sites over 0.1 ha except for Net Gain site & NSIP[8] exemptions
2b	2b. Exemptions threshold lowered & NOT better implemented	• Exempt all sites up to 0.1 ha from BNG • All sites > 0.1 ha subject to BNG with current use of exemptions
3	Current exemptions better implemented (i.e. approx. 90% <0.5 ha require BNG)	• Removal of all de minimis exemptions using Planning Portal data • Removal of the self/custom build exemption (allocated to the 0.1-0.5 ha sites, in proportion to the number of overall applications in these categories)
4	Current implementation with higher threshold for exemptions	• Exempt all sites up to 1 ha from BNG • All sites > 1 ha subject to BNG with current use of exemptions

Note: Scenarios 2 and 4 reflect government's current proposals for BNG policy changes (Defra 2025).

The scenarios illustrate different uses of BNG exemptions and levels of compliance across the planning system. Scenario 2 is used to test the effect of applying a threshold of 0.1 ha, under which all applications are exempt from BNG, with two options to determine the added effect of better implementation of BNG regulation: in Scenario 2a) only the BNG gain site and NSIP exemptions apply; while in Scenario 2b) the

[8] Nationally Significant Infrastructure Projects.

same rate of BNG exemptions as in the baseline (Year 1 of BNG) continues. Scenario 2a allows for all applications in the 0-0.1ha category to be exempt, but only the BNG site and NSIP exemptions for all other sites. Scenario 2b allows all applications in the 0-0.1ha category to be exempt, and assumes the same use of exemptions as the baseline (current) scenario for all other sites.

Scenario 3 involves the removal of de minimis and self/custom build exemptions to ensure that the majority of sites implement BNG. Scenario 4 uses a size exemption threshold of 1 ha, with the same use of BNG exemptions as in the baseline (Year 1 of BNG) for those sites over 1 ha.

Analysis of these scenarios shows that changing the exemption rules has a significant effect on the number of applications, area of applications subject to BNG, the total number of PDBUs, and the market demand for BUs. The results in Table 3.2 are post-approval estimates and show that Scenario 1, the removal of all exemptions, leads to the biggest impact on nature and the market for BUs. The area of planning applications in Scenario 1 subject to BNG would be 21,962 ha (95%) larger than baseline. However, not all of this will be removed by development and assumptions need to be applied to estimate how much would be mitigated on and off-site. Without any exemptions in place, BNG is estimated to result in market demand of 14,880 BUs (increase of 103%).

In Scenario 2a the full exemption awarded to sites under 0.1 ha is counteracted by the fewer exemptions allowed to sites over the threshold, resulting in an overall decrease (25%) of exemptions from the baseline. However, due to the greater spatial footprint of sites over 0.1 ha, both the hectares compensated for and the BU market demand, increase significantly (by 79% and 82% respectively). The weaker conditions applied in Scenario 2b allow a 3% increase in exemptions from the baseline, a decrease (27%) in applications subject to BNG and a very small (1%) decrease in BU market demand.

Across the scenarios, 2a is the most efficient way to strengthen BNG implementation. It shows that better implementation of BNG rules and lowering the threshold for full exemption to 0.1ha sites would significantly enhance biodiversity compensation at the same time as removing the administrative burden of BNG application to very small developments.

Scenario 3 also has a large effect on the number of smaller sites subject to BNG, as it removes the de-minimis and self/custom build exemptions. This dramatically reduces the number of exempt sites by 54,774 (79% relative to baseline) but also increases the area requiring replacement and the BU market demand to 12,498 (a 70% increase). This scenario would have slightly smaller benefit for biodiversity than Scenario 2a, and both scenarios would help the UK better fulfil its environmental obligations to mitigate damage to biodiversity and deter development on valued habitats. However, Scenario 3 has a greater requirement for administration of small site BNG applications.

In Scenario 4, increasing the threshold of 0.1 ha in Scenario 2b to 1 ha results in roughly a third of the number of applications subject to BNG compared to that in Scenario 2b, or an increase in the number of exemptions by 7,259 (10%) from the baseline. The resulting decrease in market demand is by 835 BUs (11%) compared to baseline. This is a flawed comparison, as it uses a baseline in which there appears to be significant mis-use of exemptions. The appropriate comparison is to a scenario showing BNG being well-implemented, which would be closer to scenario 2a or scenario 3. On this basis the government's proposals roughly halve the size of the BU market, compared to its intended size.

Table 3.2 Scenario analysis showing the estimated Year 1 baseline and five future scenarios (from Year 2) indicators per year

Absolute change	Baseline (with current use of exemptions)	Scenario 1 No exemptions	Scenario 2a All sites up to 0.1 ha exempt, no sites >0.1 ha are exempt	Scenario 2b All sites up to 0.1 ha exempt, current exemptions for sites > 0.1ha	Scenario 3 de minimis & self/custom build exemptions removed	Scenario 4 All sites up to 1 ha exempt, current exemptions for sites > 1ha
Number of applications subject to BNG after approval	10,862	79,291	26,870	7,922	64,546	2,513
Number of exemptions after approval	69,519	-	52,421	71,368	14,745	76,778
Spatial footprint of development subject to BNG (hectares) after approval	23,160	45,122	41,454	23,013	38,039	20,902
BU market demand	7,339	14,880	13,365	7,272	12,498	6,504
"Efficiency" of scenario	n/a	0.11	0.38	0.02	0.10	0.10

% Change relative to the baseline scenario	Current	Scenario 1	Scenario 2a	Scenario 2b	Scenario 3	Scenario 4
Number of applications subject to BNG	N/A	630%	147%	-27%	494%	-77%
Number of exemptions	N/A	-100%	-25%	3%	-79%	10%
Spatial footprint of development subject to BNG (hectares)	N/A	95%	79%	-1%	64%	-10%
BU market demand	N/A	103%	82%	-1%	70%	-11%

The efficiency of a scenario shows which scenarios lead to the largest increase in biodiversity compensation for the smallest increase in the number of planning applications (and therefore administrative burden). Scenarios that remove exemptions for a larger number of sites, including small sites (Scenarios 1 and 3) are likely to have less BUs per application, but will increase the total number of BUs demanded, improving environmental outcomes by more overall. Scenario 2a is the most efficient scenario, with the marginal increase in the number of applications subject to BNG, having the greatest positive impact on environmental outcomes.

4. Conclusions and recommendations

Analysis of the Planning Portal data show how the BNG policy has worked in its first year. There were 87,981 exemptions amongst the 101,728 planning applications in England form March 2024 to February 2025, i.e. 86% of planning applications were exempt from BNG. The BU market in the first year is estimated to have been 7,339 BUs. This estimated demand for BUs is higher than the eftec et al. (2021) model of 3,564 BUs, due to a higher estimated average BU per hectare.

The use of exemptions varies between LPA, with most (95%) registering an exemption rate of over 70%. There is no data available of the acceptance of exemption requests in each local authority, nor on the approval rates of applications with exemptions compared to those registering for BNG.

56% of applications use the de minimis exemption. This is much higher than expected and suggests there may be a widespread compliance failure within the BNG system. This may be due to it being genuinely poorly understood or monitored or intentionally misused. A very small (de minimis) impact on nature at a relatively large development site is not credible in more than a tiny number of exceptional circumstances. However, de minimis is being claimed by approx. 35% of developments of larger than 0.5ha in size, including those covering several hectares. Inappropriate use of the de minimis exemption may reduce costs for developments at the planning application stage but could create legal confusion and other problems later in the planning process. The proportion of applications registering for a de-minimis exemption rises steeply from the time of the introduction of BNG, but is inversely proportional to a decline in the temporary small site exemption as this is phased out. There are some fluctuations in the numbers of applications in different site size categories over time, but these are not statistically significant or permanent.

There is no evidence of developers reducing the size of the sites on their applications (a 'cascade effect') to avail of the self/custom build or de minimis exemption.

Understanding of the BNG market is enabled due to data collection by the Planning Portal that goes beyond the requirements of government planning application form to collect data that is essential to understand. Anomalies in submitted data, like negative BUs or positive but ultra-high BUs, could be rectified with some changes in the Planning Portal site to restrict per hectare PDBUs to within the ranges specified in the biodiversity metric. Knowing which metric (full or small sites metric) is being used would also help screen data for accuracy, and therefore help analysis of BNG policy effectiveness. It would be useful to define mitigation for different development types (residential/ commercial, small/large sites), as BU market demand is very sensitive to mitigation rates.

Five scenarios are analysed to provide insight into how the BNG system could respond to changes in regulation, and how this would influence the BU market. A large increase in applications captured by the policy (by removing exemptions) – in Scenarios 1 and 3 – would increase the applications subject to BNG by up to or over 500%. Scenario 1 would see an increase in BU compensation and market demand by 103%. Scenario 3 would only see an increase in BU compensation by 70% from the current scenario. These data suggest that current policy is reasonably well targeted, even if poorly implemented with regards to the de minimis exemption as mentioned above.

The effects of the government's current proposal for BNG policy changes are demonstrated by Scenarios 2

and 4. Scenario 2a tests the option to allow a BNG exemption for all single dwellings, alongside much better implementation of BNG requirements for larger sites. This results in an increase in the number of applications subject to BNG requirements (by 147% of the current level), and increases biodiversity compensation by 82%. Scenario 2b tests the same option, but assumes current implementation practices for BNG requirements for sites larger than 0.1 ha. This results in a 27% decrease in the number of applications requiring BNG, but little change (-1%) to biodiversity compensation and the BU market demand.

Scenario 4 has been used to test the Government's proposed amendment to offer a full exemption from BNG for all developments <1ha in size (Defra, 2025), while continuing current implementation practice for larger sites. BU compensation only decreases from the current scenario by 11%, and there is a 77% decrease in the number of applications requiring BNG. However, this is a flawed comparison, as it uses a baseline in which there appears to be significant mis-use of exemptions. The appropriate comparison is to a scenario showing BNG being well-implemented, which would be closer to scenario 2a or scenario 3. On this basis the government's proposals roughly halve the size of the BU market, compared to its intended size.

These scenarios show that: reducing the exemptions for larger developments will have the most positive effect on ecological restoration and enhancement; increased administrative burdens on small developers and the planning system can be avoided; and moving from a de minimis *impact* exemption to a de minimis *size* exemption will not undermine the BNG process or market.

The average off-site BU demand is 0.02 BU per application for the smallest site size and rises to an average of 93.3 BUs per application for sites over 10 hectares. The analysis is based on planning application data prior to assessment or approval of these applications. There is also no data on the assessment and monitoring efforts within local authorities for sites registering for BNG or for exemptions, so we can neither verify the PDBUs of the applications requiring BNG, nor whether the on-site mitigation is being implemented correctly. These factors may influence biodiversity outcomes significantly.

The current use of exemptions in BNG implementation will act as a deterrent to potential suppliers of BUs into the market. Given that inadequate supply was identified as a policy risk for BNG, better and more consistent enforcement should be seen as a way of addressing this risk and giving confidence to those willing to invest in BU supply. A further step to strengthen the system would be to improve the monitoring and transparency of on-site BU compensation. Given the evidence of poor enforcement of the de minimus exemption, there is a risk that on-site BU mitigation is also being poorly implemented.

The potential damage costs of BNG exemptions

Under Scenario 2a the area of habitat lost to land use development and subject to BNG would increase by 18,294 ha per year from Year 1 (current or actual BNG implementation), if that area were subject to BNG requirements. Based on the current market structure, this would result in a possible 6,026 additional BUs per year[9] worth of compensation provided. Assuming a market value per BU of £30,000[10], these BUs could

[9] Based on an average in the first year of BNG of 0.31 BU per ha (see Table 3.2).
[10] Conservative assumption based on: The BNG Report Pricing & Key Insights October 2024 (Arbtech and Biodiversity Units UK)

be worth approx. £181m/year.

If it is assumed that 50% of the 18,294 ha (Scenario 2a) area avoids damage to biodiversity, this leaves around 9,147 ha per year, or 91,470 ha over 10 years, more land that could be subject to BNG, if the process was well implemented and monitored. If the BNG policy is not implemented for this area, then action elsewhere will be needed to meet the Environment Act biodiversity target. Assuming agri-environment scheme would be the lowest cost route for the government, 9,147 hectares is around 2% of the 5.6m ha covered by agri-environment schemes in England in 2024[11]. Agri-environment payments totalled an average of £1.6bn in 2024/5 and 2025/6[12] or an average of £286 per ha. The costs of managing 9,147ha of land for biodiversity in agri-environment schemes is therefore around £2.6m per year (in 2025 prices). This cost would be ongoing and cumulative. Assuming it increased linearly, it would be £26.2m per year by 2035 and have a total value of £144m over the next decade.

Therefore, current BNG exemptions and poor enforcement are allowing developers to avoid compensation obligations worth £181m/year. At the same time, in order to meet our biodiversity targets under the Environment Act, this poor enforcement will also generate future wildlife management costs to taxpayers of approx. £144m to 2035.

The cost of poor implementation could be even higher, if we compare the no exemption scenario (1) with the broadest exemption scenario (4) This results in a up to £250m in lost compensation payments by developers and up to £190m of cumulative wildlife management costs to taxpayers in order to meet the UK's biodiversity targets up to 2035.

The above £ figures are guide estimates only as they are highly dependent on the rates of biodiversity loss in different development sites as well as the on and off-site mitigation rates, which were unknown for this study. More importantly, there is no evidence that spending more in agri-environment schemes (or spending through any other policy) would compensate biodiversity loss due to development.

[11] Area under agri-environment schemes in England at 31st December 2024 - GOV.UK

[12] Update on the farming budget – Farming : The 2024/25 & 2025/26 budgets for existing agreements, Sustainable Farming Initiative and other Environmental Land Management (ELM) Scheme are summed (£3.2bn) and divided by 2.

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Appendix 1 Methodology

A1.1 Understanding issues with PDBU data

To test the robustness of the Pre-Development Business Units (PDBU) data, an average PDBU value was calculated for each site, using the average development size of applications that require BNG and the average PDBU in each site size band. These values were compared to the maximum per hectare BU values that could be achieved using the biodiversity metric tool (Defra, 2023), to see if these sites could theoretically have these PDBUs.

The following assumptions were made in the calculations:

- Values were calculated using the midpoint of development size bands: i.e., for a development size band of 1-2ha, a site size of 1.5ha was used.
- For sites larger than 10 hectares for which an upper bound on size is not given, a maximum site size of 50ha, approximately equivalent to a development of 1,000 homes was assumed[13], giving a midpoint of 30ha (results are not sensitive to the assumption on the max site size).
- The per-hectare pre-development value was calculated as the average PDBU value for the row divided by the midpoint site size value, giving the average PDBU per hectare for each row. For the 57% of rows that contain one application, this gave an exact estimate for that application. For the remaining 43% of rows which contained multiple applications this value is an average, meaning it is: a) less accurate and b) possible to be biased by a single outlier site with an extreme value.
- All sites larger than 1ha were deemed "large sites", while all sites up to 1ha where considered "small sites" (BNG defines small sites in a slightly more nuanced way, e.g., additional, specific criteria for residential, commercial, and other developments. However, as the data required to apply these criteria was not available, all sites under 1ha were assumed to be small sites).
- The maximum possible pre-development BU/ha was estimated using the Defra biodiversity metric tools and guidance, assuming that BU was for habitat areas, i.e., not including hedgerow or watercourses BUs[14] (Defra, 2025). While many small sites use the small sites metric, which has a lower possible maximum pre-development BU/ha (9.2 BU/ha using the small sites metric[15] compared to 27.6 BU/ha for the full statutory metric[16]), not all of them do, specifically any sites that impact a priority/protected habitat, site, or species. Therefore using the small sites metric to calculate whether BU/ha values in small sites BNG applications are plausible is not a good assumption, as it would lead to incorrectly identifying small sites with high BU/ha values as being theoretically impossible to achieve. As the data provided did not include what metric was used[17], it was assumed that all sites used the full statutory biodiversity metric, which gave an estimated

[13] While some very large developments could be larger than this, for example the BNG500 paper includes a 111Ha giga factory in Sunderland, the distribution of sites larger than 10 Ha is likely to be positively skewed, making 30Ha a more reasonable assumption for the average size for this type of applications

[14] These two things are calculated separately and are not aggregated with habitat BUs. Therefore, as the BU demand is estimated only for habitat BUs, hedgerow and watercourse BUs are not included in the analysis. https://www.gov.uk/government/publications/statutory-biodiversity-metric-tools-and-guides

[15] Calculated as: Medium distinctiveness (4) * Moderate condition (2) * High strategic significance (1.15) = 9.2

[16] Calculated as: Very High distinctiveness (8) * Good condition (3) * High strategic significance (1.15) = 27.6

[17] There is also no estimate available on the proportion of small sites that need to use the full tool.

maximum possible pre-development BU/ha value of 27.6 for all sites.

The values from these calculations were used to evaluate the number of applications deemed to be "questionable". This was defined by whether their estimated pre-development BU/ha value exceeded the theoretical maximum value for that site size. Using this decision rule, between February 2024 and February 2025 965 applications (7%) are "questionable", which is a small but significant proportion[18].

The distribution of these values in a histogram can be seen in Figure 7. Most of the values sit in the expected range, but there is a large tail of sites with very high values, and some with negative values. There are also a sizable number of sites at 0 BU/ha, suggesting zero biodiversity (e.g. on re-development of sites), which would be exempt from BNG.

This 7% "questionable" level of pre-development BU/ha values based on our calculations is likely towards an upper bound estimate. As highlighted above, for the 43% of sites located in a row where the count of applications >1, a single extremely high value will drag the average value above the cutoff, making it seems like more sites have unrealistic values.

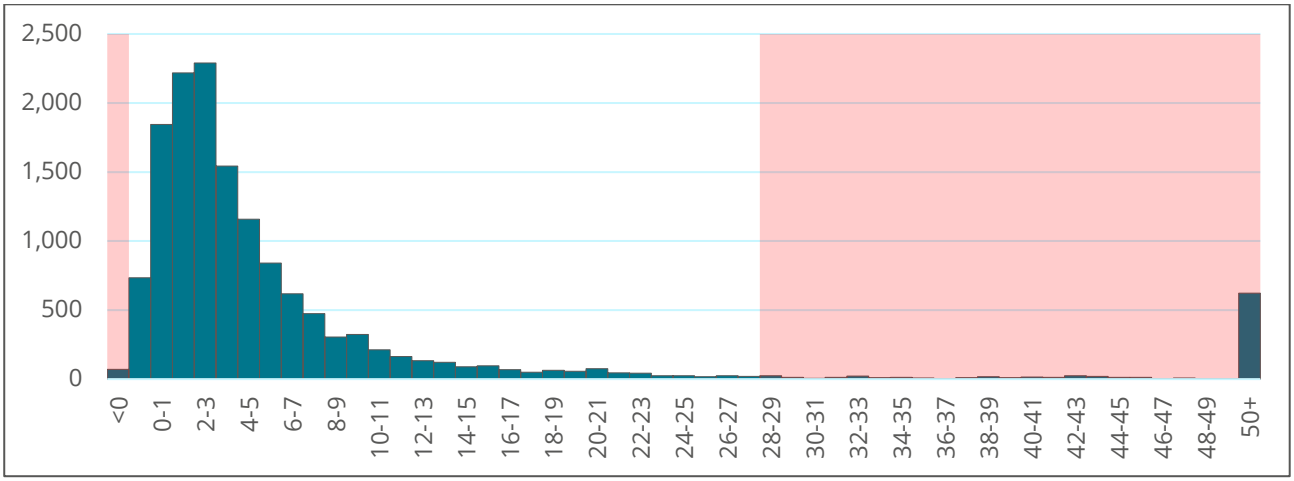

Figure 7 Estimated pre-development PDBU/ha distributions – all sites. Note: red shaded area denotes the range of values that are "questionable".

Looking at small and large sites separately (see Figure 8 and Figure 9), most of the "questionable" values come from small sites, especially the large spike for very high values (50+ BU/ha). Based on the decision rule specified above, 8% of small sites (928 applications) have "questionable" values, whereas only 1% of large sites (37 applications) do, showing that the majority of questionable data is from these smaller sites.

[18] This 7% figure is almost identical to the proportion of BNG applications that were removed from the BNG500 (2025) paper dataset, (38/541 = 7%) for the metric being "unavailable, incomplete or incomprehensible".

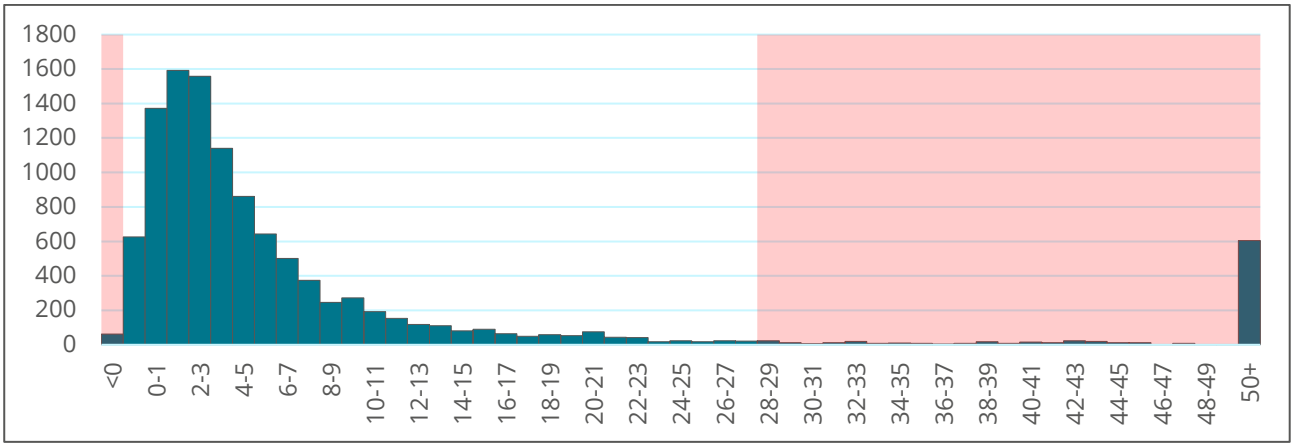

Figure 8 Estimated pre-development PDBU/ha distributions – small sites (n = 11,337). Note: red shaded area denotes the range of values that are "questionable".

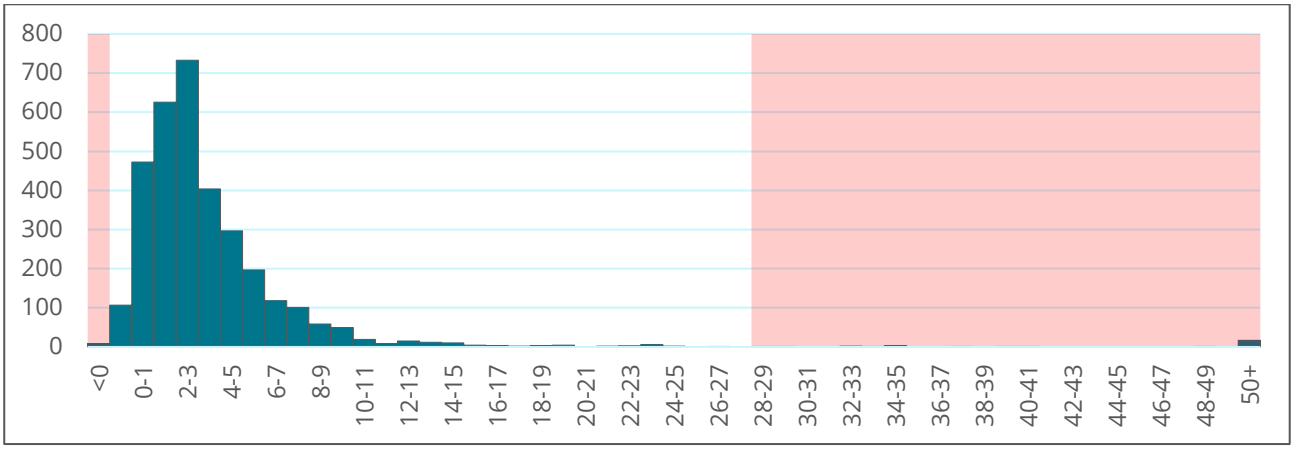

Figure 9 Estimated pre-development PDBU/ha distributions – large sites (n = 3,301). Note: red shaded area denotes the range of values that are "questionable".

There are some possible explanations for these findings regarding where the questionable values come from. Values provided by sites using the small sites metric are more likely to be inaccurate. The small sites metric tool (Defra, 2023) does not require a qualified ecologist to complete, just a "competent individual", as opposed to the full statutory tool. As less expertise is required in small sites' applications, and there may be less concern for reputational damage, incorrect values are more likely to be submitted (even if by accident). The small sites tool is also less flexible in terms of data entry compared to the full tool, which may lead also to incorrect biodiversity values. However, data on whether the full or small sites metric tool was used in an application was not provided, so this could not be investigated further.

Additionally, the way the data provided is averaged is less forgiving for small sites, leading to a higher rate of incorrect "questionable" sites. 50% of the application data for small sites have only one count of application per row, meaning the average value is equal to the actual value. In contrast, for large sites, 79% of the data for each site size have only one row. Of rows with one entry, 4% contained an application that was "questionable", compared to 11% of applications coming from rows with more than one application being "questionable". This means that the average PDBU/ha value for a site could be inflated by being in a row with more than one application, when one of those other applications is "questionable". The likelihood of this is larger for small sites, thereby biasing the number of small sites with questionable PDBU/ha data.

A1.2 Cleaning the Pre-Development Biodiversity Values data

These questionable values needed to be addressed to carry out the analysis. The following procedure was followed to remove all questionable values while limiting the exclusion of as many valid applications as possible, to keep the sample size as large as possible and to prevent biasing the analysis. [19]

- As well as the average PDBU/ha per row value, the minimum and maximum PDBU/ha values per row was calculated.
- For rows with extreme values (defined as <0 PDBU/ha for the minimum value and >27.6 PDBU/ha for the maximum value), these extreme PDBUs[20] value(s) were removed from the data, subtracted from the sum of the total PDBU for that row, giving an updated sum of PDBU values, and removed from the number of applications in a row.
- Then, the average PDBU value for each row was calculated, using the updated sum of PDBU values and the updated number of applications per row.[21]
- These new average PDBU values were used to calculate updated average PDBU/ha value.

Following this procedure, 0.3% of applications requiring BNG were still regarded as questionable (average PDBU/ha either <0 or >27.6). This implied that there was more than one extreme PDBU value application in a row. These rows were removed from the dataset, leaving no questionable values in the cleaned data.

In total, the data cleaning process removed 664[22] applications (4.5% of the number of applications that required BNG), leaving the number of applications that required BNG at 13,974. The distribution of the cleaned data's BU/ha can be seen in Figure 10, with no values in the shaded red area. This cleaned data was used in all the analysis that PDBU values.

[19] An alternative option would be to acquire more granular data, or additional data on the type of application (i.e., whether used full or small sites biodiversity calculation tool, type of development). However, that is not in the scope of this project and would be a separate piece of research.

[20] Note: actual PDBUs, not PDBUs/Ha.

[21] For rows with extreme values, this is the original number of applications in the row minus the number of extreme values (either 1 or 2), for the remaining rows, the number of applications remains the same.

[22] This number is less than the number of questionable applications in the original data (928), as the procedure removes only extreme minimum and maximum values, rather than removing entire rows, hence dealing with the issue of potentially removing valid applications from the data (264 applications that otherwise would have been removed).

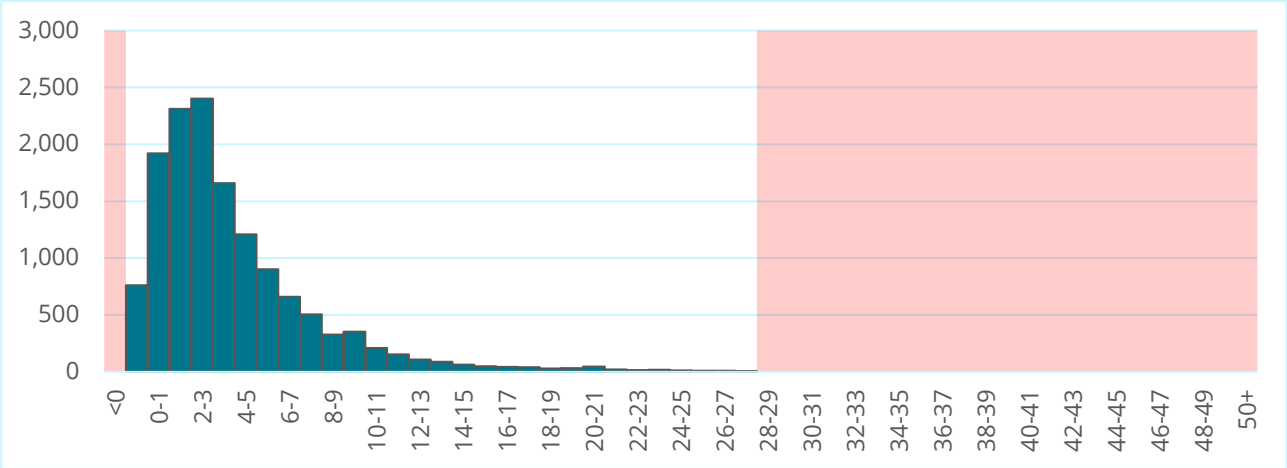

Figure 10 Estimated pre-development PDBU/ha distributions using cleaned data – all sites (n = 13,974). Note: red shaded area denotes the range of values that are "questionable".

Appendix 2 Results breakdown by site size

Appendix Table 1 Number of approved applications subject to BNG in each scenario

Site size	Current	Scenario 1	Scenario 2a	Scenario 2b	Scenario 3	Scenario 4
0-0.1	2,940	52,134	-	-	43,482	-
0.11-0.2	1,696	9,133	9,062	1,696	6,964	-
0.21-0.3	958	4,305	4,276	958	3,341	-
0.31-0.4	719	2,634	2,613	719	2,068	-
0.41-0.5	591	2,044	2,027	591	1,568	-
0.51-0.6	337	1,048	1,035	337	762	-
0.61-0.7	288	846	834	288	631	-
0.71-0.8	266	739	732	266	552	-
0.81-0.9	262	666	658	262	507	-
0.91-1	292	780	769	292	581	-
1-2	868	1,963	1,933	868	1,567	868
2-3	397	826	813	397	682	397
3-4	222	453	444	222	372	222
4-5	165	320	316	165	259	165
5-6	108	204	201	108	167	108
6-7	115	171	168	115	150	115
7-8	62	111	106	62	90	62
8-9	51	86	83	51	74	51
9-10	43	75	73	43	64	43
10+	481	753	728	481	664	481
Total	**10,862**	**79,291**	**26,870**	**7,922**	**64,546**	**2,513**

Scenario 1: no exemptions to BNG requirements; **Scenario 2a:** All sites up to 0.1ha exempt, no other exemptions for larger sites; **Scenario 2b:** All sites up to 0.1ha exempt, current exemptions apply for larger sites; **Scenario 3:** de minimis & self/custom build exemptions removed and **Scenario 4:** All sites up to 1 ha exempt, and current exemptions apply for larger sites.

Appendix Table 2 Number of approved applications exempt from BNG in each scenario

Site size	Current	Scenario 1	Scenario 2a	Scenario 2b	Scenario 3	Scenario 4
0-0.1	49,911	-	52,134	52,134	8,652	52,134
0.11-0.2	7,563	-	72	7,438	2,169	9,133
0.21-0.3	3,406	-	29	3,346	963	4,305
0.31-0.4	1,951	-	21	1,915	565	2,634
0.41-0.5	1,481	-	17	1,453	476	2,044
0.51-0.6	725	-	13	710	285	1,048
0.61-0.7	569	-	11	557	215	846
0.71-0.8	483	-	7	473	187	739
0.81-0.9	414	-	8	405	159	666
0.91-1	499	-	11	489	200	780
1-2	1,122	-	31	1,095	396	1,095
2-3	441	-	13	430	145	430
3-4	237	-	9	231	81	231
4-5	159	-	4	154	60	154
5-6	99	-	3	96	37	96
6-7	59	-	4	57	22	57
7-8	51	-	5	49	21	49
8-9	36	-	3	34	11	34
9-10	32	-	2	31	11	31
10+	282	-	25	272	89	272
Total	**69,519**	**-**	**52,421**	**71,368**	**14,745**	**76,778**

Scenario 1: no exemptions to BNG requirements; **Scenario 2a:** All sites up to 0.1ha exempt, no other exemptions for larger sites; **Scenario 2b:** All sites up to 0.1ha exempt, current exemptions apply for larger sites; **Scenario 3:** de minimis & self/custom build exemptions removed and **Scenario 4:** All sites up to 1 ha exempt, and current exemptions apply for larger sites.

Appendix Table 3 Spatial footprint of approved development sites that require BNG (ha in application boundary)

Site size	Current	Scenario 1	Scenario 2a	Scenario 2b	Scenario 3	Scenario 4
0-0.1	147	2,607	-	-	2,174	-
0.11-0.2	263	1,416	1,405	263	1,079	-
0.21-0.3	244	1,098	1,090	244	852	-
0.31-0.4	255	935	928	255	734	-
0.41-0.5	269	930	922	269	713	-
0.51-0.6	187	581	574	187	423	-
0.61-0.7	189	554	546	189	413	-
0.71-0.8	201	558	552	201	417	-
0.81-0.9	224	570	563	224	434	-
0.91-1	278	745	734	278	554	-
1-2	1,303	2,945	2,899	1,303	2,351	1,303
2-3	992	2,066	2,034	992	1,704	992
3-4	777	1,585	1,554	777	1,301	777
4-5	743	1,438	1,420	743	1,166	743
5-6	595	1,123	1,107	595	919	595
6-7	745	1,115	1,090	745	973	745
7-8	462	830	796	462	675	462
8-9	437	729	704	437	632	437
9-10	413	711	691	413	606	413
10+	14,436	22,588	21,844	14,436	19,917	14,436
Total	**23,160**	**45,122**	**41,454**	**23,013**	**38,039**	**20,902**

Scenario 1: no exemptions to BNG requirements; **Scenario 2a:** All sites up to 0.1ha exempt, no other exemptions for larger sites; **Scenario 2b:** All sites up to 0.1ha exempt, current exemptions apply for larger sites; **Scenario 3:** de minimis & self/custom build exemptions removed and **Scenario 4:** All sites up to 1 ha exempt, and current exemptions apply for larger sites.

Appendix Table 4 BU off-site demand for scenarios

Site size	Current	Scenario 1	Scenario 2a	Scenario 2b	Scenario 3	Scenario 4
0-0.1	67	1,182	-	-	986	-
0.11-0.2	107	578	573	107	440	-
0.21-0.3	96	430	427	96	334	-
0.31-0.4	91	332	329	91	261	-
0.41-0.5	99	342	339	99	262	-
0.51-0.6	74	229	226	74	167	-
0.61-0.7	63	185	182	63	138	-
0.71-0.8	69	191	189	69	143	-
0.81-0.9	74	188	186	74	143	-
0.91-1	96	258	254	96	192	-
1-2	413	935	920	413	746	413
2-3	334	695	685	334	574	334
3-4	251	512	502	251	420	251
4-5	248	479	473	248	389	248
5-6	190	358	353	190	293	190
6-7	217	325	317	217	283	217
7-8	152	274	263	152	223	152
8-9	158	264	255	158	229	158
9-10	124	214	208	124	182	124
10+	4,416	6,910	6,683	4,416	6,093	4,416
Total	**7,339**	**14,880**	**13,365**	**7,272**	**12,498**	**6,504**

Scenario 1: no exemptions to BNG requirements; **Scenario 2a:** All sites up to 0.1ha exempt, no other exemptions for larger sites; **Scenario 2b:** All sites up to 0.1ha exempt, current exemptions apply for larger sites; **Scenario 3:** de minimis & self/custom build exemptions removed and **Scenario 4:** All sites up to 1 ha exempt, and current exemptions apply for larger sites.

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