Norwich Western Link

Environmental Statement Chapter 5: Approach to EIA

Appendix 5.5: Environmental Net Gain Report

Author: WSP UK Limited

Document Reference: 3.05.05

Version Number: 0

Date: March 2024

Contents

Tables

Glossary of Abbreviations and Defined Terms

The definition of key terms used in this report are provided below.

Term	Definition
Biodiversity net gain	Biodiversity net gain (BNG) is an approach to development, and/or land management, that aims to leave the natural environment in a measurably better state than it was beforehand
Ecosystem services	Ecosystem services are the direct and indirect contributions ecosystems provide for human wellbeing and quality of life. This can be in a practical sense, providing food and water and regulating the climate, as well as cultural aspects such as increased wellbeing. The services provided by ecosystems can be categorised as provisioning, regulating, cultural and slightly supporting services.
Environmental net gain	Environmental net gain (ENG) refers to improving all aspects of environmental quality through a scheme or project. Achieving environmental net gain means achieving biodiversity net gain first and going further to achieve increases delivery of ecosystem services

1 Introduction

1.1 Background

1.1.1 This Technical Note is intended to provide an overview of how the concept of environmental net gain (ENG) can be applied to the Norwich Western Link (the 'Proposed Scheme'). This overview responds to the Norfolk County Council (County Planning Authority (CPA)) environmental policy which refers to "*embedding an environmental net gain principle for development, including housing and infrastructure*". This policy aligns with the 25 Year Environment Plan (**Ref 1**) that states "*we will seek to embed a 'net environmental gain' principle for development to deliver environmental improvements locally and nationally*".

1.1.2 After discussion with Norfolk County Council (CPA), this Technical Note applied the Environmental Benefits from Nature (EBN) Tool (Beta Test Version v1.0) (**Ref 2**). This EBN tool is designed to work alongside the Natural England Biodiversity Metric (**Ref 3**) and provides developers, planners and other interested parties with a means of interpreting benefits for people and nature associated with habitats created/enhanced to deliver biodiversity net gain. The tool uses a habitat-based approach to provide a common and consistent means of considering the direct impact of land use change across 18 ecosystem services.

1.2 Purpose of this Technical Note

1.2.1 The purpose of the Technical Note is to present the findings when baseline and post-development habitat data for the Proposed Scheme are entered into the EBN tool. This Technical Note is intended to be read alongside the wider **Environmental Statement Chapter 10: Biodiversity** (Document Reference 3.10.00) and the **biodiversity net gain (BNG) assessment Technical Note** (Document Reference 3.10.33).

1.2.2 This Technical Note is not intended replace any of the individual assessments of the potential effects of the Proposed Scheme included in the Environmental Statement. It considers the changes in ecosystem service provision linked to habitat creation and enhancement only. This Technical Note should be read as an illustrative assessment of the potential changes in ecosystem service provision pre and post development. Therefore, the relevant chapters of the Environmental Statement of the Proposed Scheme should be referred to for a complete assessment of likely impacts of the Proposed Scheme.

2 Methodology

2.1 Environmental Benefits from Nature Tool

2.1.1 This Technical Note presents an assessment of ENG using the Beta version of the Natural England Environmental Benefits from Nature (EBN) tool (**Ref 2**). This tool uses baseline and post development habitat data to measure changes in the extent and condition of habitats. It indicates relative changes in the provision of 18 different ecosystem services due to habitat and land-use change. Data entry was informed by the Beta Release User Guide (**Ref 4**) that accompanied the release of the EBN tool.

2.2 Scope of EBN Tool

2.2.1 The EBN tool was populated with the baseline and post development habitat data that had been previously collated for the Proposed Scheme **BNG assessment** (Document Reference 3.10.33) (i.e. tt matches the baseline and post development data used to inform the BNG Technical Note). These data were the same as those used to inform the biodiversity net gain assessment for the scheme. Only habitats within the ‘on-site’ areas discussed in the BNG report were used to populate the post development element of the EBN tool.

2.2.2 For the post development habitat data it was necessary to specify the 'type of change' to the habitat. This change could be one of three types, namely:

- **newly created habitats** (where one habitat will be replaced with one of a different type);
- **'enhanced' habitats** (where the condition of a habitat was changed but not the habitat type); or
- **'retained' habitats** (where the habitat remained unchanged).

2.2.3 The EBN tool requires users to add a 'starting habitat' where habitats have been newly created as part of the Proposed Scheme. This 'starting habitat' had to be specified using a predefined dropdown list. The category options included the following:

- Arable fields, horticulture and temporary grass
- Improved grasslands
- Semi-natural grasslands
- Bare ground
- Soil removed
- Sealed surface and buildings

2.2.4 Within the Beta version of the EBN tool, there was no option to capture 'other woodland; broadleaved' or 'other woodland; mixed' as a starting habitat and thus, where these were starting habitats they were captured as 'bare ground' (on the advice of Natural England, who were contacted by WSP to clarify how to approach absence of these habitat types).

2.3 Limitations

2.3.1 The aim of using the EBN tool was to provide an assessment of the potential changes in ecosystem service provision following construction of the Proposed Scheme, using a standard methodology. The EBN tool assessment

was based on habitat data for the on-site areas of the Proposed Scheme, at baseline and post development.

2.3.2 It should be noted that the version of the EBN tool used to inform this Technical Note is the Beta issue, and this tool is likely to be updated in the future. It is understood that the EBN tool is intended to complement the Biodiversity Metric, but the current version is potentially not suitable for use on linear infrastructure developments such as the Proposed Scheme. This is illustrated by the absence of suitable 'starting habitats' for some habitat creation, as discussed in section 2.2.

2.3.3 On this basis, it is therefore recommended that this Technical Note is read as an illustrative assessment of the potential changes in ecosystem service provision pre and post development. It is not intended to replace the detailed environmental assessment of the potential effects of the Proposed Scheme. Therefore, the relevant chapters of the Environmental Statement of the Proposed Scheme should be referred to for a complete assessment of likely impacts of the Proposed Scheme.

3 Results

3.1 Introduction

3.1.1 The EBN tool is based on scores (on a scale of 0-10) for the ability of different types of land cover to deliver 18 ecosystem services. The scores are modified by applying multipliers based on 40 indicators of habitat condition and spatial location, and then multiplied by the area of habitats, as well as by multipliers to reflect delivery risk and the time taken for new habitats to reach their target condition. This calculation is performed first for the habitats in the baseline (before change) and then for the habitats after the planned development or other land-use intervention. The results indicate the change in provision of ecosystem services from the baseline to the post-development situation.

3.1.2 Once the EBN tool had been populated, results were automatically calculated and displayed in the 'Results' sheet tab (refer to Figure 3-1). The results give

an overview of the potential impacts of on-site habitat change at three specific points in time (i.e. 1, 10 and 30 years - not cumulative) for the whole area. It should be noted that for the purposes of this project only 'on-site' habitat changes were relevant.

3.1.3 The potential change in provision of 18 ecosystem services were considered for the entire area and arrows used to indicate the direction and magnitude of change in the total score for each of these ecosystem services at the three time points after the Proposed Scheme compared to the baseline prior to the scheme.

Table 3-1 - Potential changes in ecosystem service provision over 30 years – output from the EBN Tool Beta V1.0. For definitions of scale of change see Table 3-2. For definition of confidence ratings within the tool see Table 3-3

Whole Area	1 Year	10 Year	30 Year	Confidence
Food production	Decrease	Decrease	Decrease	Amber
Wood production	Decrease	Minor Change	Minor Change	Amber
Fish production	Minor Change	Minor Change	Minor Change	Amber
Water supply	Decrease	Decrease	Decrease	Red
Flood regulation	Minor Change	Minor Change	Increase	Red
Erosion protection	Increase	Increase	Increase	Red
Water quality regulation	Increase	Increase	Increase	Red
Carbon storage	Minor Change	Minor Change	Increase	Amber

Whole Area	1 Year	10 Year	30 Year	Confidence
Air quality regulation	Decrease	Minor Change	Increase	Amber
Cooling and shading	Decrease	Decrease	Minor Change	Amber
Noise reduction	Minor Change	Minor Change	Minor Change	Amber
Pollination	Decrease	Increase	Increase	Red
Pest control	Decrease	Increase	Increase	Red
Recreation	Increase	Increase	Increase	Red
Aesthetic value	Decrease	Increase	Increase	Red
Education	Decrease	Increase	Increase	Red
Interaction with nature	Decrease	Increase	Increase	Red
Sense of place	Decrease	Increase	Increase	Red

Table 3-2 Definition of the relationship between change in average score per hectare and scale of increase/decrease of ecosystem service provision presented in Table 3-1 (output from the EBN Tool Beta V1.0).

Change in average score per hectare
Large decrease (more than -2.5 points out of 10)
Decrease (-0.25 to -2.5 points out of 10)
Minor Change (-0.25 to 0.25 points out of 10)
Increase (0.25 to 2.5 points out of 10)

Change in average score per hectare
Large increase (more than 2.5 points out of 10)

Table 3-3 Definition of confidence ratings within the tool (output from the EBN Tool Beta V1.0).

Confidence Rating	Definition
Red	The relationship between the provision of the ecosystem service and habitats is complex. Evidence for scoring/multipliers is partial, although may be stronger for some habitats than others. Evidence gaps have been filled by consulting experts and with a degree of subjetcivity, particularly for cultural services.
Amber	We have some suitable evidence to calibrate our range of scores across habitats and multipliers and/or scoring applied to a limited range of habitats / multipliers for which there is a sound and simple rationale.
Green	We have a strong evidence base upon which to base scores across the range of habitats and multipliers used for this ecosystem service.

3.2 Output of the EBN Tool

3.2.1 The results have been interpreted in terms of the Millennium Ecosystem Assessment classification system of ecosystem services, namely:

- Provisioning services;
- Regulating services; and
- Cultural services.

3.2.2 These services are defined below.

Provisioning Services

3.2.3 Provisioning services are the tangible resources or 'products' that people obtain from ecosystems. They include food, wood and water which are mostly traded in markets and thus, have market prices.

Food production

3.2.4 The results of the EBN tool assessment indicate a decrease in the ecosystem service of food production over time (the decrease is immediate from year 1 and including up to 30 years after the Proposed Scheme). This decrease is attributed to the large decrease (almost 45% decrease) in the area of arable crops within the boundary of the scheme post development relative to the baseline.

Wood production

3.2.5 The results indicate little change in the potential for wood production, however, by year 30 there has been a reduction in provision of this ecosystem service. In year 1 there is an initial decrease in wood production post development possibly due to the clearing of woodland before the production stabilises in later years – 10 and 30 years after development. This finding should be interpreted with caution, as the primary aim of habitat creation within the Proposed Scheme is not timber production.

Fish production

3.2.6 The results indicate little change in the potential for fish production over the 30 year period included in the EBN tool assessment. This is likely a consequence of the limited area of river/lake habitat affected by the Proposed Scheme.

Water supply

3.2.7 The results indicate a decrease in water supply ecosystem services over the 30 years post development. The increase in impermeable surfaces subsequent to development (i.e. 'developed land with sealed surfaces') results in less rainwater infiltration into the ground as well as reducing the recharging of groundwater supplies.

Regulating Services

3.2.8 Regulating services are benefits obtained from the regulation of ecosystem processes and include flood regulation, erosion control, pest control and pollination.

Flood regulation

3.2.9 The results suggest that provision of flood regulation services will initially remain stable post development of the Proposed Scheme but after a 30 year period there will be an increase. It should be noted that the assessment does not take into account topography but rather the effect of habitat and land use change in the area. It is not possible to link the potential increase in flood regulation to a specific habitat based on this tool assessment.

Erosion protection

3.2.10 Erosion protection is anticipated to increase immediately following the Proposed Scheme as well as over time. The type of habitats created post development will influence the erosion protection and those habitats that offer dense ground cover such as long grass, scrub and woodland will help increase erosion protection.

Water quality regulation

3.2.11 The results indicate an increase in the ecosystem service of water quality regulation immediately subsequent to the Proposed Scheme and over time. Ensuring a clean water supply is one of the key goals government has stated in its environmental plan and this is fully supported by the Norfolk County Council.

Carbon storage

3.2.12 The results indicate little change in carbon storage subsequent to the Proposed Scheme but after a 30-year period there will be an increase, potentially associated with the habitats created within the landscape plan for the scheme maturing. This finding should be interpreted with caution, as it may not reflect the removal of habitats during construction.

Air quality regulation

3.2.13 The results indicate an initial decrease in air quality regulation, however, by year 30 the EBN tool assessment indicate an increase in air quality. Again, this is likely related to habitats maturing but it is not possible to assign this finding changes in a particular habitat based on this tool assessment.

Cooling and shading

3.2.14 The results indicate an initial decrease in cooling and shading attributed to the initial loss of existing woodland habitat associated with the scheme. By year 30 the result for cooling and shading has stabilised.

Pollination

3.2.15 An initial decline in pollination ecosystem services is observed subsequent to the construction of the Proposed Scheme. This corresponds to a decline in crops and other vegetation present pre-development. The EBN tool assessment indicates that pollination will then increase over time (in years 10 and 30), potentially due to establishment of habitats post development.

Pest control

3.2.16 Similar to pollination services, in year 1 post development pest control services are seen to decline, due to development and Site vegetation clearance. Thereafter, the EBN tool assessment increases in years 10 and 30.

Cultural Services

3.2.17 Cultural services are nonmaterial benefits obtained from ecosystems such as recreation, spiritual values and aesthetic enjoyment.

Noise reduction

3.2.18 Results of the EBN tool assessment indicate little change in noise levels over the 30 year assessment period considered. However, this finding should be interpreted with caution as it does not reflect the use of the Proposed Scheme by traffic post development. For further information, please see Chapter 7

Noise and Vibration (**Document reference 3.07.00**) and associated appendices.

Recreation

3.2.19 Results indicate that there will be an increase in opportunities for recreation in nature following the Proposed Scheme. This is likely related to the provision of new areas of habitats within the landscape design of the scheme. This finding should be interpreted with caution as it may not accurately reflect the prevailing environmental conditions during operation the Proposed Scheme and does not consider accessibility of habitats.

Aesthetic value

3.2.20 Following an initial decline after development, EBN tool assessment results indicate that aesthetic value will increase over time as post development habitat is established (i.e. in years 10 and 30). As with noise and recreation, this finding should be interpreted with caution as it may not accurately reflect the prevailing environmental conditions during operation of the Proposed Scheme.

Education

3.2.21 The EBN tool assessment results suggest that there will be an initial decline in educational opportunities following the Proposed Scheme due to the clearance of arable lands as well as other habitat types. Over time, however, the results indicate there will be an increase in education opportunities (in years 10 and 30). This finding should be interpreted with caution as it may not accurately reflect the prevailing environmental conditions during operation Proposed Scheme.

Interaction with nature

3.2.22 The results indicate interactions with nature will increase over time. As described above, this is likely due to provision of new areas of habitats within the landscape design of the scheme. This finding should be interpreted with caution as it may not accurately reflect the prevailing environmental conditions during operation of the Proposed Scheme.

Sense of place

3.2.23 The results indicate sense of place will initially decline after the Proposed Scheme and is attributed to the initial loss of habitats that create a ‘sense of place’. The results indicate a likely increase to the sense of place in years 10 and 30. This finding should be interpreted with caution as it may not accurately reflect the prevailing environmental conditions during operation of the Proposed Scheme.

4 Conclusion

4.1.1 Through comparison of baseline and post development habitat data to measure changes in the extent and condition of habitats, the EBN tool can provide a very high level indication of the relative changes in the provision of 18 different ecosystem services.

4.1.2 It is thought that the assessment presented in this Technical Note may be one of the first times the EBN tool has been used to assess changes in ecosystem services associated with a highways scheme. This assessment has therefore illustrated some limitations in the application of the tool in this way. The findings of this Technical Note suggest caution should be applied to interpretation of EBN tool findings in the context of a linear infrastructure development. With particular respect to cultural ecosystem services (and based on the limited data that informed the assessment), it is recommended that the EBN tool results are interpreted with caution as it may not accurately reflect the prevailing environmental conditions during operation of the Proposed Scheme as a new highway.

4.1.3 It should be noted that the tool is limited both by the availability of data and that it is a ‘Beta version’ and remains in development. Care should be taken to avoid overinterpretation of results, for example in relation to factors such as noise where the tool cannot account for traffic levels and rather makes an assessment based on the relative regulating value of pre and post development habitat types. As such the results presented should be read in conjunction with and not be taken to supersede the relevant Environmental Statement chapters.

5 References

Ref 1: gov.uk government publications 25-year-environment-plan

Ref 2: The Environmental Benefits from Nature Tool - Beta Test Version

Ref 3: The Biodiversity Metric 4.0

Ref 4: Environmental Benefits from Nature (EBN) Tool - Beta Release User Guide