

SF3364 | Land off Dodworth Green Road, Dodworth

RIVER CONDITION ASSESSMENT AND BIODIVERSITY NET GAIN SUMMARY

January 2023 | For Planning

SMEEEDEN FOREMAN

Landscape Architecture • Ecology • Arboriculture

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1.0 INTRODUCTION

- 1.1 Smeeden Foreman Limited has been commissioned by Newett Homes to undertake a River Condition Assessment (RCA) and associated Biodiversity Net Gain (BNG) calculations for their site at 'Land off Dodworth Green Road, Dodworth (central grid reference SE 31440 05004), hereafter referred to as the 'site'.
- 1.2 This report details the methodology and results of the RCA and associated BNG calculations, which will further inform the site-wide BNG assessment for the site.
- 1.3 The principle of 'net gain' is set out in the National Planning Policy Framework (NPPF July 2021):
- Paragraph 174: *'Planning policies and decisions should contribute to and enhance the natural and local environment by:...*
*d) minimising impacts on and providing **net gains for biodiversity**, including by establishing coherent ecological networks that are more resilient to current and future pressures;'*
- Paragraph 179: *'To protect and enhance biodiversity and geodiversity, plans should:*
*b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable **net gains for biodiversity**.'*
- Paragraph 180: *When determining planning applications, local planning authorities should apply the following principles:*
*d) development whose primary objective is to conserve or enhance biodiversity be supported; while opportunities to incorporate biodiversity improvements in and around developments should be integrated as part of their design, especially where this can secure measurable **net gains for biodiversity** or enhance public access to nature where this is appropriate.*
- 1.4 The requirement for developers to secure a minimum biodiversity net gain of 10% is currently progressing through the legislative process within the Environment Bill.
- 1.5 The current Barnsley Local Plan (2019) does not include policy with specific reference to BNG or the delivery of measurable net gains; however, one of the objectives of the Local Plan is to *"protect and enhance Barnsley's natural assets and achieve net gains in biodiversity"*.
- 1.6 It is understood that a Biodiversity Net Gain design should improve the extent or condition of biodiversity affected by a project. It should not result in lost or damaged features being replaced by features of lower biodiversity value. The mitigation hierarchy principle of avoid – minimise – remediate – compensate should be followed within the design process with irreplaceable features retained.
- 1.7 Site proposals are for the development of 51 residential dwellings with associated infrastructure and landscaping. Infrastructure works include for the creation of a roadway over a stream which runs centrally through the site, by way of culverting a section of the stream.

2.0 THE SITE

- 2.1 The site is located to the east of Dodworth Green Road, Dodworth and comprises a series of irregular shaped fields, split by a small watercourse running west-east across the site. A second watercourse is located to the south of the site, within 10m of the application boundary. Please refer to *Figure 1* for the site location.
- 2.2 The stream which runs centrally through the site (Stream 1) is unnamed and is culverted both on the entry and exit points on the site boundaries. From reviewing Ordnance Survey maps, these culverts seem to be significant in length and it is not clear where the stream re-emerges from the culvert. The stream on site therefore appears to be the only open section of this watercourse within a significant distance from the site.
- 2.3 The stream to the south of the site (Stream 2) is culverted upstream near to residential properties off Ratten Row, Dodworth, but is visible again near Dodworth cemetery. Further upstream of the site, the stream appears to be fed by smaller agricultural ditches / streams, located adjacent to arable fields. Any further upstream watercourse connections are unclear. Downstream of the site, the stream continues to flow eastwards until it reaches South Street, Dodworth, where it is culverted. Beyond this, it is unclear where the stream re-emerges from the culvert.

3.0 RIVER CONDITON ASSESSMENT

Methodology

- 3.1 Whilst the calculation of biodiversity units for Rivers and Streams, to inform BNG, is undertaken with reference to *The Biodiversity Metric 3.1 User Guide* (Panks *et al.* April, 2022a) and *Technical Supplement* (Panks *et al.* April, 2022b) as for terrestrial habitats, the assessment of river condition is calculated via a RCA, an assessment specific to Rivers and Streams. The RCA is undertaken upon any rivers and streams located within a proposed site boundary or where a site boundary is located within the riparian zone of any given river or stream (with the riparian zone defined as the area within 10m of the bank top). The RCA comprises a combination of a desk-based assessment (which indicates 'River Type') and field survey (to assess the 'condition' of the river), as summarised in Panks *et al.* (April 2022b) and detailed within Gurnell *et al.*, (August, 2021).
- 3.2 The desk-based assessment assigns the river or stream into one of 13 river types, based upon a homogenous 'reach' that contains the site of interest. The reach is identified using current Ordnance Survey maps (1:10,00 scale) and / or aerial photographs, and will typically include areas upstream and downstream of the site of interest. The start and end point of a reach is defined where one of the following are encountered:
- a major tributary (e.g., likely to contributing > 10% flow in the river/stream)
 - a major artificial barrier (e.g., > 5m tall - likely to significantly change flow or sediment movements)
 - a distinct and persistent change in planform (e.g., meandering to straight / slightly sinuous)
- 3.3 Two alternative river types can be assigned to a river by the surveyor for rivers that are too large or deep for the riverbed to be adequately surveyed (Large River) or for rivers that are too heavily modified to conform to one of the other river types (Navigable Rivers and Canals).
- 3.4 The field element comprises a series of five MoRPh (**Modular River Physical**) surveys (Gurnell *et al.* 2022.) undertaken on contiguous lengths (modules) of a river. The length of each MoRPh module is approx. twice the river width. Completing five contiguous MoRPh modules provides a 'sub-reach'. Where required, the sub-reach survey of five modules is repeated until at least 20% of the total river length under consideration is surveyed, or to allow for characterisation of any notable variations in the river character. The field survey information is subsequently input into the MoRPh web application which, along with consideration of the desk-based assessment, automatically provides an overall condition classification.
- 3.5 The field survey was undertaken on 23rd August 2022 by trained and certified surveyor Jonathan Siberry MCIEEM (Senior Ecologist). The weather was warm and dry, with no significant precipitation events having taken place within 48 hours of the survey.

Limitations

- 3.5.1 Due to the presence of dense vegetation (scrub) in areas of Modules 2, 3 and 4 (Stream 1), the banks and river channel were partially obscured. As such, care was taken by the surveyor to accurately note all visible features and where necessary, assumptions were made for the modules based upon the visible features / characteristics and the surveyor's professional judgement.

Results

- 3.6 The reach, sub-reach and module locations are shown on *Figure 2*. It should be noted that for Stream 1, the reach does not extend beyond the site boundary due to the presence of culverts of significant lengths both upstream and downstream of the site.
- 3.7 A summary of values attributed to the RCA are summarised in Table 1 below, along with condition score and final condition classification. Full survey details from each MoRPh module or MoRPh5 group can be provided, upon request.

Table 1: Summary of the River Condition Assessment Values

River / Stream Name	Reach	Sub-reach	Module Length (m)	River Shape	Average Width (m)	River Category	A1: Braiding Index	A2: Sinuosity Index	A3: Anabranching Index	A4: Level of Confinement	A5: Reach Valley Gradient	A6: Bedrock Reach?	A7: Coarsest Bed Material	A8: Average Bed Material	River Type	Condition Score	Condition Class
Stream 1	Traveller's Inn – Stratford Walk	Traveller's Inn	10	1.36	0.98	Other River / Stream	1	1.14	1	Unconfined	0.085	No	Boulder	Silt	Type D	1.98	Fairly Good
Stream 2	Dodworth Cemetery – South Street	Ratten Row	10	0.45	2.5	Other River / Stream	1	1.02	1	Unconfined	0.022	No	Boulder	Silt	Type D	1.42	Fairly Good

- 3.8 Both Stream 1 and Stream 2 achieve a condition score of Fairly Good.

4.0 BIODIVERSITY NET GAIN ASSESSMENT – RIVERS & STREAMS

Methodology

- 4.1 The DEFRA Biodiversity Metric v3.1 has been used to carry out the BNG calculation for rivers and streams, with reference made to *The Biodiversity Metric 3.1 User Guide* (Panks *et al.* April, 2022a) and *Technical Supplement* (April, 2022b). The Metric has been developed by Natural England, the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency with input from various environmental NGOs, developers, councils and other interested parties.
- 4.2 The condition of rivers and streams is determined via a RCA, as detailed within Section 3.0. Values for distinctiveness are pre-set within the Metric spreadsheet; strategic significance has been allocated as either ‘high’ where appropriate actions have been identified within Locals Plans, Local Nature Recovery Strategies, River Basin Management Plans, Catchment Plans, a Catchment Planning System or where the river or stream is noted as a Priority Habitat for Restoration, or ‘low’ where no appropriate actions are identified, with reference to Table 9-5 of the Biodiversity Metric v3.1 User Guide (Panks *et al.* 2022a). Values for watercourse and riparian encroachment have been selected based upon the guidance provided within Table 9-3 and 9-4 of the Biodiversity Metric v3.1 User Guide (Panks *et al.* 2022a).

Baseline

- 4.3 Details of the on-site streams are summarised in Table 2 along with the length measurements for each river / stream type and any necessary justifications. Baseline habitats have been mapped and measured using scaled GIS drawings (*Figure 3*). Please refer to Section 3.0 for a summary of the condition assessment for each stream.

Table 2: Site Habitat Baseline – Rivers & Streams

Ref No.	River Type	Length (km)	Distinctiveness (pre-set)	Condition	Strategic significance	Watercourse Encroachment	Riparian Encroachment	Justification/notes
1	Other River and Stream	0.135	High	Fairly Good	High – Within Local Plans	No Encroachment	Major	Rivers and streams are listed as a local priority habitat within the Barnsley Biodiversity Action Plan. No watercourse encroachment but residential buildings are present within 4m of the stream.
2	Other River and Stream	0.115	High	Fairly Good	High – Within Local Plans	Minor	Minor	Rivers and streams are listed as a local priority habitat within the Barnsley Biodiversity Action Plan. Outflow pipes present but less than 5% of the streambank is engineered. A footpath is located approx. 6m from the stream but comprises less than 10% of the riparian zone area.

4.4 Inputting the above site habitat baseline information into the Metric Calculation Tool provides the excerpts shown below in Tables 3, 4 and 5.

Table 3: River Baseline On-site – Metric Calculation Tool

C-1 Site River Baseline																					
Condense / Show Columns		Condense / Show Rows																			
Main Menu		Instructions																			
Existing river type			Habitat distinctiveness		Habitat condition		Strategic significance			Watercourse encroachment		Riparian encroachment		Suggested action	Ecological baseline	Retention category biodiversity value					
Baseline ref	River type	Length (km)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic significance	Extent of encroachment	Multiplier	Extent of encroachment	Multiplier		Total river units	Length retained	Length enhanced	Units retained	Units enhanced	Length Lost	Units Lost
1	Other Rivers and Streams	0.135	High	6	Fairly Good	2.5	Within Local Plans	High strategic significance	1.15	No Encroachment	1	Major	0.75	Restore	1.75		0.113	0.00	1.46	0.02	0.28
2	Other Rivers and Streams	0.115	High	6	Fairly Good	2.5	Within Local Plans	High strategic significance	1.15	Minor	0.8	Minor	0.95	Restore	1.51		0.115	0.00	1.51	0.00	0.00
3																					
4																					
5																					
6																					
7																					
															3.25	0.00	0.23	0.00	2.97	0.02	0.28

4.5 On-site baseline units for rivers and streams, as calculated within the Metric, equate to a total of **3.25 units**.

Post-development

4.6 Based upon the proposed planning layout and landscape masterplan (Drawing Ref. H22-0018_001D), there will be no additional watercourse creation and the condition of the streams would also not change. As such, the change in river units would be a **loss of 0.72 units (22.12%)**. However, recommendations have been provided by Smeeden Foreman to the client with regards to increasing the condition of the on-site streams. Enhancements to Stream 1 were agreed upon and would increase the condition of Stream 1 from 'Fairly Good' to 'Good'. This condition increase would be achieved through:

- 1) the addition of large wood (greater than 1m long and 10cm diameter) to the bank top and stream bed in Module 1 (the northern extent of the on-site section of Stream 1); and,
- 2) the removal of large trash throughout the on-site section of Stream 1.

4.7 Delivery of the above-listed enhancements would reduce the loss of river units on site, resulting in an overall **0.57 river unit loss (17.63%)**.

4.8 Table 4 summarises proposed watercourse (culvert) creation, whilst Table 5 summarises proposed watercourse changes / enhancements. Please refer to *Figure 4* for the location of post-development river / stream habitats.

Table 4: River Creation on Site – Metric Calculation Tool

C-2 Site River Creation											
Condense / Show Columns			Condense / Show Rows								
Main Menu			Instructions								
Baseline ref	Proposed habitats		Habitat distinctiveness	Habitat condition	Strategic significance	Temporal multiplier		Difficulty multipliers	Watercourse encroachment	Riparian encroachment	River units delivered
	River type	Length (km)	Distinctiveness	Condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition/years	Final difficulty of creation	Extent of encroachment	Extent of encroachment	
1	Culvert	0.022	Low	Poor	Low potential/action not identified in any plan	Standard time to target condition applied	1	Low	Major	Major	0.02
2											
3											
4											
5											
		0.02									0.02

Table 5: River Changes / Enhancement on Site – Metric Calculation Tool

C-3 Site River Enhancement																
Condense / Show			Condense / Show Rows													
Main Menu			Instructions													
Baseline ref	Baseline habitats		Proposed River Type (Pre-populated can be overridden)		Change in distinctiveness and condition		Length (km)	Post development/ post intervention habitats		Temporal multiplier		Difficulty multipliers	Watercourse encroachment	Riparian encroachment	River units delivered	
	Baseline habitat		Proposed River Type		Distinctiveness movement	Condition movement		Habitat distinctiveness	Habitat condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition/years	Final difficulty of enhancement	Extent of encroachment		Extent of encroachment
1	Other Rivers and Streams		Other Rivers and Streams		High - High	Fairly Good - Good	0.113	High	Good	Delivery within Local Plans	Standard time to target condition applied	2	Medium	Minor	Major	1.32
2	Other Rivers and Streams		Other Rivers and Streams		High - High	Fairly Good - Fairly Good	0.115	High	Fairly Good	Delivery within Local Plans	Standard time to target condition applied	1	Medium	Minor	Moderate	1.35
							0.23									2.66

Table 6: Headline Results – Metric Calculation Tool

On-site baseline	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	3.25
On-site post-intervention <small>(Including habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	2.68
On-site net % change <small>(Including habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	0.00%
	<i>Hedgerow units</i>	0.00%
	<i>River units</i>	-17.63%
Off-site baseline	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Off-site post-intervention <small>(Including habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Total net unit change <small>(including all on-site & off-site habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	-0.57
Total on-site net % change plus off-site surplus <small>(including all on-site & off-site habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	0.00%
	<i>Hedgerow units</i>	0.00%
	<i>River units</i>	-17.63%
Trading rules Satisfied?	Yes ✓	

5.0 SUMMARY

- 5.1 One stream (Stream 1) is present on site, splitting the site in two and flowing west-east. A second watercourse is located to the south of the site, within 10m of the application boundary, also flowing west-east.
- 5.2 The current Barnsley Local Plan (2019) does not include policy with specific reference to BNG or the delivery of measurable net gains; however, one of the objectives of the Local Plan is to *“protect and enhance Barnsley's natural assets and achieve net gains in biodiversity”*.
- 5.3 Both streams (Stream 1 and Stream 2) have been assessed being of ‘Fairly Good’ condition.
- 5.4 Watercourse and riparian encroachment will increase for both streams as a result of the proposed residential development and there would not be any enhancements of either stream as a result of the proposed layout; however, targeted enhancements will be adopted within Stream 1 (the inclusion of ‘large wood’ on the bank top / within the channel and the removal of large trash from the stream). These enhancements will result in a condition increase from ‘Fairly Good’ to ‘Good’ for Stream 1. As such, the anticipated net change in river units as a result of the proposed development is **a loss of 0.57 units (-17.63%)**.
- 5.4.1 Commitment to long term future management of Stream 1 will be required to achieve the habitat conditions aimed for and should be undertaken in accordance with a site-specific Biodiversity and Ecological Management Plan (BEMP), or similar. The provision of these details can be provided by condition.

6.0 REFERENCES

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FIGURES

Figure 1: Site Location Plan

Figure 2: Reach, Sub-reach and Module Locations

Figure 3: Pre-Development Habitats – Rivers & Streams

Figure 4: Post-Development Habitats – Rivers & Streams

FIGURE 1: SITE LOCATION PLAN

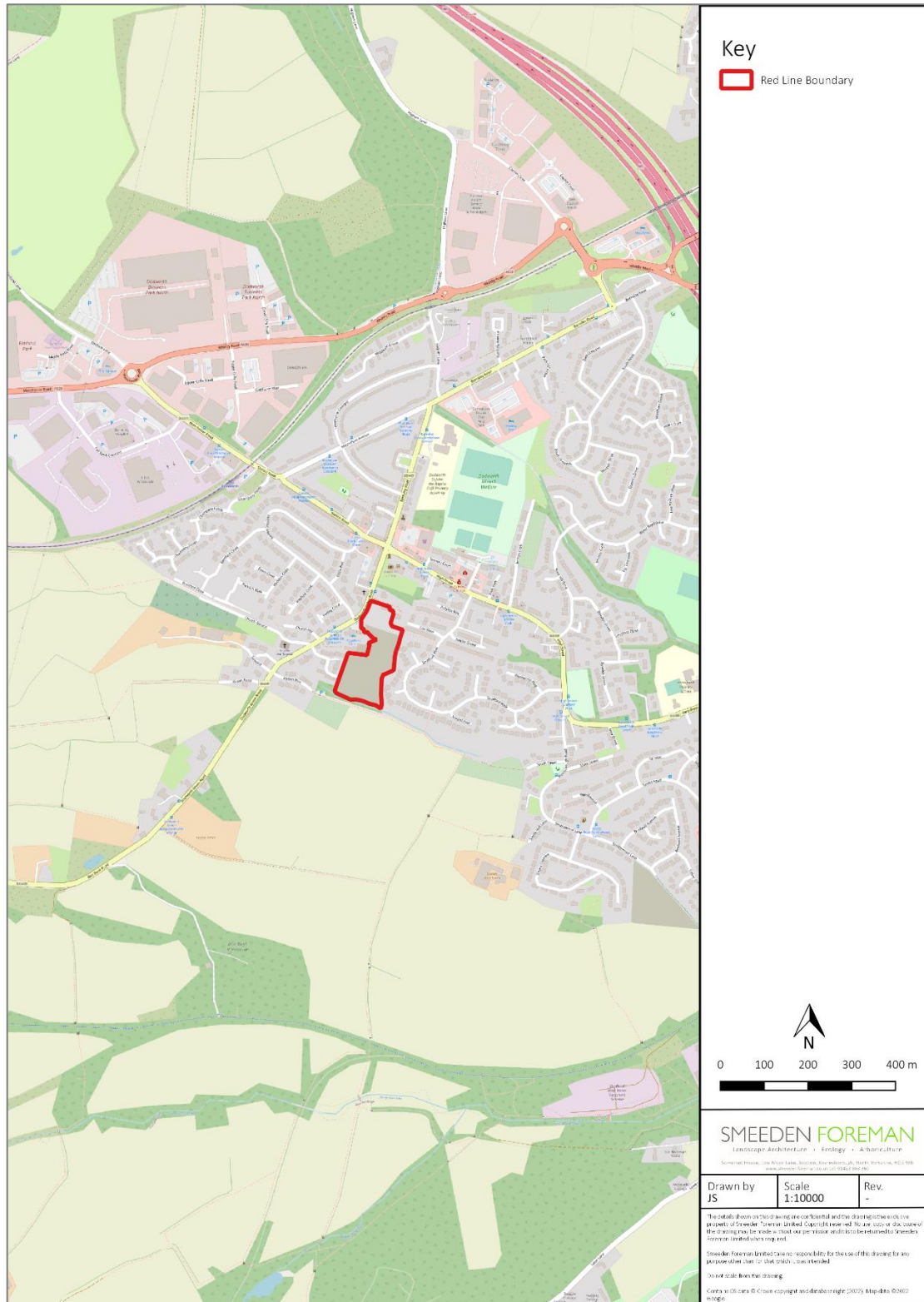


FIGURE 2: REACH, SUB-REACH AND MODULE LOCATIONS



FIGURE 3: PRE-DEVELOPMENT HABITATS – RIVERS & STREAMS

