A585 Windy Harbour to Skippool Improvement Scheme

TR010035

6.8.9 ES Appendix 8.9: Biodiversity Metric Calculations

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Infrastructure Planning

Planning Act 2008

The Infrastructure Planning
(Applications: Prescribed Forms and
Procedure) Regulations 2009

A585 Windy Harbour to Skippool Improvement Scheme
Development Consent Order 201[ ]

ES APPENDIX 8.9: BIODIVERSITY METRIC CALCULATIONS

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010035
Application Document Reference	TR010035/APP/6.8.9
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Version	Date	Status of Version
Rev 0	October 2018	DCO submission

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CONTENTS

LIST OF TABLES

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1 INTRODUCTION

1.1 Aims and Objectives

1.1.1 This report provides the findings of the Habitat Metric Calculation undertaken in support of Highways England's proposed development of the A585 between Windy Harbour and Skippool (hereafter referred to as 'the Scheme').

1.1.2 The aims and objectives were to:

- Calculate the Scheme's biodiversity units: baseline and predicted future baseline

- Determine the change in biodiversity units as a result of the Scheme

1.2 Report Structure

1.2.1 This report has been subdivided into the following sections:

- Section 1: Aims and objectives

- Section 2: Methodology

- Section 3: Results

- Section 4: Discussion

- Section 5: References

2   METHODOLOGY

2.1   Study Area

2.1.1   The area used for the calculation comprised all land within the draft order limits (refer to Figure 2.1 within Chapter 2: Description of the Scheme (document reference TR010035/APP/6.2).

2.2   Calculation

2.2.1   Biodiversity units were determined using the metric calculation published by Highways England in April 2018 within Chief Highway Engineer Memorandum 422/18, hereafter referred to as the 'CHE Memorandum' (Highways England, 2018), and the method published by Defra in Biodiversity Offsetting Pilots Technical Paper: the metric for the biodiversity offsetting pilot in England (Defra, 2012), hereafter referred to as the 'Defra Paper'.

2.2.2   The metric calculation requires the calculation of Biodiversity Units based on 5 factors and is calculated before and after works are undertaken, as per the following:

Before Works =   Distinctiveness Score x Condition Criteria x Area

After Works =   (((Distinctiveness Score x Condition Score x Area) /Time till target condition) / Difficulty of creation/restoration)

2.2.3   The 5 factors are determined as follows:

- Distinctiveness Score – (high, medium, low) based on Phase 1 Habitat types

- Condition Score – (good, moderate, poor) based on habitat condition assessment

- Area – hectares of habitat type

- Time till target condition – period in years until the target condition will be achieved

- Difficulty of creation/restoration – a score applied to account for risk associated with different types of habitat creation/restoration

2.2.4   Full details relating to criteria for Distinctiveness Scores and Condition Scores can be found the CHE Memorandum. Full details relating to Time till target condition and Difficulty of creation/restoration can be found in the Defra Paper.

2.2.5   Linear habitats (i.e. hedges and ditches) are addressed separately to non-linear habitats such as woodland and grassland; additionally, as biodiversity units are calculated for conditions both before and after works, this results in 4 separate sets of values.

Before Works

2.2.6   Biodiversity units for 'before works' represent existing baseline conditions prior to construction. Habitat types for baseline conditions were derived during field surveys undertaken in support of the Scheme in line with the method described in the 'Handbook for Phase 1 Habitat Survey – a technique for environmental audit' (Joint Nature Conservation Committee, 2010) (see Appendix 8.1 (document reference

TR010035/APP/6.8.1) for full details).

After Works

2.2.7 Biodiversity units for 'after works' represent the predicted future conditions, post-construction. Phase 1 Habitat types for the predicted future baseline were derived from the Environmental Masterplan prepared in support of the Scheme (document reference TR010035/APP/6.19).

2.2.8 The metric calculation does not consider the comprehensive set of Phase 1 habitat types; therefore, only those habitats of relevance to the metric were included (e.g. hardstanding does not have an associated metric category). Additionally, the metric includes habitats at a lower resolution, for example, 'hedges' does not distinguish between species-rich and species-poor at the habitat category level, but species richness is accounted for in the associated condition score.

Distinctiveness Score

2.2.9 The metric assigns each Phase 1 Habitat type a level of distinctiveness Low–High with a corresponding distinctiveness score (Table **2-1**).

Table 2-1: Distinctiveness Score

Distinctiveness	Score
High	6
Medium	4
Low	2

2.2.10 The distinctiveness score is independent of habitat condition and is a set value assigned to each habitat type.

Condition Criteria

2.2.11 Each habitat type is assigned 3 condition criteria. These criteria include parameters (e.g. species diversity, vegetation cover, level of disturbance) against which each distinct area of habitat type can be compared. The cumulative number of criteria against which each habitat area is matched is used to determine its condition and associated score (Table **2-2**).

Table 2-2: Condition Scores

No. of condition criteria matched	Condition	Score
3	Good	3
2	Moderate	2
1	Poor	1
0	Poor	1

Area

2.2.12 Non-linear habitats were measured in hectares. Linear habitat features were measured in metres.

Time till Target Condition

2.2.13 Time till target condition for each habitat is categorised and assigned a multiplier as per Table **2-3**.

Table 2-3: Time till Target Condition Multipliers

Years	Multiplier
5	1.2
10	1.4
15	1.7
20	2.0
25	2.4
30	2.8
32	3

Difficulty of Creation / Restoration

2.2.14 The difficulty of creation or restoration proposals is assigned to 1 of 4 categories, each of which is assigned a multiplier (Table **2-4**).

Table 2-4: Difficulty of Creation / Restoration Multipliers

Difficulty of recreation/ restoration	Multiplier
Very High	10
High	3
Medium	1.5
Low	1

3 RESULTS

3.1.1 The area and linear metres of each habitat before and after works is presented in Table **3-1** and Table **3-2**. The total hectarage of habitats included in the metric calculation increases substantially post-construction.

3.1.2 Note, the metric calculation does not include a comprehensive list of Phase 1 habitats; hence, the results do not indicate that the area within the draft order limits would increase post-construction, just that those habitats included in the metric would be more abundant. Additionally, linear habitats (hedges and ditches – the latter included within standing water) are calculated separately to non-linear habitats (e.g. a hedgerow would be positioned on top of grassland habitat); hence the addition of extensive new hedgerow planting as a result of the Scheme is a large contributory factor to the increase in hectarage post-construction.

Table 3-1: Phase 1 Habitat Areas

Phase 1 Habitat Category	Area (ha)		Percentage Change
	Before works	After works	
Broad-leaved plantation woodland	0.97	5.10	425.8
Dense continuous scrub	0	2.26	N/A
Semi-improved neutral grassland	0	19.62	N/A
Improved grassland	45.62	0	-100.0
Poor semi-improved grassland	1.29	0	-100.0
Standing water	0.58	0.71	22.4
Reedbed	0	0.58	N/A
Marsh / Marshy grassland	0	0.02	N/A
Cultivated/ Disturbed Land	6.30	5.51	-12.5
Total	54.76	33.80	N/A

Table 3-2: Phase 1 Linear Habitats

Phase 1 Habitat Category	Linear metres (m)		Percentage Change
	Before works	After works	
Boundaries - Hedges - Intact	2,304	477	-79.3
Boundaries - Hedges - Defunct	781	0	-100.0
Boundaries - Hedges - With trees	866	5,137	493.2
Standing Water	917	5,825	535.2
Total	4,867	11,4369	N/A

3.1.3 A summary of the results of the metric calculation is presented in Table **3-3** and Table **3-4**. Full results are presented in Annex A.

Table 3-3: Metric Calculation Results (Non-linear)

Condition	Phase 1 habitat description	Biodiversity units			
		Before works	After works	Difference	Percentage Change
Good	Broad-leaved plantation woodland	8.52	24.00	15.48	181.69
	Cultivated / disturbed land	37.80	27.55	-10.25	-27.12
	Standing Water	0	7.10	7.10	N/A
	Swamp	0	7.46	7.46	N/A
Moderate	Marsh / Marshy grassland	0	0.06	0.06	N/A
	Poor semi-improved grassland	10.32	0	-10.32	-100.00
	Standing Water	3.00	0	-3	-100.00
	Semi-improved neutral grassland	0	87.20	87.2	N/A
	Dense continuous scrub	0	15.07	15.07	N/A
Poor	Improved grassland	91.24	0	-91.24	-100.00
	Standing Water	0.56	0	-0.56	-100.00
Total		151.44	168.44	17.00	11.23

Table 3-4: Metric Calculation Results (Linear)

Condition	Phase 1 habitat description	Biodiversity units			
		Before works	After works	Difference	Percentage Change
Good	Boundaries - Hedges - With trees	0	72,522.35	72,522.35	N/A
	Boundaries - Hedges - Intact	0	6,734.12	6,734.12	N/A
Moderate	Boundaries - Hedges - With trees	144.00	0	-144.00	-100.00
	Boundaries - Hedges - Intact	26,208.00	0	-26,208.00	-100.00
	Standing Water	11,004.00	33,285.71	22,281.71	202.49
Poor	Boundaries - Hedges - Defunct	3124.00	0	-3,124.00	-100.00
Total		40,480.00	112,542.18	72,062.18	178.02

3.1.4 The Scheme will result in a net increase in biodiversity units for non-linear (17.00) linear habitat (72,062.18).

4   CONCLUSIONS

4.1.1   Biodiversity units would be substantially higher as a result of the Scheme.

4.1.2   Notably, there would be marked increases in biodiversity units for linear habitats. These increases, amongst others, are a result of increases in the length of these habitats, but also improvements in habitat conditions; the latter of which would be delivered through landscape design (pre-construction) and appropriate management (post-construction).

4.1.3   The National Networks National Policy Statement (2014) states '*Government policy for the natural environment is set out in the Natural Environment White Paper (NEWP). The NEWP sets out a vision of moving progressively from net biodiversity loss to net gain, by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures'*. The metric calculations undertaken demonstrate a net gain as a result of the Scheme.

5   REFERENCES

Defra (2012). *Biodiversity Offsetting Pilots Technical Paper: The Metric for the Biodiversity Offsetting Pilot in England.* Accessed here https://www.gov.uk/government/publications/technical-paper-the-metric-for-the-biodiversity-offsetting-pilot-in-england

Highways England (2018). *Chief Highway Engineer Memorandum 422/18.*

Joint Nature Conservation Committee (2010). *Handbook for Phase 1 Habitat Survey - a Technique for Environmental Audit. Revised print, JNCC, Peterborough.*

6 ABBREVIATIONS

Term	Meaning/Definition
CHE Memorandum	Chief Highway Engineer Memorandum
NEWP	Natural Environment White Paper

7 ANNEX A – METRIC RESULTS

Table 7-1: Phase 1 Habitat (Non-linear): Before Works Conditions

Phase 1 Habitat	Area (ha)	Distinctiveness		Condition	
		Category	Score	Category	Score
Improved grassland	45.62	Low	2	Poor	1
Woodland- Broadleaved - Plantation	0.97	Medium	4	Good	3
Poor semi-improved grassland	1.29	Medium	4	Moderate	2
Standing water	0.49	High	6	Moderate	2
Standing water	0.09	High	6	Poor	1
Other: Arable	6.30	Low	2	Good	3
Grassland: Improved grassland	45.62	Low	2	Poor	1
Total	54.76	N/A			

Table 7-2: Phase 1 Habitat (Non-linear): Effects

Phase 1 Habitat	Habitat to be retained with no change		Habitat to be retained and restored		Habitats to be lost	
	Area (ha)	Units	Area (ha)	Units	Area (ha)	Units
Improved grassland	0.00	0.00	0.00	0.00	45.62	91.24
Woodland- Broadleaved - Plantation	0.26	3.12	0.00	0.00	0.71	8.52
Grassland: Poor semi-improved grassland	0.00	0.00	0.00	0.00	1.29	10.32
Standing water	0.24	2.88	0.00	0.00	0.25	3.00
Standing water	0.00	0.00	0.00	0.00	0.09	0.56
Other: Arable	0.00	0.00	0.00	0.00	6.30	37.80
Total	0.50	6.00	0.00	0.00	54.26	151.44

Table 7-3: Phase 1 Habitat (Linear): Before Works Conditions

Phase 1 Habitat	Length (m)	Distinctiveness		Condition	
		Category	Score	Category	Score
Boundaries - Hedges - Intact	2,304.00	High	6	Moderate	2
Boundaries - Hedges - Defunct	781.00	Medium	4	Poor	1
Ditches: Standing water	917.00	High	6	Moderate	2
Boundaries - Hedges - With trees	865.79	Very High	8	Moderate	2
Total	4,867.79	N/A			

Table 7-4: Phase 1 Habitat (Linear): Effects

Phase 1 Habitat	Habitat to be retained with no change		Habitat to be retained and restored		Habitats to be lost	
	Length (m)	Units	Length (m)	Units	Length (m)	Units
Boundaries - Hedges - Intact	120.00	1,440.00	0	0	2,184.00	26,208.00
Boundaries - Hedges - Defunct	0	0	0	0	781.00	3,124.00
Standing water	0	0	0	0	917.00	11,004.00
Boundaries - Hedges - With trees	856.79	13,708.64	0	0	9.00	144.00
Total	976.79	15,148.64	0.00	0.00	3,891.00	40,480.00

Table 7-5: Phase 1 Habitat (Non-linear): After Works Conditions

Phase 1 Habitat	Area (ha)	Distinctiveness		Condition	
		Category	Score	Category	Score
Semi-improved neutral grassland	19.62	Medium	4	Moderate	2
Cultivated/ disturbed Land	5.51	Low	2	Good	3
Woodland- Broadleaved - Plantation	5.10	Medium	4	Good	3
Standing water	0.71	High	6	Good	3
Reedbed	0.58	High	6	Good	3
Marsh / Marshy grassland	0.02	High	6	Moderate	2
Scrub - Dense/ continuous	2.26	Medium	4	Moderate	2

Phase 1 Habitat	Area (ha)	Distinctiveness		Condition	
		Category	Score	Category	Score
Total	33.80	N/A			

Table 7-6: Phase 1 Habitat (Non-linear): After Works Units

Phase 1 Habitat	Time to Target Condition		Creation/Restoration Difficulty		Biodiversity Units
	Years	Score	Category	Score	
Semi-improved neutral grassland	5	1.2	Medium	1.5	87.20
Cultivated/ Disturbed Land	5	1.2	Low	1	27.55
Woodland- Broadleaved - Plantation	15	1.7	Medium	1.5	24.00
Standing water	5	1.2	Medium	1.5	7.10
Swamp	10	1.4	Low	1	7.46
Marsh / Marshy grassland	10	1.4	High	3	0.06
Scrub - Dense/ continuous	5	1.2	Low	1	15.07

Table 7-7: Phase 1 Habitat (Linear): After Works Conditions

Phase 1 Habitat (Linear)	Area (ha)	Distinctiveness		Condition	
		Category	Score	Category	Score
Boundaries - Hedges - With trees	5,137.00	Very High	8	Good	3
Standing water	5,825.00	High	6	Moderate	2
Boundaries - Hedges - Intact	477.00	Very High	8	Good	3

Table 7-8: Phase 1 Habitat (Linear): After Works Units

Phase 1 Habitat (Linear)	Time to Target Condition		Creation/Restoration Difficulty		Biodiversity Units
	Years	Score	Category	Score	
Boundaries - Hedges - With trees	15	1.7	Low	1	72,522.35
Standing water	10	1.4	Medium	1.5	33,285.71
Boundaries - Hedges - Intact	15	1.7	Low	1	6,734.12