Habitat Regulations Assessment Addendum July 2015

Air Quality impacts of the Core Strategy Main Modifications

On the Lewes Downs SAC

1 Introduction

1.1 The main Habitat Regulations Assessment (HRA) 2013 and the HRA Addendum 2014 are online: http://www.lewes.gov.uk/planning/20408.asp. This HRA Addendum Report 2015 has been written to accompany the consultation on the Main Modifications to the Core Strategy; it builds upon the 2013 HRA in respect of the Lewes Downs Special Area of Conservation (SAC) and supersedes the 2014 HRA Addendum.

1.2 This report sets out the findings of the investigation into the effects of the predicted rise in traffic flows and attendant air quality impacts as a result of the increase in new dwellings proposed by the Core Strategy Main Modifications, on the Lewes Downs SAC.

2 Non-Technical Summary

2.1 The Main Modifications propose an increase of 1300 new dwellings, over and above the number tested in the 2014 HRA Addendum, which will result in increased traffic flows along the A26 and B2192 in the vicinity of the Lewes Downs SAC. The Core Strategy now plans for at least 6,900 new dwellings between 2015 and 2030. East Sussex County Council (ESCC) has modelled the likely patterns of commuting in relation to the new dwelling figures that have been apportioned to settlements in the District (Appendix 1 HRA Traffic Data Technical Note).

2.2 Air quality consultants at AECOM used the ESCC traffic data to model scenarios that assess the potential impact of airborne pollutants from traffic emissions on the Lewes Downs SAC.

2.3 Ecologists at AECOM then analysed the results of the air quality modelling and provided professional ecological interpretation in line with Environment Agency Guidance and the recognised DMRB[1] assessment methodology.

2.4 We have consulted with Natural England (the statutory consultee) who agree with AECOM's findings that the contribution of Local Plan (Core Strategy) traffic is not likely to have a significant effect on the Lewes Downs SAC (letter from Natural is presented in Appendix 2).

2.5 The next section of this report provides AECOM's analysis of transport-related air quality impacts on the Lewes Downs SAC from development proposed in the Lewes Core Strategy Main Modifications July 2015. The final section outlines Natural England's response to the consultation on AECOM's findings and provides a short conclusion to the HRA Addendum.

[1] Assessment methodology presented in Annex F of the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 1 (HA207/07) for the assessment of impacts on sensitive designated ecosystems due to highways works.

3 AECOM's Analysis of Air Quality Impacts on the Lewes Downs SAC

3.1 Since vehicle exhausts are situated very close to the ground the emissions only have a local effect within a narrow band along the roadside, well within 200m of the centerline of the road. Beyond 200m emissions will have dispersed sufficiently that atmospheric concentrations are essentially background levels. Even 200m may be a considerable overestimate of the dispersal distance depending on the topography of the area. For example, if the road is at the base of a steep slope, the local dispersal of exhaust emissions will be physically much more constrained than if the road is on the same level as the adjacent habitat. In addition, intervening objects such as buildings and thick tree belts will also intercept a large proportion of the emitted pollutants (trees intercept a lot of pollutants compared to other types of vegetation due to the large leaf area).

3.2 There are two measures of relevance regarding air quality impacts from vehicle exhausts on calcareous grassland such as that found at Lewes Downs SAC. The first is the concentration of oxides of nitrogen (known as NOx) in the atmosphere. In extreme cases NOx can be directly toxic to vegetation but its main importance is as a source of nitrogen, which is then deposited on adjacent habitats either directly (known as dry deposition) or washed out in rainfall (known as wet deposition). The guideline atmospheric concentration advocated by Government for the protection of vegetation is 30 micrograms per cubic metre (μgm^{-3}), known as the Critical Level.

3.3 The second important metric is a measure of the rate of the resulting nitrogen deposition (expressed in terms of the amount that would be deposited over one hectare during the course of a year). The addition of nitrogen is a form of fertilization, which can have a negative effect on calcareous grassland over time by encouraging more competitive plant species that can force out the less competitive species that are more characteristic of such grassland. Unlike NOx in atmosphere, the nitrogen deposition rate below which we are confident effects would not arise is different for each habitat. In the case of calcareous grassland, the rate (known as the Critical Load) is provided on the UK Air Pollution Information System website (www.apis.ac.uk) and is 15-20 kilograms of nitrogen per hectare per year ($kgNha^{-1}yr^{-1}$).

3.4 Environment Agency guidance (to which Natural England also subscribes) states that if the contribution of a project or plan to changes in NOx concentrations or rates of nitrogen deposition is equivalent to 1% of the Critical Level (for NOx) or Critical Load (for nitrogen deposition) then the emission is essentially trivial and is not likely to have a significant effect either alone or in combination irrespective of the background levels. No further investigation is required in these circumstances.

3.5 Two scenarios have been modelled. Scenario One allows for an improvement in background air quality over the Local Plan period as a

result of ongoing national initiatives to improve emissions and the expected improvement in vehicle emissions over that period. Such an allowance is in line with Government guidance. As a precaution however, a second scenario (Scenario Two) has also been modelled. For this scenario it has been assumed that there would be no improvement in background air quality over the Local Plan period. This is not a particularly realistic assumption and is likely to considerably over-estimate background concentrations at the end of the plan period. However, it is provided for the purposes of comparison.

3.6 The predictions of nitrogen deposition and annual mean NO_X concentrations for the proposed works are based on the assessment methodology presented in Annex F of the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 1 (HA207/07)[2] for the assessment of impacts on sensitive designated ecosystems due to highways works. Background data for the predictions for 2030 were sourced from the Department of Environment, Food and Rural Affairs (Defra) background maps for 2011 projected forward to 2030[3]. Data for 2011 were also sourced from 2011 base maps. Background data for 2030 were used for the future assessment, with contributions from A-roads within the grid square removed from the background as this contribution was calculated using ADMS-Roads software. Background nitrogen deposition rates were sourced from the Air Pollution Information System (APIS) website[4]. For Scenario One, these rates were reduced by 2% per year as set out in HA207/07.

3.7 Annual mean concentrations of NOx were calculated at distances back from each road adjacent to the SAC, with the closest distance being the closest point of the SAC to the road. Predictions were made using the latest version of ADMS-Roads using emission rates derived from the Defra Emission Factor Toolkit (version 6.0.2) which utilises traffic data in the form of 24-hour Annual Average Daily Traffic (AADT), detailed vehicle fleet composition and average speed for the 2011 baseline, 2030 Do-Minimum and 2030 Do-Something Options.

3.8 The tables below present the calculated changes in NOx concentration and nitrogen deposition due to Local Plan development compared to that which would occur in any case over the plan period. These are based on the traffic flows, average vehicle speed and percentage Heavy Duty Vehicle data provided by East Sussex County Council. Both the A26 and B2192 are modelled. A point at which the A26 and B2192 both lie within 200m of the SAC has also been modelled.

3.9 In these tables 'Base' refers to the current baseline flows, 'Do Min' or DM refers to the future situation without the Local Plan in place (i.e. background traffic growth) and 'Do Some' or DS refers to the future situation with the Local Plan in place. The end of the Local Plan period has been selected for the 'Do Some' scenario as this is the point at

[2] Design Manual for Roads and Bridges, HA207/07, Highways Agency
[3] Air Quality Archive Background Maps. Defra, 2013. Available from: http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html
[4] Air Pollution Information System (APIS) www.apis.ac.uk

which the total emissions due to Local Plan traffic will be at their greatest. The key column/row is that which shows the difference between the 'Do Min' and the 'Do Some' scenarios. For NOx, if the numbers in this column fall below 0.3 μgm^{-3} (i.e. 1% of the generic critical level for vegetation of 30 μgm^{-3}) then it can be screened out. For nitrogen deposition, if the numbers in this column fall below 0.15 $kgNha^{-1}yr^{-1}$ (1% of the lowest point in the critical load range for the SAC of 15 $kgNha^{-1}yr^{-1}$) then it can also be screened out.

Scenario One

Table 1: **Background Pollutant Concentrations at the SAC**

SAC: Nearest Road	1 km x 1 km OS Grid Square	Year	Annual mean background NO_x concentrations (μgm^{-3})
Lewes Downs SAC: A26 and B2192 junction	542407, 111225	2011	16.3
		2030	11.7
Lewes Downs SAC: A26	542274, 110919	2011	18.0
		2030	12.9
Lewes Downs SAC: B2192	542758, 111410	2011	16.3
		2030	11.7

Table 2: NO_x Concentrations at Lewes Downs SAC; adjacent to A26 and B2192 junction

Distance from named link* (m)	Annual Mean NO_x (μgm^{-3})			Change (μgm^{-3})	
	2011 Base	2030** Do-Min	2030** Do-Some	Do-Some – Do-Min	Do-Some – Base
172	18.33	12.36	12.38	**+0.02**	-5.95
200	18.16	12.30	12.32	**+0.02**	-5.83

* This is distance from named road (adjacent to A26 and B2192 junction). Other roads included within calculation if within 200m

** Calculation carried out for 2030 as that is the limit of the emission factor tools

Table 3: NO_x Concentrations at Lewes Downs SAC; adjacent to A26

Distance from named link* (m)	Annual Mean NO_x (μgm^{-3})			Change (μgm^{-3})	
	2011 Base	2030** Do-Min	2030** Do-Some	Do-Some – Do-Min	Do-Some – Base
6.5	36.46	19.35	19.56	**+0.21**	-16.89
26.5	26.98	15.99	16.09	**+0.10**	-10.88
46.5	23.90	14.91	14.98	**+0.07**	-8.92
66.5	22.50	14.43	14.48	**+0.05**	-8.02
86.5	21.57	14.11	14.15	**+0.04**	-7.42
106.5	20.99	13.91	13.94	**+0.03**	-7.05
118	20.69	13.81	13.84	**+0.03**	-6.85

* This is distance from named road (A26). Other roads included within calculation if within 200m

** Calculation carried out for 2030 as that is the limit of the emission factor tools

Table 4: NO_x Concentrations at Lewes Downs SAC; adjacent to B2192

Distance from named link* (m)	Annual Mean NO_x (μgm^{-3})			Change (μgm^{-3})	
	2011 Base	2030** Do-Min	2030** Do-Some	Do-Some – Do-Min	Do-Some – Base

61.1	18.91	12.45	12.48	**0.03**	-6.43
81.1	18.46	12.32	12.35	**+0.03**	-6.11
101.1	18.15	12.24	12.26	**+0.02**	-5.88
121.1	17.91	12.17	12.19	**+0.02**	-5.72
141.1	17.74	12.12	12.14	**+0.02**	-5.60
161.1	17.60	12.09	12.10	**+0.02**	-5.50
181.1	17.49	12.05	12.07	**+0.01**	-5.42
201.1	17.39	12.03	12.04	**+0.01**	-5.35

* This is distance from named road (B2192). Other roads included within calculation if within 200m

** Calculation carried out for 2030 as that is the limit of the emission factor tools

Table 5: Nitrogen Deposition Rates at Lewes Downs SAC; adjacent to A26 and B2192 junction

Distance from named link* (m)	**Year**	**Nitrogen deposition rate ($kgNha^{-1}yr^{-1}$)**		
		Road Contribution	**Average Rate in 5 km square**	*Total*
172	2011 Base	0.10	18.9	19.00
	2030** DM	0.03	12.62	12.65
	2030** DS	0.03	12.62	12.65
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.35
200	2011 Base	0.10	18.9	19.00
	2030** DM	0.03	12.62	12.65
	2030** DS	0.03	12.62	12.65
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.35

* This is distance from named road (A26 and B2192). Other roads included within calculation if within 200m

** Calculation carried out for 2030 as that is the limit of the emission factor tools

Table 6: Nitrogen Deposition Rates at Lewes Downs SAC; adjacent to A26

Distance from named link* (m)	**Year**	**Nitrogen deposition rate (kg N/ha/yr)**		
		Road Contribution	**Average Rate in 5 km square**	*Total*
6.5	2011 Base	0.90	18.9	19.80
	2030** DM	0.26	12.62	12.88
	2030** DS	0.27	12.62	12.89
	DS-DM	**-**	**-**	**+0.01**
	DS-Base	-	-	-6.91
26.5	2011 Base	0.45	18.9	19.35
	2030** DM	0.09	12.62	12.71
	2030** DS	0.10	12.62	12.72
	DS-DM	**-**	**-**	**+0.01**
	DS-Base	-	-	-6.63
46.5	2011 Base	0.30	18.9	19.20
	2030** DM	0.04	12.62	12.66
	2030** DS	0.04	12.62	12.66
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.54
66.5	2011 Base	0.23	18.9	19.13
	2030** DM	0.02	12.62	12.64
	2030** DS	0.02	12.62	12.64
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.49
86.5	2011 Base	0.18	18.9	19.08
	2030** DM	0.00	12.62	12.62
	2030** DS	0.00	12.62	12.62
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.46

106.5	2011 Base	0.15	18.9	19.05
	2030** DM	-0.01	12.62	12.61
	2030** DS	-0.01	12.62	12.61
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.44
118	2011 Base	0.14	18.9	19.04
	2030** DM	-0.01	12.62	12.61
	2030** DS	-0.01	12.62	12.61
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.43

* This is distance from named road (A26). Other roads included within calculation if within 200m

** Calculation carried out for 2030 as that is the limit of the emission factor tools

Table 7: Nitrogen Deposition Rates at Lewes Downs SAC; adjacent to B2192

Distance from named link* (m)	**Year**	**Nitrogen deposition rate ($kgNha^{-1}yr^{-1}$)**		
		Road Contribution	**Average Rate in 5 km square**	*Total*
61.1	2011 Base	0.25	18.9	19.15
	2030** DM	0.14	12.62	12.76
	2030** DS	0.14	12.62	12.76
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.39
81.1	2011 Base	0.11	18.9	19.01
	2030** DM	0.03	12.62	12.65
	2030** DS	0.03	12.62	12.65
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.36
101.1	2011 Base	0.10	18.9	19.00
	2030** DM	0.03	12.62	12.65
	2030** DS	0.03	12.62	12.65
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.35
121.1	2011 Base	0.08	18.9	18.98
	2030** DM	0.02	12.62	12.64
	2030** DS	0.02	12.62	12.64
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.34
141.1	2011 Base	0.07	18.9	18.97
	2030** DM	0.02	12.62	12.64
	2030** DS	0.02	12.62	12.64
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.33
161.1	2011 Base	0.07	18.9	18.97
	2030** DM	0.02	12.62	12.64
	2030** DS	0.02	12.62	12.64
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.33
181.1	2011 Base	0.06	18.9	18.96
	2030** DM	0.02	12.62	12.64
	2030** DS	0.02	12.62	12.64
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.32
201.1	2011 Base	0.06	18.9	18.96
	2030** DM	0.02	12.62	12.64
	2030** DS	0.02	12.62	12.64
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	-6.32

* This is distance from named road (B2192). Other roads included within calculation if within 200m

** Calculation carried out for 2030 as that is the limit of the emission factor tools

3.10 It can be seen from this Scenario that at no point on either road does the NOx concentration or nitrogen deposition rate associated with Local Plan traffic exceed 1% of the critical level or load.

Scenario Two

Table 8: Background Pollutant Concentrations at SAC

SAC: Nearest Road	1 km x 1 km OS Grid Square	Year	Annual mean background NO_x concentrations (μgm^{-3})
Lewes Downs SAC: A26 and B2192 junction	542407, 111225	2011	16.3
		2030 as 2011	16.3
Lewes Downs SAC: A26	542274, 110919	2011	18.0
		2030 as 2011	18.0
Lewes Downs SAC: B2192	542758, 111410	2011	16.3
		2030 as 2011	16.3

Table 9: NO_x Concentrations at Lewes Downs SAC; adjacent to A26 and B2192 junction

Distance from named link* (m)	Annual Mean NO_x (μgm^{-3})			Change (μgm^{-3})	
	2011 Base	2030** Do-Min	2030** Do-Some	Do-Some – Do-Min	Do-Some – Base
172	18.33	18.50	18.56	**+0.06**	+0.23
200	18.16	18.31	18.37	**+0.06**	+0.21

* This is distance from named road (adjacent to A26 and B2192 junction). Other roads included within calculation if within 200m

** Calculation carried with 2030 traffic flows and 2011 emission factors and background concentrations as a worst case scenario.

Table 10: NO_x Concentrations at Lewes Downs SAC; adjacent to A26

Distance from named link* (m)	Annual Mean NO_x (μgm^{-3})			Change (μgm^{-3})	
	2011 Base	2030** Do-Min	2030** Do-Some	Do-Some – Do-Min	Do-Some – Base
6.5	36.46	38.98	39.50	**+0.52**	+3.04
26.5	26.98	28.21	28.47	**+0.26**	+1.50
46.5	23.90	24.71	24.89	**+0.17**	+0.98
66.5	22.50	23.12	23.25	**+0.13**	+0.75
86.5	21.57	22.04	22.15	**+0.11**	+0.58
106.5	20.99	21.38	21.47	**+0.09**	+0.48
118	20.69	21.04	21.12	**+0.08**	+0.43

* This is distance from named road (A26). Other roads included within calculation if within 200m

** Calculation carried with 2030 traffic flows and 2011 emission factors and background concentrations as a worst case scenario.

Table 11: NO_x Concentrations at Lewes Downs SAC; adjacent to B2192

Distance from named link* (m)	Annual Mean NO_x (μgm^{-3})			Change (μgm^{-3})	
	2011 Base	2030** Do-Min	2030** Do-Some	Do-Some – Do-Min	Do-Some – Base
61.1	18.91	18.82	18.91	**+0.09**	<0.01
81.1	18.46	18.40	18.47	**+0.07**	+0.02
101.1	18.15	18.11	18.17	**+0.06**	+0.02
121.1	17.91	17.89	17.94	**+0.05**	+0.03
141.1	17.74	17.73	17.77	**+0.05**	+0.03
161.1	17.60	17.60	17.64	**+0.04**	+0.04
181.1	17.49	17.49	17.53	**+0.04**	+0.04
201.1	17.39	17.40	17.43	**+0.03**	+0.04

* This is distance from named road (B2192). Other roads included within calculation if within 200m

** Calculation carried with 2030 traffic flows and 2011 emission factors and background concentrations as a worst case scenario.

Table 12: Nitrogen Deposition Rates at Lewes Downs SAC; adjacent to A26 and B2192 junction

Distance from named link* (m)	Year	Nitrogen deposition rate ($kgNha^{-1}yr^{-1}$)		
		Road Contribution	Average Rate in 5 km square	*Total*
172	2011 Base	0.10	18.9	19.00
	2030** DM	0.11	18.9	19.01
	2030** DS	0.12	18.9	19.02
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	+0.01
200	2011 Base	0.10	18.9	19.00
	2030** DM	0.10	18.9	19.00
	2030** DS	0.11	18.9	19.01
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	+0.01

* This is distance from named road (A26 and B2192). Other roads included within calculation if within 200m

** Calculation carried with 2030 traffic flows and 2011 emission factors and background concentrations as a worst case scenario.

Table 13: Nitrogen Deposition Rates at Lewes Downs SAC; adjacent to A26

Distance from named link* (m)	Year	Nitrogen deposition rate ($kgNha^{-1}yr^{-1}$)		
		Road Contribution	Average Rate in 5 km square	*Total*
6.5	2011 Base	0.90	18.9	19.80
	2030** DM	1.01	18.9	19.91
	2030** DS	1.04	18.9	19.94
	DS-DM	**-**	**-**	**+0.02**
	DS-Base	-	-	+0.14
26.5	2011 Base	0.45	18.9	19.35
	2030** DM	0.51	18.9	19.41
	2030** DS	0.52	18.9	19.42
	DS-DM	**-**	**-**	**+0.01**
	DS-Base	-	-	+0.07
46.5	2011 Base	0.30	18.9	19.20
	2030** DM	0.34	18.9	19.24
	2030** DS	0.35	18.9	19.25
	DS-DM	**-**	**-**	**+0.01**
	DS-Base	-	-	+0.05
66.5	2011 Base	0.23	18.9	19.13
	2030** DM	0.26	18.9	19.16
	2030** DS	0.27	18.9	19.17
	DS-DM	**-**	**-**	**+0.01**
	DS-Base	-	-	+0.04
86.5	2011 Base	0.18	18.9	19.08
	2030** DM	0.21	18.9	19.11
	2030** DS	0.21	18.9	19.11
	DS-DM	**-**	**-**	**+0.01**
	DS-Base	-	-	+0.03
106.5	2011 Base	0.15	18.9	19.05
	2030** DM	0.17	18.9	19.07
	2030** DS	0.18	18.9	19.08
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	+0.02
118	2011 Base	0.14	18.9	19.04
	2030** DM	0.16	18.9	19.06

Distance from named link* (m)	Year	Nitrogen deposition rate ($kgNha^{-1}yr^{-1}$)		
		Road Contribution	**Average Rate in 5 km square**	*Total*
	2030** DS	0.16	18.9	19.06
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	+0.02

* This is distance from named road (A26). Other roads included within calculation if within 200m

** Calculation carried with 2030 traffic flows and 2011 emission factors and background concentrations as a worst case scenario.

Table 14: Nitrogen Deposition Rates at Lewes Downs SAC; adjacent to B2192

Distance from named link* (m)	Year	Nitrogen deposition rate ($kgNha^{-1}yr^{-1}$)		
		Road Contribution	Average Rate in 5 km square	*Total*
61.1	2011 Base	0.25	18.9	19.15
	2030** DM	0.25	18.9	19.15
	2030** DS	0.25	18.9	19.15
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	<0.01
81.1	2011 Base	0.11	18.9	19.01
	2030** DM	0.11	18.9	19.01
	2030** DS	0.11	18.9	19.01
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	<0.01
101.1	2011 Base	0.10	18.9	19.00
	2030** DM	0.09	18.9	18.99
	2030** DS	0.10	18.9	19.00
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	<0.01
121.1	2011 Base	0.08	18.9	18.98
	2030** DM	0.08	18.9	18.98
	2030** DS	0.08	18.9	18.98
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	<0.01
141.1	2011 Base	0.07	18.9	18.97
	2030** DM	0.07	18.9	18.97
	2030** DS	0.08	18.9	18.98
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	<0.01
161.1	2011 Base	0.07	18.9	18.97
	2030** DM	0.07	18.9	18.97
	2030** DS	0.07	18.9	18.97
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	<0.01
181.1	2011 Base	0.06	18.9	18.96
	2030** DM	0.06	18.9	18.96
	2030** DS	0.06	18.9	18.96
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	<0.01
201.1	2011 Base	0.06	18.9	18.96
	2030** DM	0.06	18.9	18.96
	2030** DS	0.06	18.9	18.96
	DS-DM	**-**	**-**	**<0.01**
	DS-Base	-	-	<0.01

* This is distance from named road (B2192). Other roads included within calculation if within 200m

** Calculation carried with 2030 traffic flows and 2011 emission factors and background concentrations as a worst case scenario.

3.11 It can be seen from this Scenario that the only point on either road in which the NOx concentration or nitrogen deposition rate associated with Local Plan traffic exceed 1% of the critical level or load is at 6.5m from the A26, where NOx concentrations would marginally exceed 1% of the critical level (being 1.7% of the critical level). However, this only happens if one makes the very precautionary assumption that no improvement in air quality or emission factors will occur by 2030. This is an extremely cautious Scenario and is likely to overestimate the total concentrations and contribution of Local Plan-related traffic that will actually occur. Whilst there is currently some uncertainty about the degree to which background pollutant concentrations are decreasing,

we would expect to see some improvement by 2030 due to improving emissions technology and the evolution of this technology into the UK vehicle fleet, particularly the introduction of the Euro VI standard. Even under this Scenario it would only require a slight improvement in air quality and emission factors for the predicted contribution of the Local Plan to NOx concentrations along the A26 to fall below the '1% of the critical level' threshold and thus become entirely inconsequential.

3.12 Moreover, the A26 only comes within 10m of the SAC for a short 30m stretch and at this point the SAC is elevated above the road with a thick belt of trees separating the two. Both of these factors will result in the calculations further over-estimating the change in NOx concentration and deposition rate at that point.

Conclusion

3.13 Based on the vehicle flow data provided by East Sussex County Council it can be concluded that the contribution of Local Plan traffic to changes in NOx concentration and nitrogen deposition rate within 200m of the Lewes Downs SAC would be sufficiently small that a conclusion of no likely significant effect on the SAC alone or in combination can be drawn.

4 Consultation with Natural England

4.1 Natural England are satisfied with the approach taken by AECOM to model two scenarios, the first in relation to the predicted improvements in background emissions (from national initiatives and from expected improvement in vehicle emissions) and the second – a worst case scenario, where none of the improvements will come forward. There is agreement from Natural England that Scenario One is a more realistic scenario.

4.2 Written confirmation of Natural England's agreement with the methodology and the conclusion that the contribution of Local Plan traffic is not likely to have a significant effect on Lewes Downs SAC can be found in Appendix 2.

5 Conclusion

5.1 We are satisfied that the work undertaken by AECOM investigating the air quality impacts of the increased dwelling provision proposed by the Core Strategy Main Modifications is robust, proportionate and appropriate. We are content that with Natural England's agreement to the approach used and the conclusion reached that we have dispensed our duty under the Habitat Regulations to determine whether the Plan will adversely affect the ecological integrity of the Lewes Downs SAC. The Plan may proceed therefore on the basis of no likely significant effect on the European designated Lewes Downs SAC.

Appendix 1

Traffic Data Technical Report by East Sussex County Council

Lewes District Council Core Strategy Main Modifications

Habitats Regulations Assessment

An assessment of the significance of increases in traffic resulting from the Lewes District Core Strategy Main Modifications on the Lewes Downs Special Area of Conservation

UPDATED AND REVISED JUNE 2015

R New
East Sussex County Council CET

FINAL 15 June 2015

Introduction

In early 2011 Lewes District Council, with guidance from Natural England, undertook an Appropriate Assessment Screening Opinion[5] on the potential affect that the Core Strategy, being prepared by Lewes District Council and South Downs National Park Authority, could have on protected European sites.

Among other things, the Screening Opinion concluded that, based on the information at that time, it was not possible to determine that the Core Strategy would not cause a significant effect on the Lewes Downs Special Area Of Conservation (SAC) due to the pollution caused by vehicles from additional development. Thus, using the precautionary principle, further work was needed to examine the impact of the Core Strategy on the Lewes Downs SAC.

This paper investigates the amount of traffic likely to be generated by development if development came forward at levels suggested in the Core Strategy Main Modifications on roads near to the Lewes Downs SAC. It concludes by considering whether the resulting increased traffic would have a significant effect on the Lewes Downs SAC. The findings of the report will help the District Council and National Park Authority in determining future amounts and locations of new development.

This report is an update to the ESCC report to Lewes DC on this subject dated October 2012. The update incorporates revised housing numbers supplied by Lewes District Council in March 2015. The report also differs in that all census based data is updated to incorporate the results of the 2011 Census. At present, 2011 census travel to work data is only available at Medium Output Area (MOA) level. This is somewhat coarser than used in the original 2012 report but is adequate for the purposes of this study.

[5] Found here: http://www.lewes.gov.uk/Files/plan_AAscreening.pdf

Background

Sites

The European sites within the scope of the assessment are:

- Lewes Downs SAC: semi-natural dry grasslands and scrubland facies on calcareous substrates.

Air pollution types

The main pollutant effects of interest are acid deposition and eutrophication by nitrogen deposition.

Acid deposition: caused by oxides of nitrogen (NO_X) (or sulphur dioxide, SO_2) reacting with rain/cloudwater to form nitric (or sulphuric) acid, and is caused primarily by energy generation, as well as road traffic and industrial combustion. Both wet and dry acid deposition have been implicated in the damage and destruction of vegetation (heather, mosses, liverworts and lichens are particularly susceptible to cell membrane damage due to excessive pollutant levels) and in the degradation of soils and watercourses (including acidification and reduced microbial activity).

Eutrophication by nitrogen deposition: consists of the input of nitrogen from NO_X (and sometimes ammonia, NH_3) emissions by deposition, and is caused primarily by road traffic, as well as energy generation, industrial combustion and agricultural practices. Nitrogen deposition can cause direct damage to heather, mosses, liverworts and lichens, as well as other plant species, because of their sensitivity to additional atmospheric nitrogen inputs, whilst deposition can also lead to long term compositional changes in vegetation and reduced diversity.

Furthermore, while plants are able to detoxify and assimilate low exposure to *atmospheric concentrations of* NO_X, high levels of uptake can lead to detrimental impacts including:

- Inhibition of pigment biosynthesis, leading to reduced rates of photosynthesis;
- Water soaking as NO_2 molecules attach to lipids in membranes, causing plasmolysis (removal of water) and eventually necrosis;
- Inhibition of lipid biosynthesis, leading to reduced rates of regeneration and growth;
- Injury to mitochondria and plastids, essential to internal processing of energy and proteins;
- Decrease in stomatal conductance of air and water vapour; and
- Inhibition of CO2 fixation (at least under low light levels).

Nitrogen plays an important role in all three impact mechanisms. Sulphur dioxide emissions, which have decreased significantly in the UK over the last two to three decades through tighter regulation, are generally associated with centralised power generation, while ammonia emissions are largely related to agricultural sources and some industrial processes. The Emerging Core Strategy does not promote new energy generation facilities or significant changes to District's agricultural economy.

Over half of all emissions of nitrogen and nitrogen oxides in the UK are the result of vehicle exhausts, with an estimated 92% of those associated with residential development being contributed by road traffic (Dore *et al*, 2005). Nitrogen emissions from traffic generated by residential and commercial developments will therefore be the focus of this part of the assessment.

Guidance

The Design Manual for Roads and Bridges[6] (DMRB) provides guidance on the assessment of the impact that road projects may have on local air quality. Specific provision is made in relation to sites designated pursuant to the Habitats Directive. The DMRB usually relates to proposed new roads.

However the guidance clarifies that *"where appropriate, the advice may be applied to existing roads."* Thus, in accordance with this guidance and with the agreement of Natural England, this study examines whether there is a likely significant effect on the Lewes Downs SAC, using the DMRB guidance.

DMRB provides a scoping assessment for local air quality and initially requires the identification of roads which are likely to be affected by the proposals. The criteria for defining an **affected road** are:

- road alignment will change by 5 metres or more; or
- daily traffic flows will change by 1000 Annual Average Daily Trips (AADT) or more; or
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or
- Daily average speed will change by 10km/hr or more; or
- Peak hour speed will change by 20km/hr or more.

The scoping assessment then requires that nature conservation sites within 200 metres of the road and their characteristics be identified (including SACs and Special Protection Areas). The guidance then clarifies that if none of the roads in the network meet the traffic / alignment criteria (that is they are not affected roads) **or** there are no relevant designated sites near the **affected roads**, then the impact of the scheme can be considered neutral in terms of local air quality and no further work is needed.

[6] HA 207/07

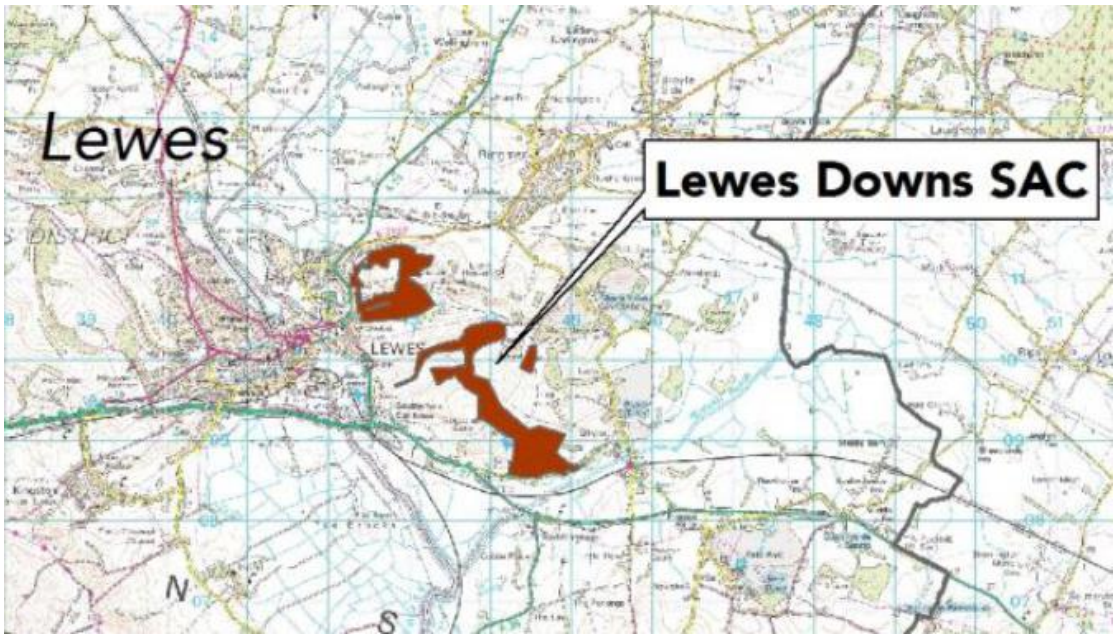
Study Methodology

Affected roads

There are three possible affected roads within 200 metres of the Lewes Downs SAC:

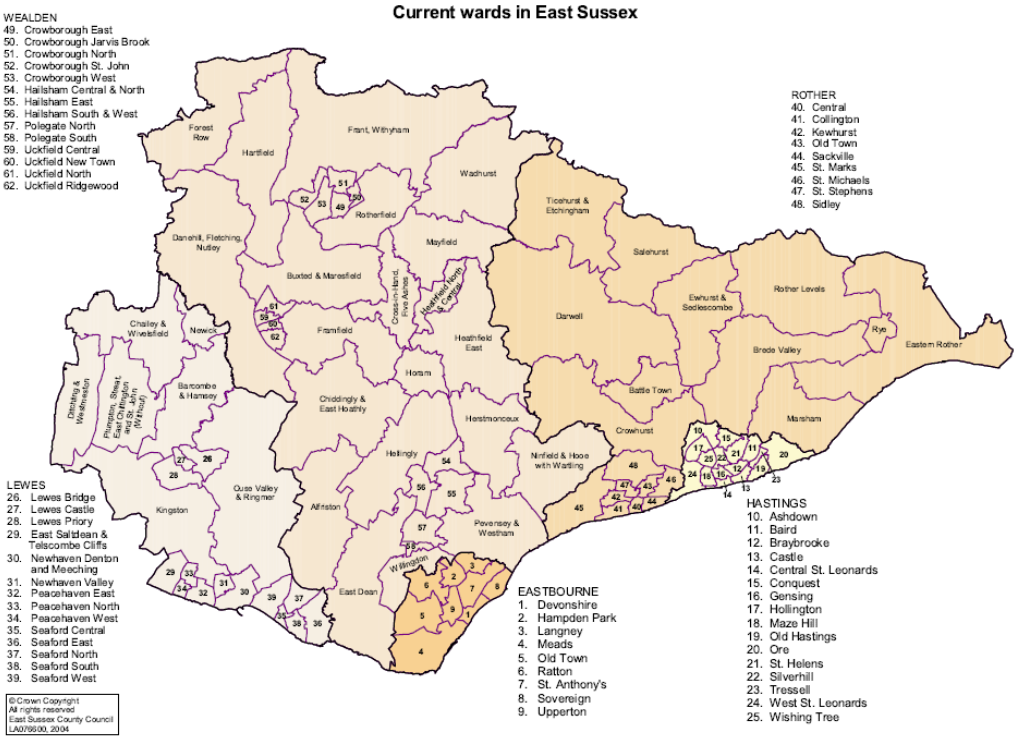
B2192 Ringmer Road;
A26 Lewes – Uckfield road (north of B2192)
A26 Lewes – Uckfield road (south of B2192, i.e. Malling Hill)

However not all new development in the Submission Draft Core Strategy will be utilising the identified roads.



Identification of relevant development areas

2001 Census travel to work data (adjusted to suit current ward boundaries as shown below) was used to determine the relevant settlements to include in the study. Travel to work data provides an indication of the general strategic use of the road system.



Lewes District covers a large area and there are alternative strategic and local road systems available for many journeys. For robustness, the assessment of impacts of the Core Strategy Main Modifications on potential **affected roads** in the Lewes Downs SAC considers traffic movements caused by all significant potential growth in the district, as listed below. The housing figures in the table below are as advised by Lewes DC in March 2015. All housing figures are from an April 2010 base and therefore include Completions since that date.

Allocating the supplied housing data to wards or urban areas (including distributing 'other' and 'windfall' sites in proportion to allocations) to enable use of Census journey to work data, the assessment housing figures are:

Lewes (Bridge; Castle; Priory)	1258
Ouse Valley and Ringmer	481
Newhaven (Denton & Meeching; Valley)	1922
Peacehaven (East; North; West; East Saltdean & Telscombe Cliffs)	1330
Seaford (Central; East; North; South; West)	649
Other (Barcombe & Hamsey, Newick, Chailey & Wivelsfield, Plumpton, Streat, East Chiltington & St John (without), Ditchling & Westmeston and Kingston	1261
TOTAL	6901

Assessment Process

The assessment has considered the increase in AADT on the identified affected roads that would arise from committed and possible future housing development in the identified relevant development areas. This was on the basis that, of the DMRB flow-related assessment criteria, only if this was exceeded would there be any possibility of an impact on the other criteria.

The study used the following 8 STEP process to estimate additional AADT traffic resulting from new development in the Submission Draft Core Strategy, identify which roads would be used, and quantify the cumulative impacts on the identified affected roads:

- **STEP 1**
  Determine annual average (5-day) person commuter trips per household using Census journey to Work data (5 Day = Monday to Friday)

  2011 Census Journey to Work (JTW) data (see Appendix 2) gives figures for employed persons per household in each of the identified relevant settlements as:

Lewes	8431 / 7457
Ringmer	3071 / 2769
Newhaven	5899 / 5252
Peacehaven	10172 / 9410
Seaford	10111 / 10794
Other	7948 / 6499

Multiplying by 2 for return trips, and factoring by 0.9 to account for non-work weekdays (5 weeks non-work per year), the annual average (5-day) person commuter trips from existing development in the identified relevant settlements are:

Lewes	2.03 trips / HH
Ringmer	2.00 trips / HH
Newhaven	2.02 trips / HH
Peacehaven	1.95 trips / HH
Seaford	1.69 trips / HH
Other	2.20 trips / HH
Weighted average (urban)	1.90 trips / HH
Weighted average (rural)	2.20 trips / HH

Excluding Seaford, there are clearly two groups of results, each with little variation about their respective weighted average, but with significant differences between those weighted averages. The groups broadly represent larger urban and more rural areas. The weighted average for urban areas excludes Seaford which, if included, would increase the gap between urban and rural. Seaford shows a lower ratio of employed persons than other urban areas, more related to the current socio-economic characteristics of the town than is likely to be the case for new development. The assessment has therefore used either the urban or rural weighted average (as appropriate for any particular development) including use of the urban average in the assessment of new development in Seaford.

- **STEP 2**
  Determine annual average (5-day) person total trips per household using the TRICS database.

  TRICS gives estimates of person and vehicle trip rates (trips / housing unit). Person total trip rates can differ between urban and rural areas, as can the proportion of those trips by private vehicles. For mixed private / non-private residential development in larger urban areas TRICS gives a person trip rate of 7.424 trips / housing unit (generally equivalent to trips / household - HH) all modes, all purposes, over a 12 hour (0700-1900) average weekday. The equivalent average trip rate for vehicles in larger urban areas is 4.054 / HH. In rural areas the equivalent figures are 6.463 person trips / HH and 4.482 vehicle trips / HH. All TRICS data was derived using the latest version – TRICS 2012a v6.9.1. The detailed TRICS analysis is at Appendix 1.

  Using National Travel Survey Table NTS0503, the factor to growth 12 hour person trips (all purposes, all modes, weekdays) to 24 hour = 1.16. Therefore annual average (5-day) person trip rate = 7.424 x 1.16 = 8.61 person trips / HH in larger urban areas, and 6.463 x 1.16 = 7.50 person trips / HH in rural areas.

- **STEP 3**
  Calculate annual average (5-day) person non-commuter trips per household

  Urban areas = 8.61 – 1.90 = 6.71 trips / HH
  Rural areas = 7.50 – 2.20 = 5.30 trips / HH

- **STEP 4**
  Convert commuter and non-commuter person trip rates from 5-day to 7-day (7-day = Monday to Sunday)

  National Travel Survey Table NTS0504.gives ratios of annual average daily (5-day) person trip rate to annual average daily (7-day) person trip rates:

  commuting = 0.80
  non-commuting = 0.98

  Annual average daily (7-day) person trip rates / HH are therefore:

  Urban areas: commuting = 1.90 x 0.80 = 1.52
  non-commuting = 6.71 x 0.98 = 6.58

  Rural areas: commuting = 2.20 x 0.80 = 1.76
  Non-commuting = 5.30 x 0.98 = 5.19

- **STEP 5** Convert STEP 4 figures to include only external 'strategic' trips.

  Census JTW data, which would apply to commuter trips, shows the ratios between external and internal workplaces for employed residents in each of the identified areas are:

	External	Internal
Lewes	40%	60%
Ringmer	65%	35%
Newhaven	60%	40%
Peacehaven	72%	28%
Seaford	57%	43%
Other	57%	43%

Non-commuter trips would include a greater proportion of internal trips than commuter trips (because of school journeys, more walk and local cycle trips, local shopping and social trips etc). The proportion would vary by area depending on the internal availability of appropriate school, shopping and social provision.

The National Travel Survey (Tables NTS9906/7) shows that, for the South East region (and allowing for 50% of business trips to be home-based on any given day and therefore 'proxy' commuter), commuting trips comprise 16% of all trips and 25% of all distance travelled.

The average non-commuting trips would therefore have a distance travelled of 56.4% of the average commuter trip. Using that factor, adjusting the above external : internal relationships for commuter trips associated with each area, gives resultant ratios between external and internal non-commuter trips of:

	External	Internal
Lewes	23%	77%
Ringmer	37%	63%
Newhaven	34%	66%
Peacehaven	41%	59%
Seaford	32%	68%
Other	32%	68%

Annual average 7-day external, 'strategic' person trip rates are therefore:

	Commuting	Non-Commuting	TOTAL
Lewes	0.61	1.51	2.12
Ringmer	0.99	2.43	3.42
Newhaven	0.91	2.24	3.15
Peacehaven	1.09	2.70	3.79
Seaford	0.87	2.11	2.98
Other	1.00	1.66	2.66

- **STEP 6** Convert from person trip rates to vehicle trip rates (AADT)

Using TRICS data reported in STEP 1:

In urban areas:

TRICS person trip rate = 7.424 / HH
TRICS vehicle trip rate = 4.054 / HH
Therefore conversion from persons to vehicles = x 0.55

In rural areas:

TRICS person trip rate = 6.463/ HH
TRICS vehicle trip rate = 4.482 / HH
Therefore conversion from persons to vehicles = x 0.69

Therefore 'strategic' annual average daily vehicle (AADT) trip rates for use in this assessment are:

Lewes	2.12 x 0.55 = 1.17 vehicle trips / HH
Ringmer	3.42 x 0.55 = 1.88 vehicle trips / HH
Newhaven	3.15 x 0.55 = 1.73 vehicle trips / HH
Peacehaven	3.79 x 0.55 = 2.08 vehicle trips / HH
Seaford	2.98 x 0.55 = 1.64 vehicle trips / HH
Other	2.66 x 0.69 = 1.84 vehicle trips / HH

- **STEP 7** Calculate the total number of new 'strategic' vehicle trips (AADT) that would arise from the identified housing commitments and new development.

	Housing Units	trip rate	Vehicles (AADT)
Lewes	1258	1.17	1472
Ringmer	481	1.88	904
Newhaven	1922	1.73	3325
Peacehaven	1330	2.08	2766
Seaford	649	1.64	1064
Other	1261	1.84	2320
TOTAL			11851

- **STEP 8** Assign strategic vehicle trips to the highway network

At the generally coarse District / County level of the known Census distribution of commuter trips, it is reasonable to assume that the distribution of workplaces is a good proxy for the distribution of shopping and social attractors, which comprise the bulk of external non-commuter trips. The same distribution is therefore assumed for both commuter and non-commuter trips.

Route choices are determined by use of Google Maps time and distance module, with the new 'strategic' trips manually assigned to the relevant highway network. Routeing assumptions are shown in Appendix 3.

Assessment conclusions

The report has assessed development coming forward at the maximum levels considered in the Core Strategy Main Modifications. As a result of developing at this level, increases in traffic would therefore arise on the affected roads around the Lewes Downs Special Area of Conservation (SAC); the A26 and the B2192.

Based on the assumptions above, increases in traffic on the affected roads within the Lewes Downs SAC are forecast to be:

		ADDITIONAL TRAFFIC (AADT) USING AFFECTED ROADS		
SOURCE	**TOTAL**	**A26 s**	**A26n**	**B2192**
Lewes town	252	252	97	155
Ringmer	623	623	106	517
Newhaven	111	111	84	27
Seaford	35	35	31	4
Other	137	137	25	112
TOTAL	1208	1208	385	823

On the A26 south of Earwig Corner junction the forecast increase in traffic flow as a result of the tested quantum of new residential development (1208 vehs/dat AADT) would exceed the threshold of 1000 AADT set out in DMRB by a significant margin.

On the other two identified ‘Affected Roads’, forecast increases in traffic flow as a result of the tested development proposals would not exceed the threshold of 1000 AADT set out in DMRB.

Appendix 2

Consultation Response from Natural England

Date: 03 July 2015
Our ref: 156972

Customer Services
Hornbeam House
Crewe Business Park
Electra Way
Crewe
Cheshire
CW1 6GJ

T 0300 060 3900

Tondra Thom
Lewes District Council

BY EMAIL ONLY

Dear Tondra

Analysis of transport related air quality impacts on Lewes Downs Special Area of Conservation (SAC) from development proposed in the Lewes Core Strategy.

Thank you for your consultation on the above dated 17 June 2015 which was received by Natural England on the same date.

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

The results from the AECOM report (dated 15 June 2015) have been modelled on two scenarios. Scenario one includes the predicted improvements in background emissions from national initiatives and from expected improvement in vehicle emissions. Scenario two is a worst case scenario where none of these improvements will come forward. We are satisfied with this approach and agree that Scenario one is a more realistic scenario

There is one point (at 6.5m from the A26) where the figures from Scenario two identify that the NO_x concentration exceeds 1% of the critical level for the SAC however this is modelled on the unrealistic scenario that there will be no improvements in background air pollution and/or improvements to vehicle technology over the course of the plan period. All other modelled figures identify that the NO_x concentration and nitrogen deposition increases fall well below 1% of the critical level and critical load.

Natural England can confirm that based on the information within the AECOM report we agree that the contribution of local plan traffic is not likely to have a significant effect on Lewes Downs SAC.

We would be happy to comment further should the need arise but if in the meantime you have any queries please do not hesitate to contact us.

For any queries relating to the specific advice in this letter only please contact me on 0300 060 4050. For any new consultations, or to provide further information on this consultation please send your correspondences to consultations@naturalengland.org.uk.

Yours sincerely

Marian Ashdown
Sussex and Kent Team

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