A27 Arundel Bypass Environmental Sensitivity Technical Note

Chapter 4 – Biodiversity

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4 Biodiversity

4.1 Introduction

4.1.1.1 This chapter provides the assessment of the potential impacts associated with biodiversity arising from the Scheme, when operated without the A27 Worthing and Lancing improvement scheme (Without WL). Specifically, this chapter considers the differences in modelled air quality emissions between the With WL and the Without WL traffic models and the effect of these air quality emissions on biodiversity.

4.1.1.2 This chapter uses the guidance provided in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 4 (Nature Conservation)[1], Interim Advice Note 130/10[2], Volume 11, Section 2, Part 5 (HA 205/08)[3] and Volume 11, Section 3, Part 1 (HA 207/07)[4], where applicable.

4.1.1.3 The potential impacts considered in this chapter are associated with the operational phase of the Scheme options only and include:

- Indirect impacts on biodiversity receptors caused by changes to air quality.

4.1.1.4 This chapter provides an assessment of the impact of air quality changes on designated sites only, which is in line with the methodology prescribed in the EAR assessment. Habitats susceptible to changes in air quality, including ancient woodland and Habitats of Principal Importance (HPI) have not been assessed. An assessment to determine if these changes are likely to result in significant ecological effects on habitats will be undertaken at PCF Stage 3.

4.1.2 Summary

4.1.2.1 Both the With WL (EAR) and Without WL scenarios are considered likely to have a beneficial effect on Fairmile Bottom SSSI, Arundel Park SSSI, Beeding Hill to Newtimber Hill SSSI and a neutral effect on Adur Estuary SSSI. There is no discernible difference between the effects anticipated on

[1] Design Manual for Bridges and Roads (1993) Volume 11, Section 3, Part 4 Ecology & Nature Conservation.

[2] Design Manual for Bridges and Roads (2010) Interim Advice Note 130/10 Ecology & Nature Conservation

[3] Design Manual for Bridges and Roads (2008) Volume 11, Section 2, Part 5, Assessment and Management of Environmental Effects

[4] Highways England, Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment: Air Quality. Advice Note HA 207/07

Fairmile Bottom SSSI and Arundel Park SSSI With or Without WL. Beeding Hill to Newtimber SSSI and Adur Estuary SSSI were not assessed in the EAR (the With WL scenario), as these designated sites were outside of the Study Area (that is the affected road network for that scenario).

4.1.2.2 This chapter should be read in conjunction with **Chapter 2: Air Quality** of this Technical Note.

4.2 Assessment Methodology

4.2.1 Overview of Assessment Methodology

4.2.1.1 An assessment of the impacts associated with the Scheme options is described in Section 8.3 of **EAR Chapter 8: Biodiversity**. This assessment follows the methodology prescribed in the DMRB (Volume 10 and 11)[1,3] and the Interim Advice Note 130/10[2].

4.2.2 Resource Valuation and Significance Criteria

4.2.2.1 Identified biodiversity receptors have been assigned a geographical level of importance, as described in Section 8.3.3 of **EAR Chapter 8: Biodiversity**. This is in accordance with Interim Advice Note 130/10[2].

4.2.2.2 The characterisation of potential impacts is described in **Section 4.6**. An assessment of the likely significant effects after classification of the potential impacts is described in **Section 4.7**.

4.2.2.3 A significance category was assigned to the effects in accordance with the categories described in IAN 130/10[2], and as shown in **EAR Chapter 8: Biodiversity** (Section 8.3.4).

4.3 Assessment Assumptions and Limitations

4.3.1.1 No assumptions and limitations have been identified of relevance to this assessment.

4.4 Study Area

4.4.1.1 The Study Area within which biodiversity receptors susceptible to air quality impacts have been investigated is described in **EAR Chapter 8: Biodiversity** (Section 8.5).

4.4.1.2 The DMRB guidance recommends that impacts on designated sites and habitats within 0.2 kilometres of the Affected Road Network (ARN) are assessed.

4.4.1.3 Two additional designated sites were brought into the assessment following a change to the Study Area from the EAR (as a result of the change in the extent of the Affected Road Network as shown in **Figure 2-1-1**). These were Beeding Hill to Newtimber Hill SSSI and Adur Estuary SSSI.

4.5 Baseline conditions

A description of the designated sites within the Study Area (see **Section 4.3**), their geographical level of importance and their distance from the Scheme options is provided in **Table 4-1**. All of the designated sites are shown on **Figure 4-1**.

Table 4-1 Summary of baseline conditions by Scheme option

Designated site	Approximate distance (km) and orientation from the Scheme options							Key habitat type and reason for designation
	Level of importance	Option 1V5	Option 1V9	Option 3V1	Option 4/5AV1	Option 4/5AV2	Option 5BV1	
Fairmile Bottom SSSI*	National	1.6 NW	1.6 NW	1.4 N	1.8 N	1.8 N	2.0 N	Yew woodland, yew scrub and chalk grassland. Designated for woodland, chalk grassland and invertebrates.
Arundel Park SSSI	National	0.4 N	0.4 N	1.4 N	1.4 N	1.4 N	1.4 N	Chalk grassland and variety of woodland. Designated for birds, invertebrates and floral communities.
Beeding Hill to Newtimber Hill SSSI	National	72m from A283 road south of Upper Beeding (The A283 at this location is part of Affected Road Network)						Chalk grassland, juniper scrub and calcareous woodland.
Adur Estuary SSSI	National	Passes directly underneath the A27 road to the north of Shoreham-by-Sea (The A27 at this location is part of the Affected Road Network)						Saltmarsh with diverse plant species
SSSI – Site of Special Scientific Interest; N – north; NW – north-west								

4.6 Potential Impacts

4.6.1.1 Potential impacts on biodiversity resulting from changes in air quality will arise during the operational phase. Four SSSIs (see **Section 4.5**) have been identified as being susceptible to impacts arising from nitrogen deposition and ambient levels of nitrogen oxides. These sites have been identified based on DMRB guidance (Advice Note HA 207/07[4]) which considers that habitats that are susceptible to the effects of changes in air quality are those that are within 0.2 kilometres of the Affected Road Network.

4.7 Assessment of Effects

4.7.1.1 Both A27 Scheme traffic models (With WL and Without WL) indicate that the Scheme options during operation are likely to have a beneficial effect on Fairmile Bottom SSSI, Arundel Park SSSI and Beeding Hill to Newtimber Hill SSSI. This is a result of the following:

- Redistribution of the traffic from the A29 onto the A27 will result in a decrease in traffic flow and a decrease in nitrogen oxide concentrations on Fairmile Bottom and Arundel Park SSSI
- Redistribution of the traffic from the A283 onto the A27 will result in a decrease in traffic flow and a decrease in nitrogen oxide concentrations on Beeding Hill to Newtimber Hill
- Nitrogen oxide concentrations will not exceed the critical load level[5] and significant effects are not anticipated.

4.7.1.2 All Scheme options would result in a decrease in nitrogen oxide concentrations at Fairmile Bottom SSSI, Arundel Park SSSI and Beeding Hill to Newtimber Hill SSSI, a Slight Beneficial significance of effect is considered likely.

4.7.1.3 These conclusions are based on the nitrogen oxide concentration levels described in **Chapter 2: Air Quality** of this Technical Note. There are no discernible differences between the effects on the Scheme options so they have been reported together.

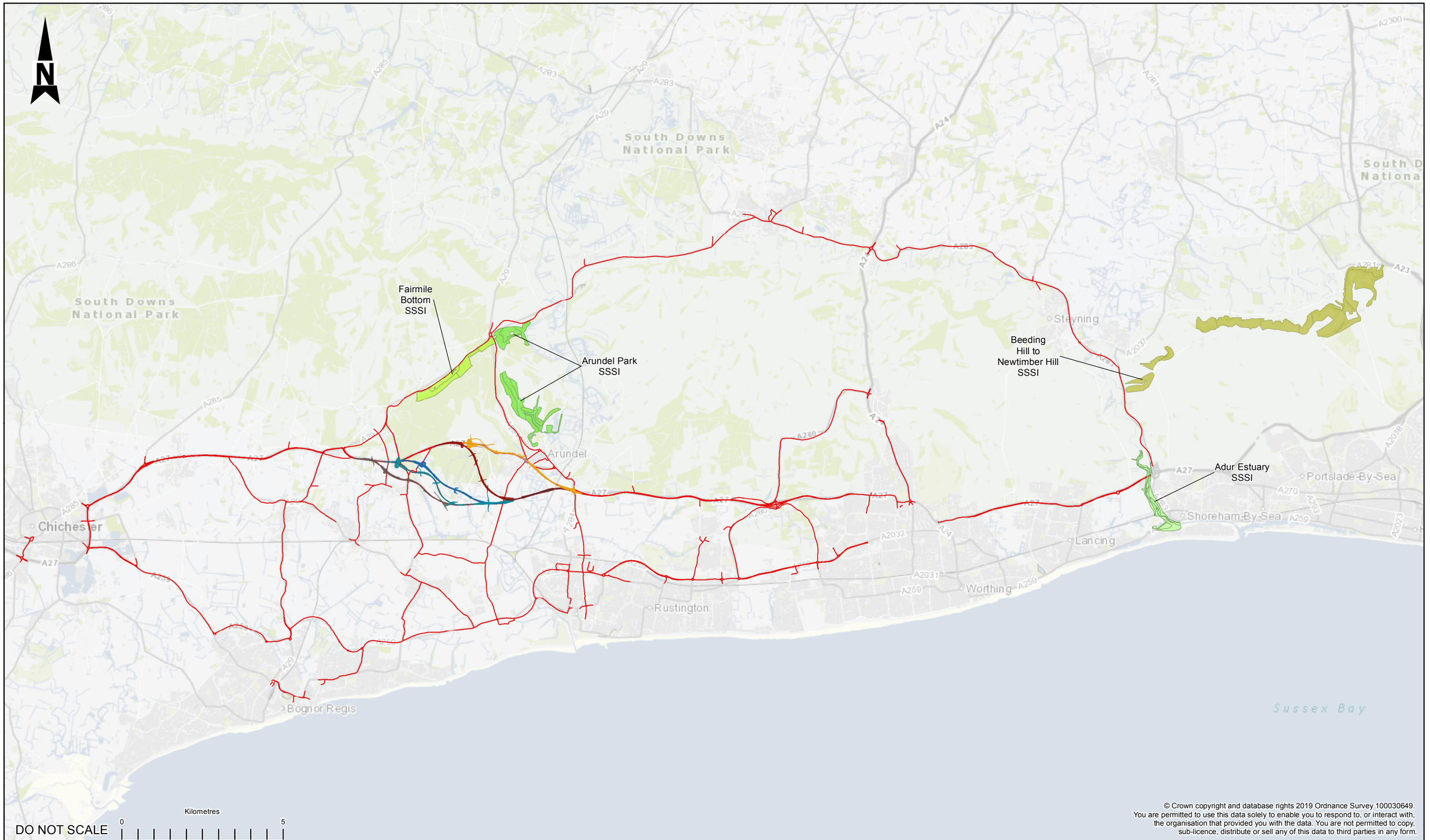
4.7.1.4 There is no discernible difference between the effects anticipated on Fairmile Bottom SSSI, Arundel Park SSSI, in the With WL and the Without WL scenarios. When using the Without WL Model there are the additional slight beneficial effects on Beeding Hill to Newtimber Hill SSSI compared to the With WL model.

[5] The critical load level for Fairmile Bottom and Arundel Park SSSI is 5-15kg/N/ha/year and for Beeding Hill to Newtimber Hill SSSI its 10-20kg/N/ha/year.

4.7.1.5 The Adur Estuary SSSI, which is traversed by the A27, experiences an increase in nitrogen oxide concentrations. This is due to the increase in traffic flow onto the A27. However, because the rise in nitrogen oxide deposition is less than 1% of the critical load level for the SSSI (8-10kgN/ha/year), the likely effect is considered to be Neutral.

highways england

Figure



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KEY:

- 🟧 OPTION 1V5
- 🟪 OPTION 1V9
- 🟥 OPTION 3V1
- 🟦 OPTION 4/5AV1
- 🟦 OPTION 4/5AV2
- ⬛ OPTION 5BV1
- — AFFECTED ROAD NETWORK (ARN)

SITE OF SPECIAL SCIENTIFIC INTEREST

- 🟩 ADUR ESTUARY
- 🟩 ARUNDEL PARK
- 🟨 BEEDING HILL TO NEWTIMBER HILL
- 🟩 FAIRMILE BOTTOM

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

Project Title
REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

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Working on behalf of
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Drawing Title
FIGURE 4-1:
STATUTORY DESIGNATED SITES WITHIN AFFECTED ROAD NETWORK

Scale	Drawn	Checked	Approved	Authorised
1:110,000	AS	RG	MD	PA
Original Size A3	Date 28/08/19	Date 28/08/19	Date 28/08/19	Date 28/08/19

Drawing Number
Project | Originator | Volume
HE551523-WSP-GEN-SWI-GI-DR-0650
Location | Type | Role | Number

Project Ref. No. 70052558

Revision P01

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