A303 Amesbury to Berwick Down

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Volume 8

Additional Submission
8.6(2) – Statement of Common Ground - Natural England

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STATEMENT OF COMMON GROUND – Natural England

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STATEMENT OF COMMON GROUND

This Statement of Common Ground has been prepared and agreed by (1) Highways England Company Limited and (2) Natural England.

Signe
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on behalf of Highways England
Date: 04/09/2019

Signed

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Date: 14/08/2019

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1 Introduction

1.1 Purpose of the Statement of Common Ground

1.1.1 Statements of Common Ground record the engagement between Highways England and stakeholders and identify areas of agreement, disagreement and ongoing discussion.

1.1.2 Guidance about the purpose and possible content of SoCGs is given in paragraphs 58-65 of the Department for Communities and Local Government's "Planning Act 2008: Guidance for the examination of applications for development consent" (March 2015 version). Paragraph 58, copied below, confirms the basic function of SoCG's:

1.1.3 "A statement of common ground is a written statement prepared jointly by the applicant and another party or parties, setting out any matters on which they agree. As well as identifying matters which are not in real dispute, it is also useful if a statement identifies those areas where agreement has not been reached. The statement should include references to show where those matters are dealt."

1.1.4 The SoCG's are a useful tool to ensure evidence at DCO examination focusses on material differences between the main parties and aims to facilitate a more efficient examination process.

1.1.5 The SoCG's have been developed in collaboration with the respective stakeholders and the wording of positions, matters and discussion outcomes in the SoCG's have been agreed with stakeholders.

1.1.6 Highways England has been engaging with stakeholders since the options consultation in 2017 and has been working with stakeholders throughout the DCO pre-application to understand and resolve issues where possible.

1.2 Purpose of this document

1.2.1 This SOCG has been prepared in respect of the proposed A303 Amesbury to Berwick Down scheme ("the Application") made by Highways England Company Limited ("Highways England") to the Secretary of State for Transport ("Secretary of State") for a Development Consent Order ("the Order") under section 37 of the Planning Act 2008 ("PA 2008").

1.2.2 The order, if granted would authorise Highways England to carry out the following works:

1.2.3 A northern bypass of Winterbourne Stoke with a viaduct over the River Till valley;

1.2.4 A new junction between the A303 and A360 to the west of and outside the WHS, replacing the existing Longbarrow roundabout;

1.2.5 A twin-bore tunnel approximately 2 miles (3.3km) long, past Stonehenge; and

1.2.6 A new junction between the A303 and A345 at the existing Countess roundabout.

1.2.7 The Application was submitted to the Planning Inspectorate on 19 October 2018.

1.2.8 This SoCG does not seek to replicate information which is available elsewhere within the Application documents. All documents are available at the deposit locations and/or the Planning Inspectorate website.

1.2.9 The SoCG's has been developed to record the engagement between Highways England and consultees to identify areas of agreement, disagreement and ongoing discussion.

1.3 Parties to this Statement of Common Ground

1.3.1 This SoCG has been prepared by (1) Highways England as the Applicant and (2) Natural England.

1.3.2 Highways England became the Government-owned Strategic Highways Company on 1 April 2015. It is the highway authority in England for the strategic road network and has the necessary powers and duties to operate, manage, maintain and enhance the network. Regulatory powers remain with the Secretary of State. The legislation establishing Highways England made provision for all legal rights and obligations of the Highways Agency to be conferred upon or assumed by Highways England.

1.3.3 Natural England is a non-departmental public body established by the Natural Environment and Rural Communities Act 2006. Natural England's general 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.

1.3.4 Natural England's role in relation to the DCO process derives from the Planning Act 2008 (the 2008 Act) and secondary legislation made under the 2008 Act. The roles and responsibilities of Natural England under the 2008 Act fall into the following categories:

- as one of the prescribed consultees under section 42 of the 2008 Act that applicants are required to consult before submitting a Nationally Significant Infrastructure Projects (NSIP) application;
- as one of the consultation bodies that the Planning Inspectorate must consult before a scoping opinion is adopted in relation to any EIA and as a prescribed consultee for the environmental information submitted pursuant to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009.
- as a statutory party in the examination of DCO applications
- as a statutory nature conservation body under the Conservation of Habitats and Species Regulations 2010 (Habitats Regulations) in respect of the HRA.
- as a consenting and licensing body/authority in respect of protected species and operations likely to damage the protected features of SSSIs pursuant to the Wildlife and Countryside Act 1981 (as amended) (WCA 1981) and in relation to European protected species under the Habitats Regulations.

1.3.5 Highways England has aimed to address any issues or concerns raised by Natural England.

1.4 Terminology

1.4.1 In the tables in the Issues chapter of this SoCG “Not Agreed” indicates a final position and “Under discussion” indicates where these points will be the subject of on-going discussion between the parties with the aim, wherever possible, to resolve, or refine, the extent of disagreement between the parties. “Agreed” indicates where the issue has been resolved.

1.4.2 It can be taken that any matters not specifically referred to in the Issues chapter of this SoCG are not of material interest or relevance to Natural England, and therefore have not been the subject of any discussions between the parties. As such, all matters of material interest or relevance to Natural England can be read as agreed, except to the extent that they are either noted as ‘not agreed’ or ‘under discussion’ in this SoCG.

2 Record of Engagement

2.1.1 A summary of the meetings and correspondence that has taken place between Highways England and Natural England in relation to the Application is outlined in table 2-1.

Table** Error! No text of specified style in document.**-1 - Record of Engagement

Date	Form of correspondence	Key topics discussed and key outcomes
NA	Discretionary Screening	Survey methodology and scope.
26/05/2016	Email	Natural England Comments on survey methodology
02/06/2016	Email	Natural England's vision.
25/01/2017	Meeting Notes	Discussion regarding the National Nature Reserve (NNR).
01/03/2017	Formal Response	Natural England formal response to January 2017 consultation.
26/05/2017	Email / Memo	Bat survey protocol / method statement. Methodology based on previous Highways England Schemes.
05/06/2017	Email	Comments on bat survey protocol / method statement.
10/11/2017	Email	Comments on Environmental Impact Assessment Scoping report.
14/12/2017	Email	A303 design meeting.
06/03/2018	Meeting Notes	Scheme update for biodiversity stakeholders, to discuss habitat creation opportunities.
22/03/2018	Email	Email detailing the agreement of having the stone curlew plot on the Natural England National Nature Reserve (NNR).
27/04/2018	Email	Discussion on the grassland trial plots at Cherry Lodge.
27/11/2018	Meeting Notes	SoCG meeting, to discuss / raise issues associated with the DCO application. Issues covered included the following: • Pre-construction surveys to inform protected species licensing; • Baseline assessment; • Habitat Regulations Screening Assessment; • Appropriate Assessment; and, • Landscape scale mitigation.
10/12/2018	Meeting	Site visit with the RSPB and Natural England to confirm location of stone curlew Burhinus oedicnemus new plot.

30/01/2019	Phone call	Discussion on SoCG and stone curlew plot location within the Parsonage Down area, SoCG, grazing of the soft estate, and future aspirations for East of Parsonage Down management.
18/02/2019	Email	Natural England response to clarifications on results of Environmental Statement.
27/03/2019	Phone call	Update on the risk management of the mitigation associated with stone curlew plots.
17/04/2019, 23/04/19	Calls and emails	Discussions with Natural England and RSPB regarding Highways England commitment to additional stone curlew plots.
25/04/19 and 30/04/19	Calls and emails	Details on chalk grassland habitat creation
07/06/2019	Meeting	Meeting to discuss provision of stone curlew plots.
10/06/19	Emails	Natural England provided examples relevant to HRA where a commitment to future provision was given rather than specific locations.
11/06/19	Call and email	Discussion of water issues for HRSA Clarification Note
17/06/19	emails	HRA matters and draft s253 agreement for Parsonage Down plot
15/07/19	Emails	HRA water issues
17/0719. 18/07/19	Call and email	Discussion on and issue of draft stone curlew plots sift, approach agreed.
19/07/19	Email	Fencing specifications for s253 agreement Parsonage Down
01/08/19	Call and email	HRSA technical note, confirming no concerns re water issues

2.1.1 In addition to table 2-1, Natural England has also attended the following stakeholder work groups:

- Environmental Group; and
- Benefits Steering Group.

2.1.2 All the meetings associated with these groups in relation to the Scheme are not detailed here.

2.1.3 It is agreed that this is an accurate record of the key meetings and consultation undertaken between (1) Highways England and (2) Natural England in relation to the issues addressed in this SoCG.

3 Matters Agreed

Table 3-1 Matters Agreed

Issue Ref	Document	Doc Ref	Section / Issue	Natural England Comment	Highways England Response	Status
3.1	Environmental Statement Chapter 8 Biodiversity [APP-046]	Table 8.7	Survey methodology (general)	Natural England confirmed within email with the general survey scope and methods.	Agreed between Natural England and Highways England 25 May 2016	Agreed
3.2	Environmental Statement Appendix 2.1 [APP-186] and Outline Environmental Management Plan [APP-187]	Table 3.2a	Further survey requirements to inform Natural England licensing	Natural England has no objections regarding the requirement of the further pre-construction surveys that will be undertaken to inform licensing. These will include: • Bat roosting surveys of all trees / structures to be impacts by the Scheme; • Otter and water vole update surveys; and, • Badger update survey.	Agreed with Natural England 27 November 2018	Agreed
3.3	Environmental Statement Chapter 8 Biodiversity [APP-046]	Table 8.11 and Table 8.12	Baseline conditions (general)	Natural England has no objections regarding the baseline surveys. It has been acknowledged that the further surveys undertaken within 2018 have updated the baseline.	Agreed with Natural England 27 November 2018	Agreed
3.4	Environmental Statement Chapter 8	Section 8.8	Construction mitigation	Natural England has no objections regarding the construction mitigation. It is understood that update Construction	Construction mitigation will be secured through the Outline Environmental Management Plan	Agreed

	Biodiversity [APP-046] and Outline Environmental management Plan [APP-187]	[APP-046] and Table 3.2a [APP-187]		Environmental Management Plan (CEMP) will be provided.	(OEMP) [REP6-011]. It is understood that the Highways England's appointed contractor will be required to develop and implement a detailed CEMP based on, and incorporating the relevant requirements of, the OEMP. Agreed with Natural England 27 November 2018.	
3.5	Environmental Statement Chapter 8 Biodiversity [APP-046]	Table 8.14	Habitat losses and gains (general)	Natural England is broadly supportive of the application with regards to its impacts on biodiversity. It seems reasonable to conclude that the scheme will deliver net gain for biodiversity, but the documentation does not present this information as per Highways England Chief Highways Engineer Memo.	Full details of the biodiversity gains can be found in the ES Chapter 8 [APP-046], Section 8, 8.8.14 – 8.8.21, 8.9.65 – 8.9.66, and Table 8.14, Habitat losses and gains associated with the Scheme. In addition, Highways England has confirmed that a biodiversity net gain report will be compiled and issued to Natural England. This will be based on the proposals shown indicatively on the 2018 Environmental Masterplan [APP-059] and subject to detailed design. The biodiversity net gain report is not considered to be a required DCO document, as such, it will not form a further part of the SoCG.	Agreed
3.6	Environmental Statement Chapter 8 Biodiversity [APP-046]	Paragraph 8.9.69-8.9.73 [APP-046]	Embedded mitigation Chalk habitat creation	Natural England states that the area for chalk spoil deposition to the East of Parsonage Down, if appropriately established and managed, has the potential to become a high value site for wildlife.	Agreed	Agreed

				Natural England details that chalk grassland included within the Scheme and along the embankments and cuttings has potential to become a mosaic of priority habitats that would realise the ambition of linking Salisbury Plain and Porton Down as part of a coherent ecological network (as detailed within Porton to Plain project, Appendix B), and is in line with National Planning Policy Framework (Paragraph 170).		
3.7	Environmental Statement Chapter 8 Biodiversity [APP-046] and Figure 2.5 Environmental Masterplan [APP-059]	Table 8.14	Embedded mitigation Shrub planting	The Environmental Masterplan includes numerous areas of shrub planting. These are liable to become management liabilities requiring expenditure on scrub control much greater than if left unplanted and likely to be detrimental in the long term to biodiversity. We are not clear what the purpose of planting these areas and advise each is only retained if there is a good reason to do so.	Discrete areas of shrubs have been included in the scheme as shown indicatively in the Environmental Masterplan [APP-059] to provide a landscape link, for screening purposes and to provide a mosaic of habitats. The shrubbed areas will be designed taking into account the need to avoid future management issues associated with rapidly expanding scrub. The principles of creation and management of these shrubbed areas are set out in the Outline Landscape and Ecology Management Plan ('OLEMP') [APP-267], details of which, are secured as part of the landscaping scheme pursuant to Requirement 8 (Implementation and maintenance of landscaping) under Schedule 2 of the DCO [REP6-005].	Agreed

3.8	Environmental Statement Chapter 8 Biodiversity [APP-046] and Figure 2.5 Environmental Masterplan [APP-059]	Table 8.14	Embedded mitigation - Woodland creation	Whilst early successional chalk habitats are the primary ecological aspiration for the scheme, the modest levels of woodland creation provide useful landscaping and are not without their ecological benefits in terms of habitat diversity in general and key bat species.	Agreed between Natural England and Highways England 11 January 2019	Agreed
3.9	Environmental Statement Chapter 8 Biodiversity [APP-046]	Paragraph 8.8.4-8.8.8	Embedded mitigation Green bridges	Natural England welcomes the use of green bridges within the Scheme. As with the embankments and cuttings, they will help achieve defragmentation of the landscape for wildlife, allowing species that are functionally impeded by the existing road to move through the landscape more readily. They will also make the landscape more permeable for people. In particular, we are keen to make Parsonage Down National Nature Reserve more accessible to the wider public, and the provision of a circular walking route from Winterbourne Stoke via Green Bridge 1 is especially welcome in this context.	Agreed	Agreed
3.10	Environmental Statement Chapter 8 Biodiversity [APP-046] and Figure 2.5	Table 8.14	Embedded mitigation Hedgerow creation	Hedges should be used to separate arable land from species rich chalk grassland, as this will help reduce spray drift onto the grassland and provide a valuable habitat in its own right. These benefits will outweigh the	All hedgerows within the DCO boundary to be retained will be managed during the construction phase. This is secured by the OEMP (MW-G28) [APP-187], which is required to be implemented	Agreed

	Environmental Masterplan [APP-059]			negative effect of encouraging the spread of scrub onto the species rich chalk grassland, provided the species mix for the hedge does not include rapidly spreading species such as dogwood or blackthorn. These should be excluded from the planting mix. On this basis, it would appear that there are additional locations where hedgerow planting may be beneficial.	pursuant to paragraph 4 of schedule 2 to the draft DCO. Hedgerows have been included in the scheme as shown indicatively in the Environmental Masterplan [APP-059] to provide a landscape link, for screening purposes and as suitable boundaries.	
3.11	Habitat Regulations Assessment Clarification Technical Note (Submitted at Deadline 7)	Paragraph 1.49	Construction phase disturbance (stone curlew south-west of Winterbourne Stoke)	The justification as to why no adverse effects are envisaged on the stone curlew breeding plot to the south-west of Winterbourne Stoke appears reasonable.	Agreed with Natural England 18 February 2019	Agreed
3.12	Environmental Statement Chapter 8 Biodiversity [APP-046] and Appendix 8.25 Habitat Regulations Assessment [APP-266]	Paragraph 8.8.25 g) And Paragraph 5.1.1-5.1.7	Embedded mitigation (stone curlew breeding plot mitigation measures at Parsonage Down)	Natural England is satisfied with the mitigation measures that have been incorporated into the embedded design for the likely loss of a historically active stone curlew breeding plot. Natural England is satisfied with the siting of the stone curlew mitigation breeding plot (with the agreement of RSPB) within Parsonage Downs. The specifications of the stone curlew plot and fencing have been agreed.	Agreed Natural England and Highways England 18 February 2019. A S253 legal agreement is currently being progressed to secure the delivery of this plot.	Agreed
3.13	Appendix 8.25 Habitat Regulations Assessment [APP-266] and	Paragraph 5.1.1-5.1.7 And Paragraph	Embedded mitigation (stone curlew breeding plot	The stone curlew mitigation breeding plot at Parsonage Down will be managed by Natural England for 10 years post construction, 15 years total.	Agreed between Natural England and Highways England 18 February 2019.	Agreed

	Habitat Regulations Assessment Clarification Technical Note (Submitted at Deadline 7)	s 1.56 – 1.60	mitigation management measures at Parsonage Down)	This will be documented in the S253 legal agreement. Formal landowner agreement is being sought outside of this document.	A S253 legal agreement is currently being progressed to secure the delivery of this plot.	
3.14	Habitat Regulations Assessment Clarification Technical Note (Submitted at Deadline 7)	Paragraph 1.14	Nitrogen deposition	Natural England agrees that namely for Salisbury Plain SAC 'significant effects are not anticipated' from NOx emissions, or nitrogen deposition from the Scheme.	Agreed 18 February 2019.	Agreed
3.15	Habitat Regulations Assessment Clarification Technical Note (Submitted at Deadline 7)	Paragraph 1.48-1.56	Embedded mitigation (stone curlew disturbance mitigation)	In terms of the likely scale of effect associated with indirect disturbance impacts at Normanton Down RSPB Reserve and recommended fencing mitigation measures, we have the following comments. 1) The conclusion is contingent on landowner agreement to implementing the mitigation measures. This will need to be suitably secured prior to concluding no adverse effect on integrity of the Scheme. 2) The note says "The fencing measures for the RSPB Normanton Down Reserve are considered sufficient to mitigate for the associated effects of increased visitor levels on breeding stone curlew." While the measures are likely to eliminate the	Enhanced fencing at Normanton Down RSPB Reserve has not been agreed with the landowner, discussions are still ongoing. As set out in Highways England's response to the Examining Authority's Second Written Question Ec.2.1 [REP6-024], enhanced fencing was not relied upon for the assessments undertaken for the Scheme. That notwithstanding, a precautionary approach is being taken to mitigation for this Scheme. In response to comments made by interested parties to date, Highways England has committed to providing two additional stone curlew plots to those previously committed to. It is considered that	AGREED

				impact, there is a low but distinct risk that they will not eliminate the impact, particularly given the assertions a) that stone curlew can be disturbed by activity within 500m and b) that the plots are within 170m (closest point) of a public right of way. It is for this reason that a monitoring programme is being developed. The question then arises "what additional measures are there that could be put in place should monitoring reveal an impact, and are they sufficiently certain to mitigate the impact?".	this commitment, together with the provision of the stone curlew plot at Winterbourne Down, underlines the robustness of a conclusion of no adverse effect on integrity of the SPA in the Statement to Inform an Appropriate Assessment (Environmental Statement Appendix 8.25) [APP-266]. A technical note has been submitted by Highways England at Deadline 6 (REP6-039) that explains the process by which the stone curlew plot sift has been undertaken. The selection of additional plots is underway and there are ongoing discussions with landowners, RSPB and Natural England.	
3.16	Habitat Regulations Assessment Clarification Technical Note (Submitted at Deadline 7)	Paragraph 1.53	Monitoring strategy	Originally it was perceived that a visitor monitoring strategy would be required in order to correlate any disturbance to breeding stone curlew within the Normanton Downs RSPB Reserve to visitor levels. As stated in the Natural England response to the Examining Authority's Second Written Questions, discussions regarding any monitoring strategy have been superseded by the commitment from Highways England to provide two additional stone curlew plots, irrespective of visitor monitoring data	In response to the Examining Authority's Second Written Questions Ec2.1 and Ec2.3 [REP6-062], we note and concur with Natural England that reliance on visitor monitoring data to inform future mitigation is not required considering the unqualified commitment from Highways England to provide additional stone curlew plots. However, in terms of any monitoring of ~~exiting~~existing and future stone curlew plots, it has been agreed with the RSPB on 24	AGREED

					January 2019 and Wiltshire Council on 22 January 2019, that the monitoring data would be obtained from the RSPB to inform of plot utilisation.	
3.17	Appendix 11.4 Groundwater Risk Assessment [APP-284] and Appendix 8.25 Habitat Regulations Assessment [APP-266] and Habitat Regulations Assessment Clarification Technical Note (Submitted at Deadline 7)	Annex E [APP-284] and Paragraph 55-57 [APP-266]	Hydrology	The report states that the tunnel, to be located below the groundwater level, will lead to interference to the groundwater flow in the Chalk aquifer, also identifying the top 50m of the chalk aquifer as the most active. However, the chalk is represented as one single layer in the model when we know that there is a lot of variety and it does not behave uniformly with some layers acting as preferential flow horizons, especially where the chalk is jointed. We accept that variation in hydraulic conductivity in the model does address this to some degree but there remains uncertainty as to how accurate the model reflects ground water levels. This is particularly relevant when an area of floodplain with spring fed ditches that support Desmoulin's whorl snail lies just outside of the zone of influence predicted by the model (as shown in Appendix 11.4) and ground water levels (or rather the depth that the water level is below the ground) is critical for the snail. An appropriate assessment should therefore consider the confidence that can be applied to the outputs from the model with respect to ground-water	A precautionary approach has been taken which recognises the heterogeneity and dominance of fracture flow in the Chalk – see Appendix 11.4 Groundwater Risk Assessment [APP-282]. The effects would not extend to the area of Desmoulin's whorl snail and its supporting habitat. It is agreed that the Chalk has preferential flow horizons and does not behave uniformly. There is a detailed assessment of the Chalk in the report on the implications of the 2018 ground investigations to the groundwater risk assessment, [AS-023] [REP3-018], which concludes that the modelling in support of the Groundwater Risk Assessment does provide a suitable simulation of the groundwater conditions in the Chalk aquifer at the regional scale (paragraph 5.2.3). The representation of the tunnel in the model is described in Section 3.5 of Annex 1 of the Groundwater Risk Assessment [APP-282]. There is no lowering of groundwater levels beneath or adjacent to the River Avon and no effect on groundwater levels in the area where the snails	AGREED

				levels and whether further conceptualisation of the chalk geology would help to increase the confidence. If uncertainty remains, then a credible plan is needed for a 'what if scenario' where the monitoring shows an adverse impact on the Desmoulin's whorl snail habitat, e.g. where and how much compensatory habitat will be restored or created; how any population on the impacted site be rescued etc. Such a plan should include a) monitoring sufficient to assess wither potential impacts are materialising, b) demonstration that there is certainty that there are viable measures sufficient to mitigate worst case impacts, and c) a commitment to deliver such measures. An appropriate assessment should also consider temporary construction dewatering impacts. Whilst it is recognised that temporary construction dewatering will be minimised as far as reasonably practicable, and that where it occurs it will comply with the general water protection provisions of the Water Abstraction and Impounding (Exemptions) Regulations 2017, it could, none-the-less, have a significant effect on ground water levels in the area and therefore on Desmoulin's whorl snail. We therefore advise that a plan for mitigating any impacts needs to be in place to conclude adverse effect on integrity should this	were observed. River Avon flow would not be significantly affected (as indicated in Annex 1 of Appendix 11.4 [APP-282], paragraph 4.1.16 and 4.1.19, Figures 4.4 and 4.7 hence water level in the river adjacent to areas with Desmoulin's whorl snail would not be affected. In a 1 in 100 year rainfall event the existing drainage from the highway to the River Avon is approximately 0.85 m3/s. The design would provide 20% reduction compared to existing discharges. The Scheme would not prevent the construction of the proposed River Avon improvement (River Avon Appraisal and Design Package, Reach A603/A604 Countess Outline Design) as the Scheme would only modify the existing highway toe drain and would not involve any works in the area shown for the proposed improvement. The Scheme drainage design as set out in the Road Drainage Strategy [REP2-009] in the vicinity of the Countess junction would provide a minimum of 20% betterment of attenuation of scheme drainage compared to existing conditions, as shown in ES Appendix 11.3 Road Drainage	

				eventuality arise. We are pleased to see SuDs integral to the project design with respect to the road drainage scheme but we would like to understand what 20% betterment on the existing discharges to the River Avon actually looks like. It also does not appear that the assessment has considered any impacts on the River Avon if the proposed (and desired) new alignment of the river (as attached) alongside reconnection of the floodplain/wetland habitat creation is implemented at Countess Roundabout. This project is required to restore the physical condition of the river SAC at this site and is in the River Avon Restoration Plan. We would therefore advise that the design of the surface water ditch attenuation scheme needs to consider if measures are needed to prevent it becoming a potential source of pollution under out of bank flow conditions. This should be considered as part of the Appropriate Assessment, in so far as the road scheme may, conceivably, preclude the necessary restoration of the physical condition of the SAC at this location. The Appropriate Assessment should also outline the site specific monitoring plan which will need to be responsive to ground water levels. An Appropriate Assessment will also	Strategy [REP2-009] (paragraph 5.2.3). The design would also include SuDS provision to improve the quality of drainage there compared to existing conditions. The ponds would be lined, planted with reeds and contain permanent water to provide treatment prior to discharge and to enhance biodiversity opportunities. In addition, the drainage design for the drainage catchments around Countess junction would not become a potential source of pollution. It is designed to avoid any ingress from flood water in flood conditions up to a 1 in 100 year event (plus an additional allowance for changes in flood return periods due to climate change). The Scheme drainage would have no adverse effect on water quality in the River Avon. The assessment of risk and identification of any required mitigation measures associated with temporary dewatering will be achieved through the Outline Environmental Management Plan (OEMP) [REP6-011] (MW-WAT3, MW-WAT8 and MW-WAT10). Highways England will ensure that both Wiltshire Council and the Environment Agency are kept informed on this matter as the appropriate regulatory authorities.	

				enable any in combination issues to be considered and assessed.	Natural England have confirmed in their email of 15th July to Highways England (appended to the Updated Habitat Regulations Screening Assessment note, submitted by the Applicant at deadline 7), that:- *With reference to the potential for the scheme to impact on water levels that support the springs, ditches and meadow habitats that occur on the floodplain (both outside and within the SAC boundary) to the east of West Amesbury to Upper Woodford Road that in turn support the Desmoulin's whorl snail, NE concurs that the scheme is unlikely to have a significant effect and an appropriate assessment is therefore not required…* *However, due to the inherent uncertainty of any model, NE advises that a flag (trigger level) should be included in the Groundwater Level and Water Quality Monitoring and Reporting Programme (required by the Outline Environmental Management Plan (OEMP)) for the Desmoulin's whorl snail. If observed impacts are greater than those modelled (either during construction, or once the tunnel is in place/operational), then the potential impact on ground water levels across the floodplain will*	

					need to be re-assessed at this point and, if required, mitigation identified & implemented. Highways England considers that screening out of effects on the River Avon SAC means groundwater monitoring is not required. Notwithstanding, this, Highways England has agreed to carry out general monitoring of groundwater as set out in the OEMP (Deadline 6 Submission - Appendix 2.2 Outline Environmental Management Plan [REP6-011]). It is not necessary to agree specific details at the pre-consent stage. However, the Groundwater Management Plan required by item MW-WAT10 will address: a. Potential effects on groundwater (resources and quality) that fall outside other regulations such as the Environmental Permitting Regulations. b. An update to the Groundwater Risk Assessment for the final design and construction plan. c. The groundwater level and water quality monitoring and reporting programme.	

					d. Development of baseline groundwater conditions and derivation of trigger levels and action levels/Mitigation/action plans for exceedances and accidents/incidents. e. The management of groundwater flood risk. MW-WAT10 includes a requirement for consultation with both the Environment Agency and Wiltshire Council in relation to their statutory functions in developing the Groundwater Management Plan. It would be expected that both these parties would consult Natural England as necessary and appropriate as part of this process.	
3.18	Appendix 11.4 Groundwater Risk Assessment [APP-284] and Habitat Regulations Assessment Clarification Technical Note (Submitted at Deadline 7)	Paragraph 3.10.14 [APP-284] And Paragraph 1.15 -1.22	Phosphatic chalk	The justification as to why phosphatic chalk has not been included within the HRA Likely Significant Effects report appears reasonable. Natural England concurs that it is unlikely that the Phosphatic Chalk yields concentrations of dissolved phosphorus that would change the phosphorus levels of the groundwater. We do, however, feel that it is misleading to state (in 1.18 and 1.21) that 'the natural phosphorus in the surface water is considered to have originated from the Upper Greensand rather than the	Agreed. The updated Habitat Regulations Screening Assessment (HRSA) note, submitted by the Applicant at deadline 7, now confirms that *'originated from the Upper Greensand rather than the Chalk'* is changed to: *'originated from the upper catchment, rather than from Phosphatic Chalk'.*	AGREED

				Chalk'. Ongoing research by Bristol University is suggesting that the amount of phosphate occurring from the greensand geology as a whole is likely to be very small, although there may be localised strata that is more phosphate-rich, and it is more likely that the elevated levels originate from historic land-use practise and/or other anthropogenic sources. We would therefore recommend that this is reworded.		
3.19	Environmental Statement Chapter 8 Biodiversity [APP-046] and Figure 2.5 Environmental Masterplan [APP-059]	Paragraph 8.9.71	Embedded mitigation Chalk habitat maintenance	Natural England highlights that including a grazing regime within the Environmental Masterplan [APP-059] would deliver ecologically (and most likely financially) better outcomes compared to mechanical management options, without compromising road safety. Natural England is concerned that the Environmental Masterplan does not include stock fencing or watering infrastructure within the Masterplan. This would be expensive to retro-fit, and should be included within the design, if possible.	The Applicant has identified where grazing units could be accommodated based on the indicative Environmental Masterplan. The detail of where those grazing units would be located would be a matter for detailed design, although grazing would not be possible in all areas,. The principles of creation and management of this land are set out in the Outline Landscape and Ecology Management Plan ('OLEMP') [APP-267]. Under requirement 8 of the draft DCO [REP6-005], Highways England will be required to submit a detailed landscaping scheme, which is required to be on the basis of the mitigation measures set out in the ES, which includes the OLEMP. In any areas where chalk grassland is to be managed by grazing,	Agreed

					appropriate fencing and stock watering facilities would be provided, as described in ES Chapter 8, Biodiversity [APP-046], 8.9.71, the locations of which will be confirmed during detailed design.	
3.20	Environmental Statement Chapter 8 Biodiversity [APP-046]	Paragraph 8.9.71	Embedded mitigation Fencing	We advise that the public right of way and Private Means of Access (PMA) route west of Green Bridge One is separated from the species rich chalk grassland to the north. Lack of fencing is likely to cause significant difficulties due to conflict between dogs (and their owners) and stock management. Having the right establishment and management regimes for both these areas will be critical.	Specific stock-proof fencing has been included within discrete areas and in locations associated with mitigation fencing, this includes fencing within proximity of Green Bridge One. This will be based on the proposals shown indicatively on the 2018 Environmental Masterplan [APP-059] and subject to detailed design. In the areas where chalk grassland is to be managed by grazing, appropriate access for stock, fencing and stock watering facilities would be provided, as described in ES Chapter 8, Biodiversity [APP-046], 8.9.71.	Agreed
3.21	Environmental Statement Chapter 8 Biodiversity [APP-046]	Paragraph 8.9.149 – 8.9.156	Embedded mitigation Provision for bats	Natural England has no objections to the mitigation principles. All efforts are made to discourage bats from using the original crossing point at a level likely to result in mortality but	In total, four green bridges have been incorporated into the scheme to provide a range of environmental mitigations and enhancements. Their purposes include: providing habitats and safe routes for wildlife	Agreed

				rather to cross at a safe height or use green bridge 1. More detail should be provided as to what has been considered, what has been discounted and why, and how effective the proposed measures are likely to be. The area between and including the underpass at Vespasian's Camp should be designed to encourage bats to cross over the cut and cover area. The current planting regime appears insufficient for this purpose.	to cross the Scheme; integrating the Scheme into the landscape as part of a connected ecological network; providing visual screening of the highway; providing private means of access to farmland or other property, and public rights of way. Green bridge one It was not possible for a green bridge to be located at the original crossing point (Crossing Point 8) indicatively illustrated within Figure 8.11 [APP-160]. The following measures have been incorporated into the design of the proposed Scheme where the proposed Scheme bisects Crossing Point 8 as shown indicatively in the Environmental Masterplan [APP-059]: • The incorporation of embankments and false cuttings means the road embankments are raised between 3-5m above the road surface. • The woodland planting both north and south of the proposed Scheme would include very dense planting in order to push bats up and over the road at safe heights. This planting extends to the B3083	

					underbridge (another safe area of crossing). • The large blocks woodland planting to the north and south have been designed to provide optimal foraging habitat to lead towards the safe crossing feature at green bridge one, this landscaping links woodland habitat at Parsonage Down and Scotland Lodge. • Additional landscaping and habitat creation both north and south of the proposed Scheme in the form of species rich grassland, shrubbed areas, and areas of inundation have been included to provide optimal foraging habitat. Mitigation at Vespasian's Camp As stated within Question Ec.1.14 of the Response to the Examining Authority's Written Questions - 8.10.7 Biodiversity [REP2-027], it was not possible to include into the embedded design a crossing structures due to the topography of the surrounding ground and the Scheme. Instead a combination of mitigation measures have been incorporated to ensure no adverse effects on the local populations of bat, additional to the diversion of the A303 into a 3km tunnel immediately west of the underpass,	

					which is considered to result in an improvement on the current north-south connectivity. As indicatively illustrated within Figure 8.11 [APP-160] and stated within paragraphs 19.3.20 – 19.3.22 of the Comments on Written Representations (REP3-13) the vegetation will be retained and managed along the south of the proposed Scheme at the Vespasians Camp underpass location. This will provide suitable habitat connectivity leading towards the safe crossing point (where the A303 is diverted into tunnel). Furthermore, the proposed Scheme will have false cuttings (which will contain the bat hibernation feature). As such, mitigation is considered to be proportionate to the likely impact. Furthermore the existing scrub and woodland vegetation the runs along the southern embankment of the Scheme is to be retained as illustrated on Sheet 8 of the illustrative Environmental Masterplan [APP-059], this will provide suitable habitat to connect bats at Vespasian's Camp to suitable safe crossing locations over the proposed Scheme. The proposed mitigation incorporated along the route is	

					considered suitable to avoid any impacts on the local bat population.	
3.22	Outline Landscape and Ecology Management Plan [APP-267]	-	OLEMP	There are a number of detailed points around the OLEMP which Natural England believes, if addressed, would improve the biodiversity outcomes from the scheme: a) A high-level aspiration for the chalk grassland habitat is to achieve high levels of habitat heterogeneity. The specifications in the OLEMP seem likely to achieve low heterogeneity, due to uniform prescriptions for seed bed preparation, sowing regimes and post sowing management including plug planting. b) Care needs to be taken in managing the transition from arable to chalk grassland to minimise weed burden. Arable land usually carries a low weed burden and in that respect is very good for establishing chalk grassland. There is a danger that arable land, if left abandoned for a season, will develop a high weed burden which may contaminate areas going to chalk grassland (either through wind blow, or via soil transfer). c) The land to the south of Parsonage Down is not treated differently in the OLEMP, though as we understand it, will not be receiving any chalk deposition. As such the specification in the OLEMP needs reflect this, and the	The OLEMP is not a 'live' document, but instead forms part of the ES so has not been updated. However, Highways England submitted a revised OEMP (REP6-011) at Deadline 6. This provides further detail regarding points raised by Natural England. As stated within MW-LAN1 of the OEMP (REP6-011) Natural England will be consulted on the production of the Landscape and Ecology Management Plan (LEMP). It is anticipated that the detail required to provide suitable levels of habitat heterogeneity will be confirmed at the stage the LEMP is produced. With respect to weed burden, the OEMP submitted at Deadline 6 (REP6-011) includes requirements MW-COM8 and PW-COM8) to undertake a Record of Condition Survey for landowners and occupiers. Any restoration of agricultural land undertaken as a result of requirement MW-COM4 shall proceed in full consultation with the landowner or occupier. The management of temporary habitats will be confirmed within the construction phase of the Scheme.	Agreed

				transition from arable to grassland managed carefully to avoid weed burden. d) The opportunity for temporary “pop up” habitats during construction e.g. arable annuals strewn on spoil heaps does not seem to feature in the OLEMP. In addition to the points above relating to the OLEMP, we are also discussing with Highways England how opportunities to involve volunteers in the natural environment aspects of the scheme can be realised, potentially within the Community Liaison section of the future CEMP.	Highways England recognises the importance of volunteers in nature conservation and will continue to liaise with Natural England over non-DCO matters.	

4 Matters Under Discussion

4.1.1 There are no matters Under Discussion at the present time.

5 Matters Not Agreed

5.1.1 There are no matters Not Agreed at the present time.

Appendix A – Habitat Regulations Screening Assessment - Clarification Technical Note (07 August 2019)

Technical Note

A303 Amesbury to Berwick Down

Project:	**A303 Amesbury to Berwick Down**				
Title:	**Habitat Regulations Screening Assessment - Clarification Technical Note**				
Doc ID:	**8.43**				
Date:	**07 August 2019**	Version:	**P02**	Status:	**Deadline 7**

Introduction

1 Requirement for clarification

1.1 Following consultation with Natural England, as part of the development of a Statement of Common Ground between Highways England and Natural England, further clarification of certain elements of the Habitat Regulations Screening Assessment (HRSA) and Statement to Inform Appropriate Assessment (SIAA) report has been requested.

1.2 This Technical Note provides clarification on the rationale used in the HRSA and SIAA. It references and brings together material from various parts of the Environmental Statement which was used in the preparation of the HRSA [APP-265] and SIAA [APP-266], It does not include new data or analysis besides that which was reported in the HRSA and SIAA and the Environmental Statement on which those were based, with the exception of some details on the method by which locations for new stone curlew plots have been identified. It responds to queries raised by Natural England. Early drafts of this note were reviewed by Natural England and as the clarification on individual topics has been progressively accepted agreement has been recorded in the Statement of Common Ground at Deadline 2 [REP2-016] and Deadline 7 [REP7-011].Specific subjects within the HRSA included within this Technical Note are clarification on the following: -

- NOx concentrations and nitrogen deposition on the Salisbury Plan Special Area of Conservation (SAC);
- phosphatic chalk and any effects of it on the River Avon SAC; and,
- hydrology and any effects on the River Avon SAC.

1.3 Specific subjects within the SIAA included within this Technical Note are clarification and explanation on the following:

- likely scale of impact on stone curlew at Normanton Down, including mitigation measure that are to be incorporated; and
- details regarding replacement breeding plot within the Parsonage Down SAC.

1.4 This note addresses the subjects above, with further explanatory detail included in two supporting appendices, Appendix 1 stone curlew plot sift (submitted previously at Deadline 6 [REP6-039] which shows the process by which potential stone curlew plots have been identified and Appendix 2, which shows itemised responses to comments by Natural England on water issues which have now been agreed. The information in this Technical Note is based on information within the following documents:

NOx concentrations and nitrogen deposition – Salisbury Plain SAC

- Environmental Statement Chapter 8: Biodiversity - TR010025-000199-6-1_ES_Chapters_08_Biodiversity [APP-046]
- Environmental Statement Appendix 8.24 Habitat Regulations Likely Significant Effects - TR010025-000418-6-3_ES-Appendix_8.24 [APP-265]
- Environmental Statement Chapter 5: Air Quality - TR010025-000196-6-1_ES_Chapters_05_AirQuality [APP-043]
- Environmental Statement Appendix 5.2 Air Quality Methodology Figure 5.1 [APP062] TR010025-000216-6-2_ES-Figure_5.2 [APP-063]
- Natural England (2018) Internal Note on Ways of Working: Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations
- DMRB Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 Air Quality (HA207/07).
- DMRB Interim Advice Note 174/13 Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 'Air Quality (HA207/07)

Phosphatic chalk effects – River Avon SAC

- Environmental Statement Chapter 10: Geology and Soils - TR010025-000201-6-1_ES_Chapters_10 [APP-048]
- Environmental Statement Appendix 10.1 Preliminary Ground Investigation Report [APP-273]
- Environmental Statement Appendix 11.4: Groundwater Risk Assessment - TR010025-000435-6-3_ES-Appendix_11.4_GroundwaterRiskAssessment [APP-282]
- Environment Agency (2014), The Hampshire Avon Management Catchment: A summary of information about the water environment in the Hampshire Avon management catchment.

Stone Curlew *Burhinus oedicnemus* – supporting population of the Salisbury Plain SPA

- Environmental Statement Chapter 8: Biodiversity - TR010025-000199-6-1_ES_Chapters_08_Biodiversity [APP-046]
- Environmental Statement Appendix 8.24 Habitat Regulations Likely Significant Effects - TR010025-000418-6-3_ES-Appendix_8.24 [APP-266]
- RSPB (undated) Stone-curlew, Population trends. Available from: *https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/stone-curlew/population-trends* [Accessed 21st August 2018].
- Geophysical Survey report (Parsonage Down): - HE551506-AMW-HER-SW_GN_000_Z-RP-LH-0004
- Natural England, Forestry Commission, and the European Agricultural Fund for Rural Development (2018), Countryside Stewardship: Higher Tier Manual
- FG7: Anti-predator combination fencing. Available from *https://www.gov.uk/countryside-stewardship-grants/anti-predator-combination-fencing-fg7* [Accessed 8th January 2019].
- Environmental Statement Appendix 8.25 Habitat Regulations Assessment, Statement to Inform Appropriate Assessment - TR010025-000419-6-3_ES-Appendix_8.25_HRA_AppropriateAssessment [APP-266]
- Environmental Statement Figure 8.11 – Breeding Bird species (Confidential) [APP-157]
- RSPB Information Note: Managing Nest Plots for Stone Curlew, Version 1 Wessex Area. Available from:

https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/guidance-on-plot-management-in-the-brecks.pdf

Hydrological Effects – River Avon SAC

- Environmental Statement Chapter 11: Drainage and Water - TR010025-000202-6-1_ES_Chapter_11_Drainage and Water; [APP-049]
- Environmental Statement Appendix 11.1 Water Quality Risk Assessments - TR010025-000432-6-3_ES-Appendix_11.1_WaterQualityAssessment [APP-279]
- Environmental Statement Appendix 11.3 Road Drainage Strategy - TR010025-000434-6-3_ES-Appendix_11.3_RoadDrainageStrategy [APP-281]
- Environmental Statement Appendix 11.4 Groundwater Risk Assessment - TR010025-000435-6-3_ES-Appendix_11.4_GroundwaterRiskAssessment [APP-282]
- Environmental Statement Appendix 11.6 Non-Significant Effects - TR010025-000437-6-3_ES-Appendix_11.6_NonSignificantEffects [APP-284]
- Environmental Statement Appendix 8.8 Desmoulin's Whorl Snail Survey [APP-245]

NOx Deposition – Salisbury Plain SAC

Introduction

1.5 NOx in atmosphere and nitrogen (NOx) deposition have been screened out within the HRA Likely Significant Effects report (HRSA) [APP-265]. The screening is shown in Table 3.2 [APP-265], with assessment described in paragraphs 30 to 34 in the table. Outputs from air quality modelling relevant to the Salisbury Plain SAC are shown in detail in Appendix D, Table D2 in the HRSA [App-265]. The air quality assessment for the Scheme is included in the ES Chapter 4 Air Quality [APP-043]. The text below further explains the assessment.

Potential Effects

1.6 As detailed within Natural England's 2018 approach to Habitat Regulations, direct effects of air pollution may arise if the concentration of a pollutant in air exceeds a defined critical level, which is expressed in μgm^{-3} (micrograms per cubic metre). Indirect effects on vegetation may arise when a pollutant settles onto the ground (referred to as deposition). In the case of emissions from traffic the pollutants are nitrogen oxides (NOx), which can be deposited, particularly as nitrates and nitric acid. This can lead to nutrient enrichment of the soil (eutrophication) or changes in the soil's pH (acidification). Soils that are already acidic or low in nitrate are the most susceptible to change. Eutrophication favours growth of tall, vigorous plants that can utilise the increase in soil nutrients, at the expense of species with lower ability to compete, thus potentially resulting in a change in the plant community.

Assessment of Likely Significant Effects

1.7 Air quality modelling has been undertaken for the Scheme to determine the expected changes in the concentrations of NOx due to the Scheme and consequently whether there is likely to be sufficient change to affect the vegetation within the SAC nearest to the Scheme. The modelling shows that because the concentrations are low, the contribution of the Scheme to nitrogen deposition would also be low. The rationale is explained further below.

1.8 The Design Manual for Roads and Bridges Interim Advice Note 174/13 (Updated advice for evaluating significant air quality effects for users of DMRB Volume 11, Section 3,

Part 1 Air Quality (HA207/07)) states that nitrogen deposition does not need to be investigated directly when: -

- the total NOx concentration does not exceed the critical level for protection of vegetation (30 μgm^{-3}) in the assessment year[1]; or
- the contribution of NOx concentrations associated with the Scheme is imperceptible (less than 0.4 μgm^{-3} contribution); or
- There will be a reduction in NOx concentrations and thus nitrogen deposition (a positive effect).

1.9 This is because the main role of NOx is as a source of nitrogen and low NOx concentrations (i.e. below the critical level) indicate that combustion (the process that generates NOx) is not a significant source of deposited nitrogen compared to other sources, particularly livestock and fertiliser. When the NOx from traffic is at low concentration in air the deposition of nitrogen on soils and vegetation from this source will also be correspondingly low. Other source or sources can also contribute to total nitrogen deposition, e.g. from agriculture.

1.10 In the case of Salisbury Plain SAC, NOx concentrations at the modelled locations are forecast to be low in 2026 with the A303 Scheme in operation (e.g. 7 μgm^{-3} at Parsonage Down) and air quality modelling shows they will be below the critical level in all assessment years (2021, 2024, 2026) on all transects associated with Salisbury Plains SAC (Transects E1, E2, E3, E11, E12, and E13), when the baseline concentrations, traffic growth between the baseline and operational phase and the A303 Scheme is included (i.e. the 'in combination scenario'). The locations of transects are shown on ES Figure 5.3 [APP-064]. Transects E12 and E13 extend into the Salisbury Plain SAC from the two points on the south boundary of Parsonage Down SSSI/NNR which are closest the Scheme. EC3 is at the eastern limit of the Scheme where the SAC boundary is adjacent to the A303. Results are summarised below:

Table 1: Highest operational Do Something (i.e. with the A303 Scheme) NOx concentrations (μgm^{-3}) at baseline year and years of assessment of the air quality transects (inclusive of the Scheme in combination with other Schemes and general traffic modelling)

Model transect	Baseline highest level of NOx concentration	Highest level of NOx concentration with the Scheme included 2021 construction phase	Highest level of NOx concentration with the Scheme included 2024 construction phase	Highest level of NOx concentration with the Scheme included 2026 operational phase	Below or above the threshold for further threshold for further investigation
E1	13.7	15.2	10.1	7.2	Below threshold
E2	22.1	21.2	16.1	10.7	Below threshold
E3	47.1	42.1	31.7	25.2	Positive effect as NOx levels will be

[1] *The NO_2 levels should also be used to describe the magnitude of change on NOx levels.*

					reduced due to the operation of the Scheme
E11	19.2	15.0	11.8	9.2	Below threshold
E12	10.2	8.3	9.1	7.4	Below threshold
E13	10.5	8.5	7.1	6.5	Below threshold

1.11 Full NOx concentration data, including future concentrations 'with' and 'without' the A303 Scheme are contained in Appendix D, tables D2.1 to D2.3 of the HRSA [APP-265] (the 'without Scheme' and 'with Scheme' results are labelled 'Do Minimum' and 'Do Something' in that appendix in line with standard Highways England practice; the NOx data are columns 2-6 of the three tables). The results are summarised in Table 3.2, paragraph 34 of the HRSA [APP-265] as follows: '*Using the IAN 174/13 criteria there is no location on any modelled transect where NOx concentrations are forecast to exceed 30 µgm^{-3}* ***and*** *the change in concentrations due to the Scheme is forecast to be greater than imperceptible. On all modelled transect locations total NOx concentrations will either be below 30 µgm^{-3} in all assessment years (2021, 2024 and 2026) or the contribution of the Scheme will be imperceptible (i.e. less than 0.4 µgm^{-3}) or will be positive (i.e. causing a reduction in NOx concentrations). It can therefore be concluded that (quoting from IAN 174/13) 'significant effects are not anticipated'.*

1.12 Notwithstanding the conclusions regarding NOx, nitrogen deposition rates were calculated and these data are also presented in Appendix D, Tables D2.1-D2.3 of the HRSA [APP-265] (the nitrogen deposition data are columns 7-11 of the tables). Reference to these data, and particularly Table D2.3 (the operational Scheme and thus the long-term effect) shows that deposition rates on most Salisbury Plain SAC transects (E1, E2, E11 and E13) will be no worse or marginally (up to 0.2 kgN/ha/yr) better with the Scheme in operation than they would be in 2026 without the Scheme. The exceptions being transects E3 (at the closest point to the road) and E12 (up to 15m into the SAC at Parsonage Down) where the operational Scheme will raise deposition rates by 0.1 kgN/ha/yr compared to the 2026 situation without the Scheme. However, this is a very small difference (less than 1% of the lowest part of the critical load range) and a substantial net reduction in deposition is still forecast by 2026, to the extent that on transect E3 the critical load would no longer expected to be exceeded at all. For this reason, a conclusion of no likely significant effect can be drawn.

1.13 Although it does not form part of, or is relied upon to reach, the conclusion over likely significant effects (and is therefore not referenced in the HRA reports) it is worth noting that the nature of the A303 Scheme material disposal proposals at Parsonage Down involve removing land from agricultural production. This is relevant because it has been estimated that 0.3 kg of nitrogen is lost due to leaching or surface run-off for every kilogram of nitrogen fertiliser or manure applied to a field[2]. Even in Nitrate Vulnerable

[2] Duxbury, J.M., L.A. Harper, and A.R. Mosier. 1993. Contributions of agroecosystems to global climate change. In L.A. Harper, A.R. Mosier, J.M. Duxbury, and D.E. Rolston (eds.), Agroecosystem Effects on Radiatively Important Trace Gases and Global Climate Change (pp. 1-18). Spec. Pub. no. 55. ASA. Madison, WI.

Zones (where nitrogen application rates are restricted), nitrogen fertiliser is often applied at rates of up to 150-250kg per hectare depending on crop and season[3]. Therefore, even in a Nitrate Vulnerable Zone, 45-75kg of nitrogen can be lost to leaching or surface run-off from each hectare of arable land for every application, and could thus affect adjacent designated wildlife sites. Moreover, these numbers do not include the ammonia released to air from the fertiliser. In comparison, inputs from non-agricultural atmospheric sources are usually very modest (typically being several orders of magnitude less than those from agricultural run-off). This means the Scheme is expected to indirectly reduce nitrogen deposition inputs to Parsonage Down by taking some land out of arable production on the south and east sides of Parsonage Down and subsequent creation of chalk grassland.

1.14 It can therefore be concluded that for Salisbury Plain SAC *'significant effects are not anticipated'* from NOx emissions, or nitrogen deposition from the Scheme, as stated in the HRSA [APP-265].

Phosphatic chalk – River Avon SAC

Introduction

1.15 The River Avon Nutrient Management Plan was implemented by Wiltshire Council, Natural England and the Environment Agency in 2015 to help manage phosphorus levels in the River Avon and to avoid the deterioration of ecologically designated sites as a result of water quality changes through eutrophication. Phosphorus poses a threat to the River Avon and its ecologically important features because as phosphorus (as phosphate) increases the communities of aquatic plants for which the site is designated undergo changes in composition. Phosphates are naturally present within the chalk geology of the UK and in other geology in southern England, notably the Upper Greensand. Phosphate can also enter waterbodies from a range of human activities, including agricultural fertilizers, livestock production, run-off of soils and wastewater treatment works.

Potential Effects

1.16 As stated in Appendix 11.4 Groundwater Risk Assessment, [APP-282] (paragraph 3.10.8) an elevated level of dissolved phosphorus in the Chalk groundwater is a key reason for the surface water bodies of the River Avon and River Till failing to achieve "good status" classification under the Water Framework Directive. The main sources of phosphorus include farming as well as point sources such as wastewater treatment works discharges (phosphorus) and natural phosphatic minerals in the Upper Greensand and Chalk aquifers (Environment Agency, 2014). The presence of phosphate nodules in the Phosphatic Chalk present in the vicinity of Stonehenge Bottom has been previously noted as a potential natural source of higher phosphorus in groundwater and this possibility has been investigated further for the environmental assessment of the Scheme.

1.17 The River Avon SAC surface water bodies are subject to the Water Framework Directive class boundary standards (43 µg/l for the "High/Good" class boundary) and the SAC standards for phosphorus (soluble reactive phosphorus measured as orthophosphate) of 50 µg/l.

[3] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/432141/pb14050-nvz-guidance.pdf

Assessment

1.18 Phosphatic chalk has not been considered in the HRSA [APP-265] because the leachate tests (reported in the Geology and Soils Chapter 10 of the ES) [APP-048] and in additional detail in ES Appendix 10.1, section 5.11 [APP-273]) all reported concentrations of orthophosphate below the laboratory detection limit. It is therefore considered unlikely that the Phosphatic Chalk yields concentrations of dissolved phosphorus that would change the phosphorus levels of the groundwater. The phosphorus in the surface water is considered to have originated from the upper catchment rather than the Chalk. The text below provides an extract from the ES (ES Appendix 11.4 [APP-282] as evidence-based clarification.

1.19 The groundwater samples taken in 2018 have been analysed for dissolved phosphorus, as well as for total phosphorus which was the only concentration recorded historically. The concentration of dissolved phosphorus in the Chalk groundwater in the study area (ranging from <5µg/l to 11µg/l) is lower than the mean British Geological Surveys regional concentration (40µg/l) at all locations monitored.

1.20 It is likely that the dominant calcium carbonate chemistry of the Chalk generates a precipitated form of phosphorus, rather than a soluble form. Dissolution of calcite carbonate minerals at lower pH can result in the release of phosphorus contained within the Chalk. However, the pH range measured across all the samples is relatively small (6.7 – 8) with near-neutral to alkaline values, which are consistent with groundwater being well-buffered by carbonate equilibrium reactions.

1.21 The general low concentration of orthophosphate measured in the groundwater is in contrast to higher concentrations measured in the River Avon. This suggests that the origin of the phosphorus in the surface water is from the upper catchment rather than the Chalk. Leachate tests were undertaken on Phosphatic Chalk samples to determine the likelihood of phosphorus being released from the strata. The leachate tests (reported in the Geology and Soils chapter of the ES) all reported concentrations of orthophosphate below the laboratory detection limit, and it is therefore considered unlikely that the Phosphatic Chalk yields large concentrations of dissolved phosphorus.

1.22 As the phosphatic chalk is not considered to yield dissolved phosphorus, the abstraction and subsequent use of the tunnel spoil which comprises predominantly chalk, some of which may consist of Phosphatic Chalk present in the vicinity of Stonehenge Bottom, is unlikely to add to the phosphorus levels within the groundwater. As such, it has not been included in the HRSA report.

Hydrology – River Avon SAC

Introduction

1.23 Hydrological effects have been screened out in the HRA Likely Significant Effects Report.(HRSA) [APP-265] Table 3.1,paragraphs 55-57 and 72). The text below further clarifies / justifies the assessment.

Potential Effects

1.24 Temporary, localised dewatering of the groundwater may take place during the construction phase of the Scheme. If it is required, this may result in diverting water away from groundwater-dependent receptors, or bypassing part of the system, leading to reduced groundwater level and flow.

1.25 The construction of the Scheme may result in permanent changes to hydrology, such

as the presence of part of the tunnel below the groundwater level in the Chalk interfering with groundwater flow, underground structures interfering with groundwater flow, physical and hydromorphological impacts from watercourse crossings and other hydraulically linked surface water features, any increase in discharges to the ground and construction within the floodplain or key overland flow routes altering flood flows and flood risk.

1.26 If permanent changes in groundwater led to changes in the hydrological regime in groundwater-dependent riparian habitats with Desmoulin's Whorl Snail this could lead to drying out of wetlands and possible reduction or loss of populations.

1.27 During the operational phase of the Scheme, impacts on groundwater and surface water are related to water quality arising from pollutants.

1.28 Assessment

Temporary dewatering during construction

1.29 An assessment is presented in the Groundwater Risk Assessment (ES Appendix 11.4) [APP-282], Sections 6.1 – 6.5 and Table 3.1 of the HRA Likely Significant Effects report (HRSA) [APP-265], paragraph 56).. The twin-bore tunnel is to be constructed partially below the groundwater level in the Chalk. Closed face tunnelling techniques will be used (as secured in item D-CH32 of the Outline Environmental Management Plan (OEMP)) to minimise the need to undertake dewatering during construction. That method would fit and seal pre-cast concrete sections behind the cutting face of the TBM, avoiding ingress of water into the tunnel during construction. All dewatering activities, if any are required, will be required to comply with the general water protection provisions of the relevant legislation. As such, no significant effects associated with dewatering have been identified, and as such temporary dewatering was screened out in the HRSA.

1.30 Furthermore, the OEMP sets out requirements that if dewatering was required, it would be kept to a minimum and would require approval (MW-WAT8), the contractor would have to prepare and implement a Groundwater Management Plan (MW-WAT10) and this would be require consultation with the Environment Agency. There would also be a requirement for monitoring of groundwater if any changes in groundwater level were predicted which would be considered significant (MW-WAT15).

Permanent effects on groundwater and surface water associated with the construction of the Scheme

1.31 The presence of the tunnel below the groundwater level will lead to interference to the groundwater flow in the Chalk aquifer (see ES Appendix 11.4 [APP-282], Figure 5.3 conceptual illustration. Numerical modelling (adapting the Wessex Basin model for the study area) has been undertaken (ES Appendix 11.4) [APP-282]. The model has undergone sensitivity testing to verify it under different conditions and has been independently review to confirm that it is both robust and precautionary, as stated in the response in Appendix 2 to this note, item 3.The zone of influence of the tunnel on groundwater is shown in ES Appendix 11.4, [APP-282], Annex 1, in Figures 4.1, 4.6 and 4.11 for high, average summer and drought conditions respectively. (These three figures are also reproduced in Appendix 2 to this HRSA Clarification note)in The greatest changes in groundwater level at the tunnel would be If the watertable is exceptionally high, but in all three scenarios the modelling shows that changes in groundwater level would not extend to the groundwater-dependent riparian zone of the River Avon south of the A303.

1.32 The effects of the tunnel on groundwater would be minimal during normal summer flow or drought conditions and would not extend far enough to affect areas with Desmoulin's whorl snail next to the River Avon near West Amesbury, as described in Appendix 2 of this note, in responses to items 2 and 3. Hence there would be no likely significant effect and no need for an appropriate assessment for effects on Desmoulin's whorl snail.

1.33 The groundwater model predicts negligible changes in flow in any reach of the River Avon or the River Till at low flows in an average year. In the River Avon flow changes associated with the Scheme average approximately 20m^3/d compared to flows in excess of 100,000m^3/d, a predicted change of less than 0.1%. Flows with the Scheme are up to 25m^3/d higher in the River Till, representing an increase of approximately 0.2% from approximately 15,000m^3/d flow.

1.34 Under drought conditions the model predicts negligible changes in flow in both rivers. Flow changes in the River Avon average approximately 20m^3/d compared to flows averaging approximately 70,000m^3/d, a predicted change of less than 0.1%. No flow changes are predicted in the River Till, as during drought conditions there is very little flow in this river.

1.35 A summary of the non-significant effects has been presented in Appendix 11.6 of the ES [APP-284] where it concludes that the effect of the Scheme on groundwater baseflow, alteration to hydrological regime and alteration to flood levels and overland flow paths will be neutral due to the design measures identified in Table 2 [APP-284] regarding protection of surface and groundwater from construction of the tunnel and bridges (secured via the OEMP).

1.36 The potential impact of the Scheme on hydrology was assessed as part of the Water Framework Directive Compliance Assessment (Appendix 11.2) [APP-280] for the Upper Hampshire Avon (Chalk) groundwater body and the River Till, River Wylye and River Avon (Upper) surface water bodies. The impact of each Scheme element was assessed against the hydromorphological supporting elements for the identified surface water bodies and dependent surface water for the groundwater body.

1.37 The WFD Compliance Assessment concludes that the impacts resulting from the construction and operation of the Scheme are unlikely to cause a permanent change in the status of the water bodies and overall the Scheme is compliant with the requirements of the WFD.

Permanent effects to groundwater and surface water associated with the operational phase of the Scheme

1.38 The main impacts considered for the operational phase of the Scheme were relating to the road drainage. A summary of the proposed road drainage for the Scheme is provided in the Road Drainage Strategy (REP2-009). Requirement 10 of the draft DCO provides that the final drainage system for the Scheme must be approved by the Secretary of State, in consultation with Wiltshire Council (as appropriate) and the Environment Agency; and that this must be based on the mitigation measures in the ES, which include that strategy.

1.39 Currently road drainage from the existing A303 drains to the side of the road without any treatment and infiltrates to ground with any land drainage (surface water run-off) from road ditches.

1.40 For the Scheme land drainage will be kept separate from road drainage and returned to the aquifer through land drainage ditches. This will be of a positive benefit to

groundwater quality in the area.

1.41 The Road Drainage Strategy comprises three distinct drainage sections, the roads west of the tunnel, the tunnel and the roads east of the tunnel. Each of the three sections uses different sustainable drainage features to treat and attenuate the highway water run-off prior to discharge.

1.42 *West of the tunnel* - road drainage is to be captured by a new drainage system and directed to grassed infiltration basins to the west of the tunnel and to infiltration crate systems in the vicinity of the tunnel portals. Carrier pipes will be used to ensure that any spillages are contained within the drainage system and do not infiltrate to ground prior to reaching the infiltration basins.

1.43 *Tunnel* - tunnel drainage is to be captured in a separate system with all contaminated run-off collecting in an impounding sump and removed by tanker.

1.44 *East of the tunnel* - road drainage to the east of the tunnel is to be collected in a series of road edge channels and combined kerb drains which will drain to linear ponds before outfalling into the River Avon via the existing highway ditches. The ponds would be lined, planted with reeds and contain permanent water to provide treatment prior to discharge and enhance biodiversity opportunities. The run-off would be attenuated to achieve a minimum 20% betterment of the existing discharge rates.

1.45 An assessment of the potential impact of the Scheme on groundwater during the operation phase is presented in Sections 6.6 of the Groundwater Risk Assessment (Appendix 11.4 [APP-282]) which concludes that there will be no significant impact on groundwater levels, flow and quantity.

1.46 The Highways England Water Risk Assessment Tool (HEWRAT) assessments have been completed for the proposed drainage system. For the drainage systems involving discharge to ground, and therefore the groundwater environment, a slight improvement on the spillage risk is estimated, but this is not enough to reach the 50% improvement threshold for a minor benefit (Appendix 11.1 [APP-279]). For water quality in the River Avon there is a Moderately Beneficial residual effect as a result of improved prevention and treatment of pollution from road run-off and sediment transport. This assessment is based on the soluble pollutant (Copper) becoming a Pass from the existing baseline which is a Fail condition (Appendix 11.1) [APP-279].

Summary

1.47 Effects on hydrology associated with temporary dewatering, permanent construction and operation activities are not considered likely to be significant and have been screened out in the HRA Likely Significant Effects report (HRSA [APP-265], Table 3.1 paragraphs 54-57). Because construction and operation would not affect the water regime in riparian wetland at the River Avon, there are no likely significant effects on Desmoulin's whorl snail and this is also screened out (HRSA [APP-265], Table 3.1, paragraph 53).

Stone Curlew *Burhinus oedicnemus* – supporting population of the Salisbury Plain SPA

Introduction

1.48 In 2016, there were between 320 and 380 breeding pairs of stone curlew in the UK. The Salisbury Plains SPA is considered to support approximately 11% of the breeding population of stone curlew within Great Britain. The breeding population present within

the study area is considered to be a supporting population of the breeding population in Salisbury Plain SPA. The text below clarifies the following:

- Detailed justification as to why no adverse effects are envisaged on the stone curlew breeding plot to the south-west of Winterbourne Stoke;
- likely scale of effect associated with indirect disturbance impacts at Normanton Down RSPB Reserve and mitigation measures agreed; and,
- details of the compensation stone curlew breeding plot proposed within Parsonage Down.

Potential Effects

1.49 Stone curlews are highly vulnerable to disturbance by pedestrians and dogs. They respond to disturbance, even at large distances (500 m). Hence, increased human activities within 500 m of any stone curlew breeding site have the potential to disturb breeding pairs. Frequent prolonged disturbance may result in birds leaving their nests for long periods of time, which may result in an unviable brood or increased losses to predation. Furthermore, if there is excessive disturbance during the spring when stone curlews are setting up territories and selecting nest sites they may not use an available plot. A reduction of quality of a plot and its reduced utilisation could reduce the likelihood of successful breeding by a pair of stone curlews. Although this is likely to be limited to individual breeding pairs, disturbance impacts on nesting pairs outside the SPA (within 5km) may result in reduced breeding success in the supporting population of the SPA and conceivably increased competition for territories and resources for the population breeding within the SPA.

Assessment

Disturbance during construction phase on stone curlew breeding plot south-west of Winterbourne Stoke

1.50 A historically active breeding plot is located approximately 250-300m south of the current A303 to the south-west of Winterbourne Stoke. This plot was one of the plots mentioned in the SIAA [APP-266 in paragraph 5.1.4, which had been screened out because it would become more distant from the A303 due to the Winterboure Stoke bypass. The rationale for screening out the plot is described in more detail here. The breeding plot is screened from the existing A303 by the topography of the area (the existing A303 is not within line of sight of the breeding plot). Furthermore, the existing A303 is lined by hedgerows and scattered trees. The activities associated with the downgrading of the existing A303 to a private means of access would involve only limited construction activities on an area that is already subject to a high level of traffic, as such, disturbance to stone curlew that may be breeding within the plot is unlikely to occur during this stage. The new section of A303 planned to be constructed would be routed further north of the existing A303 and construction works associated with the new section of road would not be within 500m of the historically active breeding plot. As such, disturbance to breeding pairs is not anticipated. For these reasons, a conclusion of no likely significant effect can be drawn.

Disturbance during construction phase on stone curlew breeding plots at Normanton Downs RSPB Reserve

1.51 The stone curlew plots at Normanton Down RSPB reserve are more than 500m from the old A303 (the closest being 630m distant) and further than this from the tunnel portals. Hence construction activity would not occur within the disturbance range of the

existing stone curlew plots and a conclusion of no likely significant effect can be drawn (section 5.2 of the SIAA [APP-266]).

1.52 In addition, the Outline Environmental Management Plan Appendix 2.2 [REP6-011] in item PW-BIO5 and MW-BIO8 requires measures to be taken to deter stone curlew from attempting to nest within the construction area. In the event that nesting stone curlews are found located within the Scheme boundary or within 500m then liaison with Natural England and the RSPB will be undertaken. This will aim to identify and agree the specific and appropriate measures to be undertaken in order to avoid disturbance of the nesting pair. This safeguard will apply to all areas of the Scheme and hence will ensure that there is no likely significant effect on the population during construction (section 5.2.5 of the SIAA [APP-266].

Disturbance of stone curlew breeding plots at Normanton Downs RSPB Reserve during the operational phase (section 5.3 of the SIAA [APP-266])

1.53 Two established and historically active stone curlew plots are located within the Normanton Down RSPB Reserve (the two plots support approximately 1% of the breeding population of Great Britain).

1.54 Two Public Rights of Way (PRoW) run north-south along the western and eastern edges of the RSPB Reserve. The historically active stone curlew breeding plots are located approximately 170m from the PRoW (at the closest point) and are partially obscured from the PRoW by the natural landform. It is anticipated that the removal of the A303 (which currently acts as a natural barrier to foot traffic) could result in an increase in recreational use of the PRoWs that run along the RSPB reserve boundary. . The boundaries of the Normanton Down RSPB Reserve are already fenced, in order to manage stock and deter people from trespassing. Although the majority of the recreation users within the World Heritage Site remain on the PRoWs, trespassing has been reported by the RSPB and local landowners. As such, the increase in recreational use may also result in an increase of people illegally trespassing on the reserve. If so, it may result in indirect disturbance to stone curlew that may be breeding within the plots. If the number of disturbing events increases above the threshold of tolerance of individual pairs of stone curlew, this could result in a reduction in breeding success of stone curlew within the reserve.

1.55 Enhanced fencing of greater height, with electric wires added (in line with the FG7: Anti-predator combination fencing, as stated in the Countryside Stewardship: Higher Tier manual) was offered to the landowner to help to reduce the likelihood of trespass, but has not been accepted to date. The Statement to Inform an Appropriate Assessment (SIAA) [APP-266] does not rely on the erection of enhanced fencing at Normanton Down RSPB Reserve to mitigate for any in-combination effect of recreational disturbance on breeding stone curlew and the conclusion of the SIAA of no adverse effect on the supporting population of the Salisbury Plain Special Protection Area (SPA) (as was stated in the response to written questions at Deadline 6 [REP6-024], Ec.2.1).

1.56 It has been agreed with Natural England and RSPB that it is desirable to not only address the risk of increased disturbance of stone curlews and thus mitigate (and avoid) any indirect effect on the breeding population within the SPA, but also to provide net enhancement for the stone curlew population. Highways England has therefore agreed to identify and secure two additional new stone curlew plots. This is in addition to the plot which will be provided at Parsonage Down to address the direct loss of an existing plot in that area and a plot which has been agreed in principle with the RSPB on its reserve at Winterbourne Down (as described in the response to written questions

at Deadline 6 [REP6-024], Ec.2.3).

1.57 These measures underline the robustness of a conclusion of no adverse effect on integrity of the SPA in the Statement to Inform an Appropriate Assessment [APP-266]. This is described in more detail in Appendix 1, Habitat Regulations Screening Assessment Clarification Note - stone curlew plot sift (issued separately at Deadline 6 [REP6-039]), which sets out the method used to identify suitable locations for additional plots. For the protection of nesting sites of Schedule 1 birds the locations of existing stone curlew plots and proposed new ones are confidential, as has been agreed with RSPB.

1.58 Ongoing monitoring of the stone curlew breeding plots in and around the Salisbury Plain SPA is undertaken annually by the RSPB. Static automated monitoring of visitor numbers associated with the PRoWs (byways 11 and 12)is ongoing, to provide quantitative data on visitor numbers.

1.59 The monitoring of stone curlew breeding post-construction will be compared with the long term pre-construction dataset to determine whether there has been a change in breeding attempts. Breeding success post-construction will be analysed in conjunction with the visitor monitoring surveys. Whether or not there is any future reduction of utilization of plots at Normanton Down RSPB reserve, the provision of the new stone curlew plots will ensure there is no reduction of nesting opportunities for the supporting population of the SPA and therefore there would be no adverse effects on the integrity of the SPA and the results of the monitoring would not impact on this.

1.60 The presence of an autumn roost of stone curlews at Normanton Down was considered during the environmental assessment and the issue has been raised during the DCO examination period [REF]. As stated above, the two stone curlew plots and environs in the Normanton Down RSPB reserve, which are used for seasonal roosting are beyond the disturbance distance from the construction area. As for post-construction in combination recreational disturbance, the roosting birds are not limited to specific plots, whereas breeding stone curlews with nests are limited to their territorial plot. The birds have the option of congregating on the Normanton Down plots, or any other stone curlew plots within the SPA and surrounding zone. As the birds congregate in late summer, there is also fallow land available after harvest. Hence, whether there is an increase in recreational disturbance at Normanton Down or not, there would be no likely significant effect on the supporting population of the SPA even if the birds chose to vary the current autumn roost.

Replacement breeding plot – Parsonage Down SSSI

1.61 The Scheme will result in the loss of a single and historically active stone curlew breeding plot to the north-west of Winterbourne Stoke. A new stone curlew breeding plot will be created within Parsonage Down SSSI to compensate for the loss of the above plot.

1.62 The stone curlew replacement breeding plot will be located on a sloping southern aspect within the Parsonage Down SSSI (within Salisbury Plain SAC) (Confidential Figure 1). The replacement breeding plot will be located approximately 500m from existing breeding plot to be lost as part of the Scheme in what is likely to be the foraging area for the breeding pair on the plot to be lost. The replacement breeding plot has been micro-sited to avoid any impact on the Bronze Age round barrow and pit features identified within the Parsonage Down SSSI(Figure 1).

1.63 The replacement breeding plot is located outside of the Scheme boundary, as such it will be delivered through a landowner agreement (in this instance with Natural

England). The plot will be created in the year prior to the commencement of the construction phase, as part of the preliminary works (this is secured in the OEMP, item PW-BIO5). The duration of the agreement will be 10 years from the year of Scheme opening (15 years from year of creation). Most stone curlew plots in the Wessex area are in arable farmland and the locations are not permanent. They are mostly provided by agri-environment schemes. Currently, the Countryside Stewardship agreements are for a period of five years, although some previous agreements have been for longer periods or have been renewed. The period for which the replacement plot will be secured by agreement with Natural England is expected to be longer than the likely duration of the arable fallow plot it will replace.

1.64 The replacement plot will be located within an area of calcareous grassland and created through the provision of a 1ha chalkland scrape with an associated grassland verge surrounding it (totalling approximately1.2ha). This will involve the removal of topsoil to bare chalk. In addition to being easy to maintain, the provision of the scrapes will allow for early successional chalk grassland assemblages to become established. The chalk scrape and surrounding grassland will be surrounded by fencing; the specifications are consistent with the Countryside Stewardship Scheme FG7: Anti-predator combination fencing requirements, and will include the following to ensure effectiveness:

- stock-proof fencing (wire and post) at a height of >1.2m (higher than normal fence);
- inclusion of predator deterrents (spiked posts to deter corvid predators); and,
- offset electrical wires to deter mammalian predators;
- wire netting extending below ground level to deter access by badgers.

1.65 The proximity of the plot to an existing utilized plot, the location which meets all the selection criteria for a good quality plot and the type of plot proposed (scraped chalk with anti-predator provisions) together are considered to provide a high degree of confidence that the stone curlew plot will be utilised.

Technical Note

A303 Amesbury to Berwick Down

Appendix 1 Stone Curlew Plot Sift

A303 Amesbury to Berwick Down

TR010025

Volume 8

Deadline 6

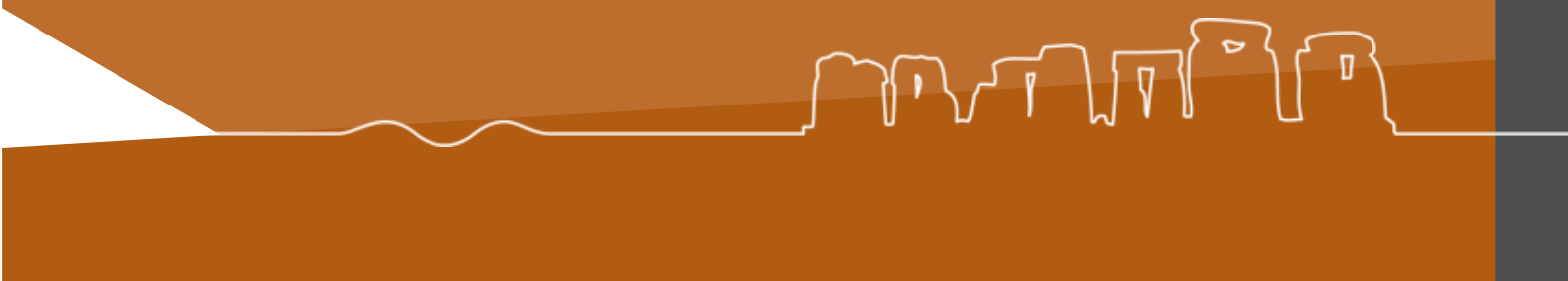
8.43 Habitat Regulations Screening Assessment Clarification Note – Stone curlew plot sift

APFP Regulation 5(2)(q)

Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

July 2019



Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

A303 Amesbury to Berwick Down

Development Consent Order 20[**]

Habitat Regulations Screening Assessment Clarification Note – Stone curlew plot sift

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Technical Note

A303 Amesbury to Berwick Down

Project:	**A303 Amesbury to Berwick Down Scheme**				
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1 Introduction

Stone curlew *Burhinus oedicnemus* – supporting population of the Salisbury Plain SPA and the Scheme.

1.1 In 2016, there were between 320 and 380 breeding pairs of stone curlew within the UK. The Salisbury Plain Special Protection Area (SPA) is considered to support approximately 11% of the breeding population of stone curlew within Great Britain. The breeding population present within proximity to the A303 Amesbury to Berwick Down Scheme is within 5 km of the SPA and hence is considered a supporting population of the breeding population in Salisbury Plain SPA.

Disturbance of stone curlew breeding plots at Normanton Down RSPB Reserve during the operational phase

1.2 Stone curlews are highly vulnerable to disturbance by pedestrians and dogs. They respond to disturbance, even at large distances (500 m). Hence, increased human activities within 500 m of any stone curlew breeding site have the potential to disturb breeding pairs. Frequent prolonged disturbance may result in birds leaving their nests for long periods of time, which may result in an unviable brood or increased losses to predation. Furthermore, if there is excessive disturbance within the 500 m zone during the spring when stone curlews are setting up territories and selecting nest sites they may not use an available plot. A reduction of quality of a plot and its reduced utilisation could reduce the likelihood of successful breeding by a pair of stone curlews. Although this is likely to be limited to individual breeding pairs, disturbance impacts on nesting pairs outside the SPA (within 5km) may result in reduced breeding success in the supporting population of the SPA and conceivably increased competition for territories and resources for the population breeding within the SPA.

1.3 Two established and historically active stone curlew plots are located within the Normanton Down RSPB Reserve. Two Public Rights of Way (PRoW) run north-south along the western and eastern edges of the RSPB Reserve. The historically active stone curlew breeding plots are located approximately 170 m from the PRoW (at the closest point) and are partially obscured from the PRoW by the natural landform. It is anticipated that the removal of the A303, which currently acts as a barrier to foot traffic, could result in an increase in recreational use of the PRoWs that run along the RSPB reserve boundary. Although the majority of the recreational users within the World Heritage Site remain on the PRoWs, trespassing has been reported by the RSPB and local landowners. There is no certainty that the expected increase in recreational usage of the PRoWs would lead to any increase in disturbance due to trespass, as the reserve is wholly enclosed by stock fencing at present and there are

signs asking people to keep out to avoid disturbance to nesting birds. Nonetheless, if the number of disturbing events increases above the threshold of tolerance of individual pairs of stone curlew; this could result in a reduction in breeding success of stone curlew within the reserve.

Provision of nesting opportunities for stone curlew

1.4 It has been agreed with Natural England and RSPB that it is desirable to not only address the risk of increased disturbance for the wider Wessex stone curlew population and thus mitigate (and avoid) any indirect effect on the breeding population within the SPA, but also to provide net enhancement for the Wessex stone curlew population. Highways England have therefore agreed to provide three new stone curlew plots. This is in addition to the plot, which will be provided at Parsonage Down to address the direct loss of an existing plot in that area. One of the three additional plots has been agreed in principle with the RSPB on its reserve at Winterbourne Down to further increase nesting opportunities for stone curlew at that site. The other two will be on locations to be identified using the sifting method set out in this note. These two additional plots will be located within the area of the SPA + 5 km zone. The three additional plots would collectively represent enhancement of opportunities for breeding stone curlew. For the reasons set out below, the provision of two plots within the area of the SPA + 5 km zone and preferably within 5km of the Scheme can be considered to fully mitigate the risk of reduction of breeding opportunities if there was any loss of utilisation at Normanton Down due to in-combination disturbance impacts.

1.5 The provision of these three additional plots underlines the robustness of a conclusion of no adverse effect on integrity of the SPA in the Statement to Inform an Appropriate Assessment (Environmental Statement Appendix 8.25).

1.6 As any increase in recreational use of the PRoW would be expected to occur only after traffic was removed from the existing A303, Highways England would provide the three plots within a year of the opening of the Scheme. The timing of the setting up of new plots would be subject to agreement with the landowners but is expected to be during the construction period. The reference to within a year of opening takes into account the need to ensure that any construction activity such as landscaping or re-instatement of land in temporary use has finished prior to setting up a plot, if the plot is to be located where it could be temporarily disturbed by such activity. This would not affect the robustness of the measures. The replacement stone curlew plot at Parsonage Down would be prepared for use prior to the start of the main works, to ensure availability of the plot before loss of the existing plot. Natural England and RSPB consider that it is not necessary to secure plots at a specific location by landowner agreement during the examination period. Natural England considers that securing the commitment of Highways England to sourcing and funding the extra plots would provide sufficient certainty for the Scheme, since Natural England is confident that there is scope to secure plots in future. Nonetheless, Highways England intends to identify suitable locations for the two additional plots as soon as possible.

1.7 At present, the stone curlew plots in the Wessex area (approximately 250 in 2018, demonstrating the suitability of the area for such plots) are in farmland and most are funded by agri-environment schemes. Current agri-environment funding of plots is for periods of five years (although previous schemes and renewals mean some plots have been in place for longer). The plot at Parsonage Down and the new plot at Winterbourne Down RSPB reserve would be provided as 1 ha chalk scrapes. The

two other stone curlew plots are expected to be 2 ha arable fallow plots, managed on rotation under the same regime as the agri-environment plots, but may be 1ha chalk scraped plots depending on the location and landowner agreement. All three plots will be secured by agreement (where necessary) for ten years. The date when individual plots will be put in place will depend on the agreements but will be not later than one year after the opening of the Scheme. The plot at Parsonage Down will be secured by agreement for fifteen years because it will be started prior to the main construction period.

Scope of study

1.8 This note presents the method and results of a desk study, the results of which have been used to inform the list of landowners Highways England is approaching in respect of exploring the possibility of locating one of the two additional plots on their land.

1.9 The SPA + 5 km zone is shown on Figure 1, together with the Scheme, which is in the southern part of the zone. Natural England has agreed that any suitable locations within the SPA+ 5 km zone would maintain or increase the breeding opportunities for the stone curlew population and thus avoid any adverse effect on the Salisbury Plain SPA breeding population and consequently avoid an adverse effect on the integrity of the SPA. It has been agreed with Natural England and RSPB that, where practicable and if suitable plots are available, plots would be considered using a hierarchy of distance from Normanton Down RSPB Reserve and the Scheme. Hence the search for plots to be secured as part of the Scheme has followed the distance hierarchy set out in section 2 below.

1.10 It should be noted that Highways England is including the area within the Order limits within the search zone, to explore whether powers conferred by the DCO (if granted) could be utilised.

2 Plot search method

2.1 This desk study has considered land within the following areas:

- 3 km of Normanton Down RSPB Reserve (considered to be a typical foraging distance for stone curlews) and 5 km of the SPA (inclusive);
- 5 km of Normanton Down RSPB Reserve and 5 km of the SPA;
- 5 km of the Scheme and 5 km of the SPA; and
- 5 km of the SPA as a whole.

RSPB suitability criteria for good quality stone curlew plots in the Wessex area

2.2 RSPB provided suitability criteria for the search for good quality stone curlew plots as follows (meeting with RSPB and Natural England at Parsonage Down, 9th May 2018):

- Minimum 75 m from trees and hedges, preferably >100m;
- Minimum 100 m from overhead lines;
- Minimum disturbance; preferably >100 m from any regularly used farm road/track, >200 m from public roads; >200 m away from public footpaths (ideally >400 m). Closer may be acceptable if out of sight relative to the plot and there is no risk of

access by dogs.

- Open position, preferably close to the brow of a low hill or ridge, not in a valley bottom;
- Moderate to gentle slopes, less than 15º;
- Preferably south-facing, but not essential;
- Preferably within 200 m of grassland, but not essential.

2.3 The reasons for the criteria are as follows. Crows and other birds which prey on eggs use vantage points such as trees, overhead electric lines and buildings to spot nests, or behaviour of ground-nesting birds which would help the predators find the nests. Hedges may also be used as vantage points and they provide cover for mammalian predators. Use of nest sites on high ground and avoidance of steep slopes is likely to maximise visibility for stone curlews and to avoid vantage points of predatory birds. South-facing slopes will be warmer and will dry more quickly after rain, hence they may be better for young chicks, which could become chilled and die in cold, wet conditions. Proximity to grassland is for ease of foraging, although stone curlews will forage over greater distances.

2.4 It should be noted that the items listed above in respect of being 'preferable' or 'not essential' are not required to ensure the plots would contribute to the conclusion of no adverse effects on the integrity of the SPA.

Application of the suitability criteria in the desk study

2.5 A staged approach was used, to progressively exclude unsuitable areas and hence refine the search for remaining areas of the zones which are potentially suitable.

2.6 For the first stage of the desk study the A303 Stonehenge GIS was used to apply buffer distances on Ordnance Survey map features and open source datasets[1], with all areas within those distances excluded from potential plots as follows:

- Woodland, 100 m;
- Individual houses and farms, 200 m;
- PRoWs, roads and tracks, 200 m;
- SSSI, site boundary;
- Archaeological monument, site boundary;
- MOD land;
- Open Access areas (where available); and
- Towns and villages, 400 m.

2.7 MOD land was excluded because during consultation on the Scheme the MOD indicated that, due to training area requirements, it was not willing to increase the existing number of stone curlew plots on the Salisbury Plain Training Area. A 400 m buffer was applied to towns and villages, due to the likelihood of greater recreational

[1] Data for MOD land was digitised from the MOD website, Open access areas were obtained from the CRoW dataset and National Trust accessible land, Scheduled archaeological monuments were obtained from Historic England 2017, woodland was obtained from the Forestry Commission, National Forest Inventory, PRoWs were obtained from Wiltshire Council 2017 and SSSIs were obtained from Natural England 2018 (Landmark Information Group).

pressure around the larger settlements. Open Access areas were presumed to be existing grassland, or have un-restricted recreational access, or both.

2.8 The second stage was to screen the remaining areas that were potentially suitable by inspecting air photography and OS maps to identify other constraints which could not be determined from GIS information (Google and Bing maps and aerial photography, 2019). Initially all areas less than 2 ha in size were excluded from the dataset, then using aerial photography and OS maps, areas were excluded where the following features were a potential constraint:

- Field boundaries with hedges or trees;
- Existing semi-natural grassland;
- Overhead pylons;
- Railway lines;
- Valley bottoms;
- Other unsuitable areas for stone curlew breeding plots, such as outdoor pig-rearing areas and amenity areas.

2.9 Whilst proximity to grassland is beneficial, for the desk study it was assumed that areas currently in arable use would be sought, rather than plots within areas of permanent grassland, such as arable reversion to chalk grassland.

2.10 The third stage was to exclude slopes greater than 15°. This was done by GIS analysis, using LIDAR data, which was available for the zone around the Scheme, but not for the area north of the MOD land on Salisbury Plain.

2.11 Areas within 200 m of a known stone curlew plot were also excluded in the third stage. RSPB had previously provided data on existing stone curlew plots within 10 km of the Scheme. In the GIS a 200 m buffer was applied to existing stone curlew plots. RSPB had advised that 200 m was the closest spacing that would allow stone curlews to have separate territories. At 200 m spacing, nest sites on plots would need to be visually separated (e.g. screened) from each other. Therefore, greater spacing (400m or more) is preferable.

2.12 Those polygons (i.e. individual areas with boundaries denoting the limits of potential suitability in the GIS) with potential suitability for stone curlew plots were then overlaid with landowner information, where this was available for the Scheme.

2.13 The location of any plot within the areas will be subject to review on site and agreement with the relevant landowners. This review step is not considered to pose any risk to deliverability of sufficient plots as many polygons were identified as suitable and local landowners have shown themselves willing to provide stone curlew plots, as is indicated by the distribution of existing stone curlew plots within the SPA+5km and other zones. Where relevant landowners are contacted and express an interest in providing stone curlew plots, specific locations for plots within the identified polygons are being selected for discussion with the landowners.

3 Results of the plot search

3.1 All composite constraints from stage 1 were mapped after stage 1. The largest wholly excluded area was the MOD area of Salisbury Plain. Elsewhere, the study area is criss-crossed with exclusion bands due to the proximity of roads, tracks and public

rights of way.

3.2 After the stage 2 sift remaining polygons were clipped to the SPA + 5 km zone and those remaining after the stage 3 sift were clipped to the Scheme 5 km zone. This left polygon's scattered across the zone, with some clustering of polygons in the west, central and eastern parts of the zone.

3.3 The plot search, by the method outlined above, identified a total of approximately 18.44 km^2 of land with potential for stone curlew plots within 5 km of the Scheme and within 5 km of the SPA inclusive. Not all this land will be suitable for stone curlew plots, as during stage 2 it was only possible to exclude polygons which did not meet the sifting criteria. Hence, some polygons will have some areas which were assessed as unsuitable, but as they also contained some areas with suitability the whole polygon was included at this stage. Conversely, some areas screened out in this desk-study may be suitable. For example, although an area may be within 200m of a PRoW it may be suitable if fenced and visually screened by landform. Nonetheless, the desk study provides priority areas for discussions with landowners. All the polygons remaining are considered to have potential for one or multiple stone curlew plots, although they have not been subdivided in the GIS to refine them to the best areas. This means the total extent of suitable areas after stage 3 will be reduced further at the next stage.

3.4 Table 1 summarises the screening stages and total area in each stage and within each zone.

Table 1 Potential areas for stone curlew plots

	Normanton Down within 3km	**Normanton Down within 5km**	**Scheme within 5km**	**SPA+5km zone**
Total land area	42 km^2	100 km^2	277 km^2	791 km^2
Total area excluded in stage 1 buffering (% total)	30.5 km^2 (72%)	87.7 km^2 (88%)	237.3 km^2 (85%)	724.2 km^2 (91%)
Total area of potentially suitable areas after stage 2	4.42 km^2	7.58 km^2	19.44 km^2	42.09 km^2
Total area of potentially suitable areas after stage 3.	4.09 km^2	7.19 km^2	18.44 km^2	Not fully assessed[1]
Number of existing stone curlew plots	9	18	42	Not assessed (data provided by RSPB is for plots within

				10km of the Scheme)

Note1: LIDAR topographic data was not available for this area, so analysis of gradient could not be carried out and data for existing stone curlew plots were only available for up to 10 km from the Scheme, so although air photography has been inspected, the constraints buffers applied to this wider area are not exactly the same as for the other three zones and hence the total area has not been calculated.

Note 2: $1km^2$=100ha, and each stone curlew plot is 2ha in area, so $1km^2$ total area may involve several polygons and have multiple suitable locations for a stone curlew plot.

3.5 The next stage of this process is to approach individual landowners about the possibility of stone curlew plots, combined with an on-site appraisal of the potential areas. This includes the refinement of locations for potential plots within the areas taking into account all of the conditions on site and the farming operations.

References

- Environmental Statement Chapter 8: Biodiversity - TR010025-000199-6-1_ES_Chapters_08_Biodiversity
- RSPB (undated) Stone-curlew, Population trends. Available from: *https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/stone-curlew/population-trends* [Accessed 21st August 2018].
- Natural England, Forestry Commission, and the European Agricultural Fund for Rural Development (2018), Countryside Stewardship: Higher Tier Manual
- FG7: Anti-predator combination fencing. Available from *https://www.gov.uk/countryside-stewardship-grants/anti-predator-combination-fencing-fg7* [Accessed 8th January 2019].
- Environmental Statement Appendix 8.25 Habitat Regulations Assessment, Appropriate Assessment - TR010025-000419-6-3_ES-Appendix_8.25_HRA_AppropriateAssessment
- Environmental Statement Figure 8.11 – Breeding Bird species (Confidential)
- Environmental Statement Appendix 11.6 Non-Significant Effects - TR010025-000437-6-3_ES-Appendix_11.6_NonSignificantEffects

N

NOTES / LEGEND

- Scheme Wide Alignment - ES 03/10/18
- Scheme Red Line Boundary
- Scheme 5km Buffer
- Salisbury Plain Special Protection Area (SPA)
- SPA 5km Buffer
- RSPB Reserve Normanton Down
- Normanton Down 3km buffer
- Normanton Down 5km buffer
- Parsonage Down Site of Special Scientific Interest (SSSI)

Revision Details	By / Check	Date	Suffix

Purpose of issue: For Information

Client: Highways England

Working on behalf of: highways england

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: FIGURE 1: Potential Stone Curlew Plot Sift Study Areas

Designed	Drawn	Checked	Approved	Date
	BM	CC	SP	16/07/19

Internal Project No. 60598638

Scale @ A3: 1:140,000 | Zone: SW

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Temple Quay House
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Drawing Number: Highways England PIN	Originator	Volume	Location	Type	Role	Number	Rev
HE551506	AMW	GEN	SCHEME WIDE	DR	GI	00615	03

0 1.25 2.5 5 7.5 10 Km

Filename: pw:\\UKLON3AP114.aecomonline.local:PWAECOM_EU\Documents\60541439-A303 Stonehenge Technical Partner\0300 Non Deliverables\0330 Environmental Management Team\GIS\Figures\HE551506-AMW-DR-GI-00615.mxd

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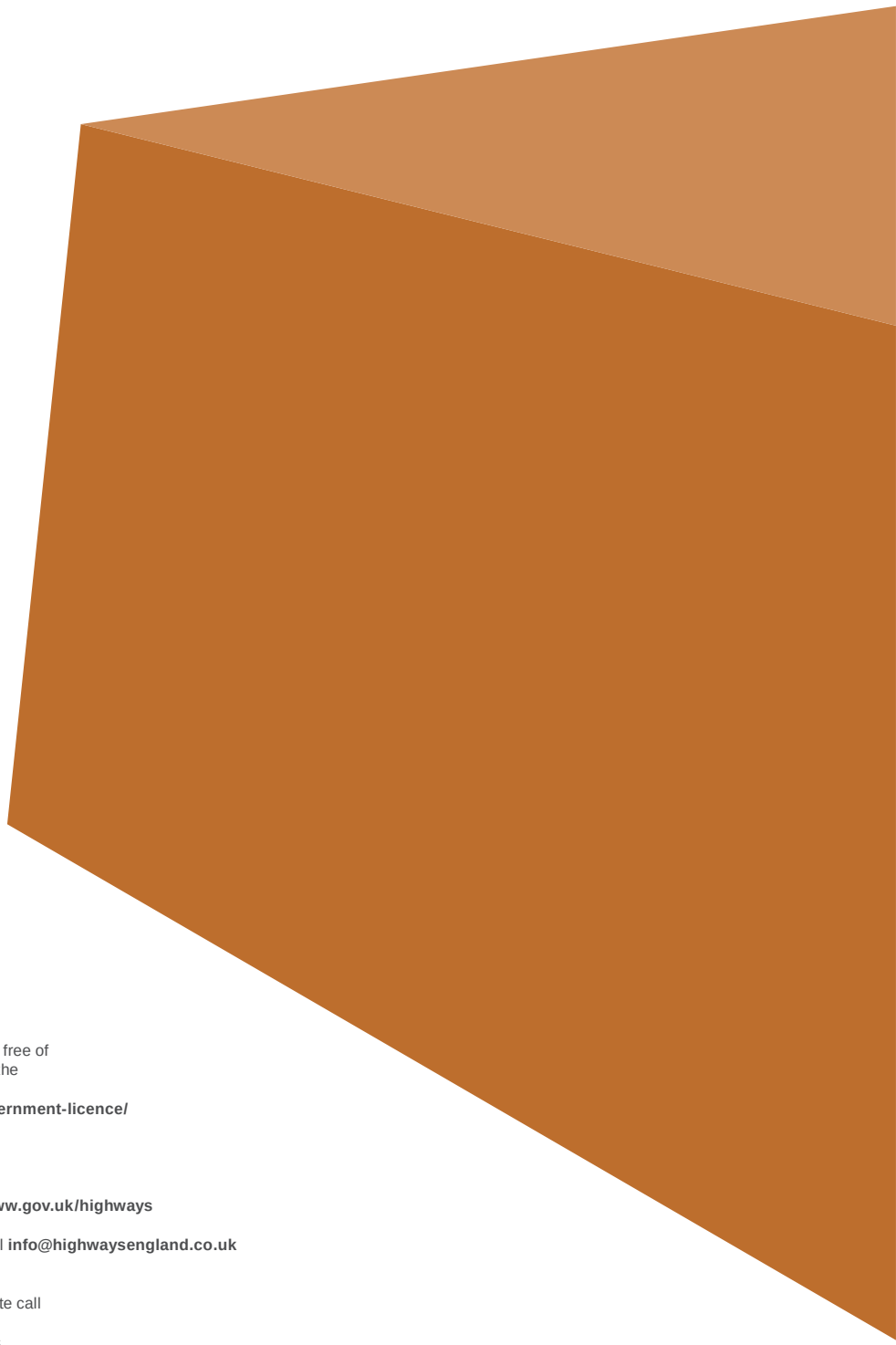

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Technical Note

A303 Amesbury to Berwick Down

Appendix 2 Water Issues Related to River Avon SAC

Technical Note

A303 Amesbury to Berwick Down

Project:	**A303 Amesbury to Berwick Down**				
Title:	**Habit Regulations Screening Assessment - Clarification Appendix 2 Water Issues related to River Avon SAC**				
Doc ID:	**8.43**				
Date:	**8 August 2019**	Version:	01	Status:	**Deadline 7**

Introduction

2 Requirement for clarification

2.1 Following consultation between Highways England and Natural England as part of the development of Statements of Common Ground for the Scheme (SoCG), Natural England asked for clarification of certain elements of the Habitat Regulations Screening Assessment (HRSA) and Statement to Inform Appropriate Assessment (SIAA). A Technical Note was prepared to provide further clarification of the HRSA and SIAA and drafts were reviewed and progressively agreed with Natural England.

2.2 This Appendix (Appendix 2) to the HRSA Clarification Note addresses issues raised by Natural England in relation to the water regime of the River Avon SAC and its interest feature Desmoulin's Whorl Snail. These issues were recorded in the SoCG submitted at Deadline 2 [REP2- 016].

2.3 Highways England responded to Natural England on each of the points raised on 11th June 2019. The responses to Natural England's original comments are set out in the table which follows. Natural England has since replied (15th July) with the following email:

"Thank you for providing further clarification on the points that we raised with respect to water related issues under the HE NE Statement of Common Ground.

With reference to the potential for the scheme to impact on water levels that support the springs, ditches and meadow habitats that occur on the floodplain (both outside and within the SAC boundary) to the east of West Amesbury to Upper Woodford Road that in turn support the Desmoulin's whorl snail, NE concurs that the scheme is unlikely to have a significant effect and an appropriate assessment is therefore not required. It should, however, be noted that we calculate that the main area of concern is approximately 1-1.5km from the scheme rather than the 2.6km stated by your response. We agree that the modelling predicts a level of drawdown (<0.02m) that would be difficult to detect by on site monitoring, and it would also be difficult to attribute any variation in groundwater levels of this scale to the tunnel works/presence.

However, due to the inherent uncertainty of any model, NE advises that a flag (trigger level) should be included in the Groundwater Level and Water Quality Monitoring and Reporting Programme (required by the Outline Environmental Management Plan (OEMP)) for the Desmoulin's whorl snail. If observed impacts are greater than those modelled (either during construction, or once the tunnel is in place/operational), then the potential impact on ground water levels across the floodplain will need to be re-assessed at this point and, if required, mitigation identified & implemented. We are happy to discuss this further with your Water Team and the EA to agree appropriate trigger level(s).

We have no further comments/concerns on the other issues raised."

2.4 Highways England welcomes the agreement of Natural England that the Scheme would have no Likely Significant Effect on the water regime which supports the populations of

	Desmoulin's Whorl Snail within the River Avon SAC.
2.5	Highways England notes the request for a trigger level. The groundwater modelling has been carried out on a highly precautionary basis; because of this there is a very high degree of confidence that the effects of the Scheme would not extend to the riparian zone at 1-1.5km from the Scheme, either under average summer conditions, as shown in Figure 4.6 of the Environmental Statement Appendix 11.4 [APP-282], or in drought conditions (as shown in Figure 4.11). When groundwater levels are extremely high the water regime at riparian wetlands at the River Avon would be dominated by surface water flooding and there would also be no effect of the Scheme on Desmoulin's whorl snail populations. There is therefore no reasonable scientific doubt about the conclusion of no likely significant effect on the integrity of any of the features for which the River Avon SAC is designated, including Desmoulin's whorl snail. Hence there is no requirement to monitor for any effects on the hydrology of the River Avon nor on Desmoulin's whorl snail populations.
2.6	Screening out of effects on the River Avon SAC means groundwater monitoring is not required. Notwithstanding, Highways England will be carrying out general monitoring of groundwater as set out in the OEMP (Deadline 6 Submission - Appendix 2.2 Outline Environmental Management Plan [REP6-011]). It is not necessary to agree specific details at the pre-consent stage. However, the Groundwater Management Plan required by item MW-WAT10 will address: a. Potential effects on groundwater (resources and quality) that fall outside other regulations such as the Environmental Permitting Regulations. b. An update to the Groundwater Risk Assessment for the final design and construction plan. c. The groundwater level and water quality monitoring and reporting programme. d. Development of baseline groundwater conditions and derivation of trigger levels and action levels/Mitigation/action plans for exceedances and accidents/incidents. e. The management of groundwater flood risk.
2.7	MW-WAT10 includes a requirement for consultation with both the Environment Agency and Wiltshire Council in relation to their statutory functions in developing the Groundwater Management Plan. It would be expected that both these parties would consult Natural England as necessary and appropriate as part of this process.

Technical Note

A303 Amesbury to Berwick Down

HRSA Clarification Note Appendix 2Table 1: Natural England comments and Highways England's responses on water-related issues			
	Comments by Natural England (Statement of Common Ground)	**Highways England response**	**Current Status**
1	Natural England concurs that it is unlikely that the Phosphatic Chalk yields concentrations of dissolved phosphorus that would change the phosphorus levels of the groundwater. We do, however, feel that it is misleading to state (in 1.18 and 1.21) *[of the HRSA Clarification Technical Note*] that '*the natural phosphorus in the surface water is considered to have originated from the Upper Greensand rather than the Chalk'*. Ongoing research by Bristol University is suggesting that the amount of phosphate occurring from the Greensand geology as a whole is likely to be very small, although there may be localised strata that is more phosphate-rich, and it is more likely that the elevated levels originate from historic land-use practise and/or other anthropogenic sources. We would therefore recommend that this is reworded.	Agreed. The note should therefore be read such that '*originated from the Upper Greensand rather than the Chalk'* is changed to: 'originated from the upper catchment, rather than from Phosphatic Chalk'.	Agreed
2	Natural England is also in agreement that the project is unlikely to have a significant impact on flows in the river, either during or post construction. However, we feel that greater caution needs to be taken with respect to the assessment of the potential for the scheme to impact on the Desmoulin's whorl snail and its supporting habitat, in particular with respect to the meadows to the south of West Amesbury and	There are no assessed impacts arising from the scheme which would affect Desmoulin's whorl snail and its supporting habitat and therefore no requirement for an Appropriate Assessment. Appendix 11.4 of the Environnmental Statement [APP-282] assesses the impacts of the scheme on the water environment by assessing changes to groundwater levels and river flows	It is agreed that an appropriate assessment is not required

	therefore Natural England does not agree with the conclusion that the effects on hydrology associated with temporary dewatering, permanent construction and operation activities are not considered likely to be significant. We therefore advise that an Appropriate Assessment should be carried out.	under flood and drought conditions. The assessment concludes that the presence of a tunnel is likely to disrupt groundwater flow as it passes from north west to south east towards the River Avon. This disruption would create a small rise in water table elevation north of the tunnel and a fall in water table elevation south of the tunnel as shown in Annex 1 of Appendix 11.4 [APP-282] Figure 4.1 (peak flow), Figure 4.6 (average flow) and Figure 4.11 (low flow) (reproduced below). The predicted fall to the south does not extend more than approximately 1km from the scheme under drought conditions (Figure 4.11) so does not affect the area where the snails were observed (Amesbury to Normanton) which is approximately 2.6km from the scheme. The Scheme that has been assessed assumes that the need for dewatering during construction will be minimised as far as reasonably practicable. (MW-WAT8). The Scheme will use closed face tunnelling techniques (OEMP – item D-CH32) that limit the requirement for dewatering during construction. As stated in Highways England's response to First Written Questions at Deadline 2 in EC.1.14, , under most conditions the construction of the cuttings leading to the portals and the retaining walls at the portals would be in the unsaturated zone of the Chalk, above the water table (as described in the Environmental Statement Groundwater Risk Assessment Appendix 11.4 [APP-282]). This would mean dewatering would not be required. This also means that under most conditions there would be no pathway for impact on groundwater levels that contribute to flow in the River Avon and hence no Likely Significant Effect on any of the features for which the River Avon SAC is designated, as concluded in the Habitat Regulations Assessment Likely Significant Effects Report	

		[APP-265] and summarised in Table 3.1 of the Habitat Regulations Assessment Likely Significant Effects Report [APP-265] item 56. Under extreme flood conditions the groundwater conditions could be high enough to intersect parts of the construction. This is addressed in the Groundwater Risk Assessment Appendix 11.4 [APP-282], Table 6.1, which shows the average and peak groundwater levels relative to the depths of the cuttings and retaining walls at the western and eastern portals (see also Figure 1.3 reproduced below). Under average conditions the cuttings, retaining walls and the tunnel base at both the portals would be well above the groundwater, so there would be no need for dewatering. Extreme peaks of groundwater rarely occur, but if they happened to coincide with construction, the groundwater level could be above the base of excavations at the tunnel portals. In those conditions, appropriate measures would need to be taken such as a temporary cessation of works until peak conditions subsided or possibly localised dewatering being needed. However, the maximum impact of dewatering under those peak conditions would be to control groundwater levels to closer to 'normal' levels in the construction area. So no effects beyond those that occur during the natural variation of groundwater levels would be experienced. During peak groundwater level there would also be high flow and water level in the River Avon. Should localised dewatering be necessary, this will be addressed as stated in item 3.19 of the Statement of Common Ground with the Environment Agency (EA) [REP2-012] (and retained in the version to be submitted at Deadline 7). Under Matters Agreed with the EA the assessment of risk and identification of any required mitigation measures associated	

		with temporary dewatering will be achieved through the Outline Environmental Management Plan (OEMP) [APP-187] (MW-WAT8) and the applicable regulatory regime for abstraction (including, as appropriate, through the protective provisions for the benefit of the EA contained in the DCO). As per Agreed item (3.28.12) in the SoCG with Wiltshire Council to be submitted at Deadline 7, Highways England will ensure that both Wiltshire Council and the Environment Agency are kept informed on this matter as the appropriate regulatory authorities. These authorities would also be expected to keep Natural England informed. The effects on hydrology associated with permanent construction and operation activities have been assessed and are not significant so an Appropriate Assessment of these effects is not required.	
3	The report states that the tunnel, to be located below the groundwater level, will lead to interference to the groundwater flow in the Chalk aquifer, also identifying the top 50m of the chalk aquifer as the most active. However, the chalk is represented as one single layer in the model when we know that there is a lot of variety and it does not behave uniformly with some layers acting as preferential flow horizons, especially where the chalk is jointed. We accept that variation in hydraulic conductivity in the model does address this to some degree but there remains uncertainty as to how accurate the model reflects ground water levels. This is particularly relevant when an area of floodplain with spring fed ditches that support Desmoulin's whorl snail lies just outside of the zone of influence predicted by the model (as shown in Appendix 11.4) and ground water levels (or rather the	A precautionary approach has been taken which recognises the heterogeneity and dominance of fracture flow in the Chalk – see Appendix 11.4 Groundwater Risk Assessment [APP-282]. The effects would not extend to the area of Desmoulin's whorl snail and its supporting habitat. It is agreed that the Chalk has preferential flow horizons and does not behave uniformly. There is a detailed assessment of the Chalk in the report on the implications of the 2018 ground investigations to the groundwater risk assessment, submitted as a working draft at Deadline 2 [AS-017] and as final at Deadline 3 [AS-023], [REP3-018), which concludes that the modelling in support of the GRA does provide a suitable simulation of the groundwater conditions in the Chalk aquifer at the regional scale (paragraph 5.2.3). The representation of the tunnel in the model is described in Section 3.5 of Annex 1 [APP-282]. To be conservative, a	Agreed

	depth that the water level is below the ground) is critical for the snail.	reduction in hydraulic conductivity of 80% was used to represent the interference of the tunnel to flow (paragraph 3.5.12 Annex 1). As with many models, there is a focus on changes in groundwater levels (as in Figure 4.11 of Annex 1 of Appendix 11.4 [APP-282] for example) as there is more confidence in a model's ability to simulate changes in heads (and flows) than in modelling absolute levels; a point also made by the model peer reviewers on behalf of Wiltshire Council in the Wiltshire Council Deadline 2a Submission - Addendum to Written Representation [REP2a-002] paragraph 6 in Section 3 of Appendix A. There are no changes predicted that would affect Desmoulin's whorl snail and its supporting habitat. In the Statement of Common Ground with the Environment Agency under Matters Agreed (Issue 3.16 in SoCG submitted at Deadline 2) it is stated that; "*.. it is agreed that the Wessex Basin groundwater model as amended for the Scheme-specific A303 groundwater model has been used appropriately to assess the risks to groundwater levels and flows from the Scheme. Following peer review, further sensitivity testing of the A303 groundwater model has been undertaken and the results reported to the EA. The results confirm the validity of the findings of the GRA as reported in the ES*." There is no lowering of groundwater levels beneath or adjacent to the River Avon and no effect on groundwater levels in the area where the snails were observed. River Avon flow would not be significantly affected (as indicated in Annex 1 of Appendix 11.4 [APP-282], paragraph 4.1.16 and 4.1.19, Figures 4.4 and 4.7 (Figures copied below) hence water level in the river adjacent to areas with Desmoulin's whorl snail	

		would not be affected.	
4	An appropriate assessment should therefore consider the confidence that can be applied to the outputs from the model with respect to ground-water levels and whether further conceptualisation of the chalk geology would help to increase the confidence. If uncertainty remains, then a credible plan is needed for a 'what if scenario' where the monitoring shows an adverse impact on the Desmoulin's whorl snail habitat, e.g. where and how much compensatory habitat will be restored or created; how any population on the impacted site be rescued etc.. Such a plan should include a) monitoring sufficient to assess wither potential impacts are materialising, b) demonstration that there is certainty that there are viable measures sufficient to mitigate worst case impacts, and c) a commitment to deliver such measures.	Please refer to responses above. The effects of the scheme will not spread far enough to affect Desmoulin's whorl snail habitat so monitoring is not required.	It is agreed that an appropriate assessment is not required
5	An appropriate assessment should also consider temporary construction dewatering impacts. Whilst it is recognised that temporary construction dewatering will be minimised as far as reasonably practicable, and that where it occurs it will comply with the general water protection provisions of the Water Abstraction and Impounding (Exemptions) Regulations 2017, it could, none-the-less, have a significant effect on ground water levels in the area and therefore on Desmoulin's whorl snail. We therefore advise that a plan for mitigating any impacts needs to be in place to conclude adverse effect on integrity should this eventuality arise.	As stated above, under Matters Agreed with the EA the assessment of risk and identification of any required mitigation measures associated with temporary dewatering will be achieved through the Outline Environmental Management Plan (OEMP) [APP-187] (MW-WAT3, MW-WAT8 and MW-WAT10). Highways England will ensure that both Wiltshire Council and the Environment Agency are kept informed on this matter as the appropriate regulatory authorities. These authorities would also be expected to keep Natural England informed. The effects on hydrology associated with permanent construction and operation activities have been assessed and are not significant so an Appropriate Assessment of these effects is not required.	It is agreed that an appropriate assessment is not required

6	We are pleased to see SuDs integral to the project design with respect to the road drainage scheme but we would like to understand what 20% betterment on the existing discharges to the River Avon actually looks like.	In a 1 in 100 year rainfall event the existing drainage from the highway to the River Avon is approximately 0.85 m^3/s. As stated in ES Appendix 11.3 Road Drainage Strategy [APP-281], paragraph 5.2.3, the he design would provide 20% reduction compared to existing discharges.	Agreed
7	It also does not appear that the assessment has considered any impacts on the River Avon if the proposed (and desired) new alignment of the river (as attached) alongside reconnection of the floodplain/wetland habitat creation is implemented at Countess Roundabout. This project is required to restore the physical condition of the river SAC at this site and is in the River Avon Restoration Plan. We would therefore advise that the design of the surface water ditch attenuation scheme needs to consider if measures are needed to prevent it becoming a potential source of pollution under out of bank flow conditions. This should be considered as part of the Appropriate Assessment, in so far as the road scheme may, conceivably, preclude the necessary restoration of the physical condition of the SAC at this location.	The Scheme would not prevent the construction of the proposed River Avon improvement (River Avon Appraisal and Design Package, Reach A603/A604 Countess Outline Design) as the Scheme would only modify the existing highway toe drain and would not involve any works in the area shown for the proposed improvement. This means there would be no likely significant effect of the Scheme on the potential for the proposed project to deliver future improvement of the status of the River Avon. The Scheme drainage design as set out in the Road Drainage Strategy [REP2-009] in the vicinity of the Countess junction would provide a minimum of 20% betterment of attenuation of scheme drainage compared to existing conditions,. The design would also include SuDS provision to improve the quality of drainage there compared to existing conditions. As set out in the Road Drainage Strategy, the ponds would be lined, planted with reeds and contain permanent water to provide treatment prior to discharge and to enhance biodiversity opportunities. In addition, the drainage design for the drainage catchments around Countess junction would not become a potential source of pollution. It is designed to avoid any ingress from flood water in flood conditions up to a 1 in 100 year event (plus an additional allowance for changes in flood return periods due to climate change). Ingress of flood water would be possible during more extreme events, but by that time the River Avon	Agreed

		and its tributaries would be expected to be under high flows with widespread flooding. Even if there were contaminants in the Scheme drainage ponds when flooding in the River Avon was high enough to enter the drainage system, there would be substantial dilution factor. The maximum gauged flow in the River Avon was 25.75m^3/s (in the period 1965-2016). The changes in the drainage in the vicinity of Countess junction due to the Scheme represent improvement compared to existing conditions, as described in the ES Chapter 11, section 11.9. The Scheme drainage would have no adverse effect on water quality in the River Avon. The provisions are secured by OEMP [REP6-011] MW-WAT 14, which requires the contractor to ensure that the surface water drainage system reflects the mitigation measures idenitifed within the ES and conforms with Requirement 10 of the DCO.	
8	The AA should also outline the site specific monitoring plan which will need to be responsive to ground water levels.	There is no requirement to monitor at the location of the Desmoulins whorl snail because there will be no impact from the scheme. For general monitoring of groundwater there is a requirement in the Outline Environmental Management Plan (OEMP) [REP6-011] (a revised version of which is submitted at Deadline 6) (MW-WAT10) for monitoring as follows: The main works contractor shall develop a Scheme-wide Groundwater Management Plan, outlining how groundwater resources are to be protected in a consistent and integrated manner. The Plan shall be prepared in consultation with the Environment Agency and address: a) Potential effects on groundwater (resources and quality) that fall outside other regulations such as the Environmental	It is agreed that an appropriate assessment is not required and that MW-WAT 10 is sufficient.

		Permitting Regulations. b) An update to the Groundwater Risk Assessment for the final design and construction plan. c) The groundwater level and water quality monitoring and reporting programme. d) Development of baseline groundwater conditions and derivation of trigger levels and action levels/Mitigation/action plans for exceedances and accidents/incidents. e) The management of groundwater flood risk. The plan will be prepared in consultation with the Environment Agency. The EA is the relevant authority for water resources. Item MW-WAT13 of the OEMP is also relevant to groundwater.	

Technical Note

A303 Amesbury to Berwick Down

Annex 1 of Appendix 11.4 [APP-282], copies of Figures

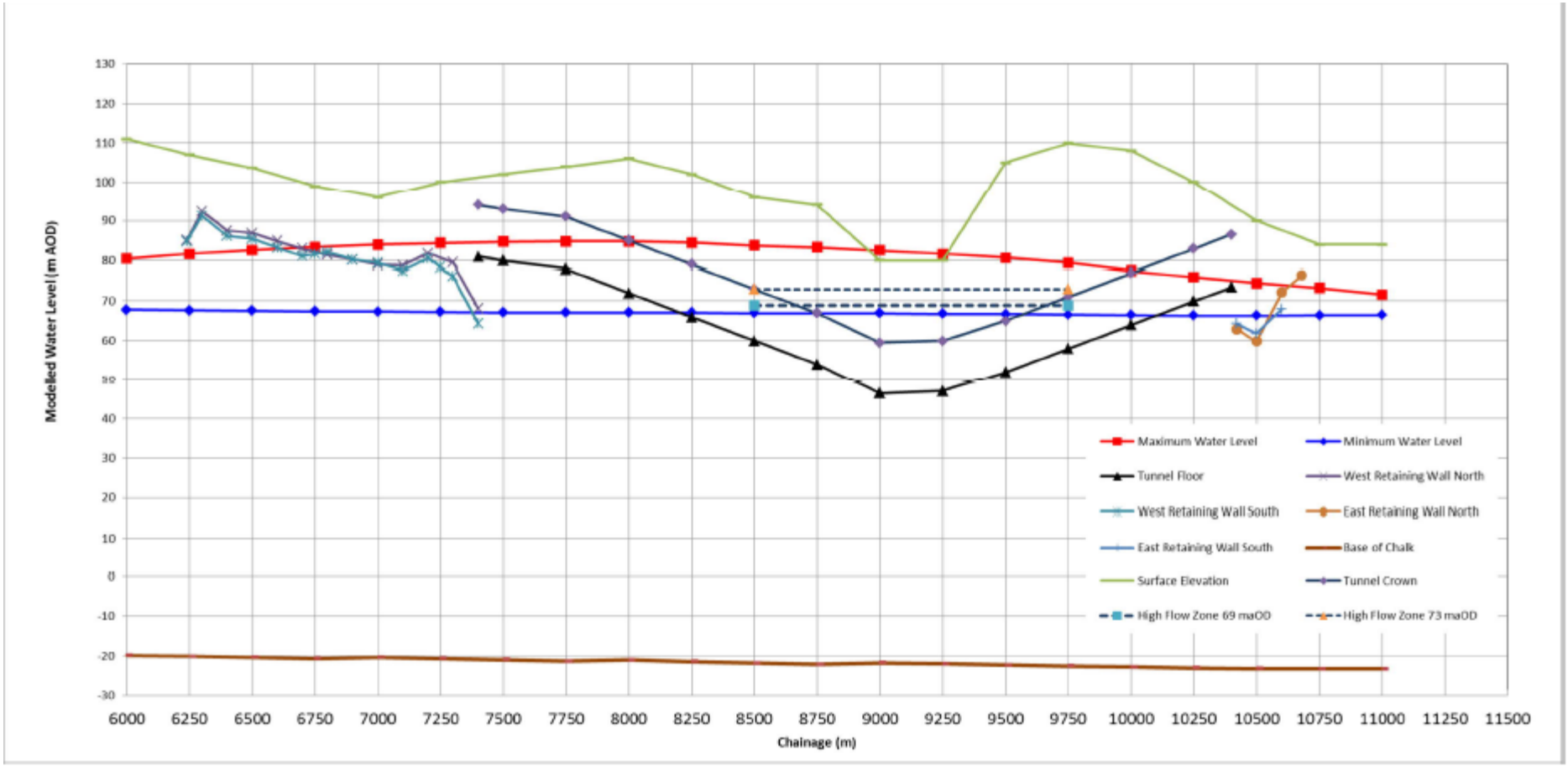


Figure 1.3 Elevations of Interest – water levels, flow horizons, tunnel and retaining walls

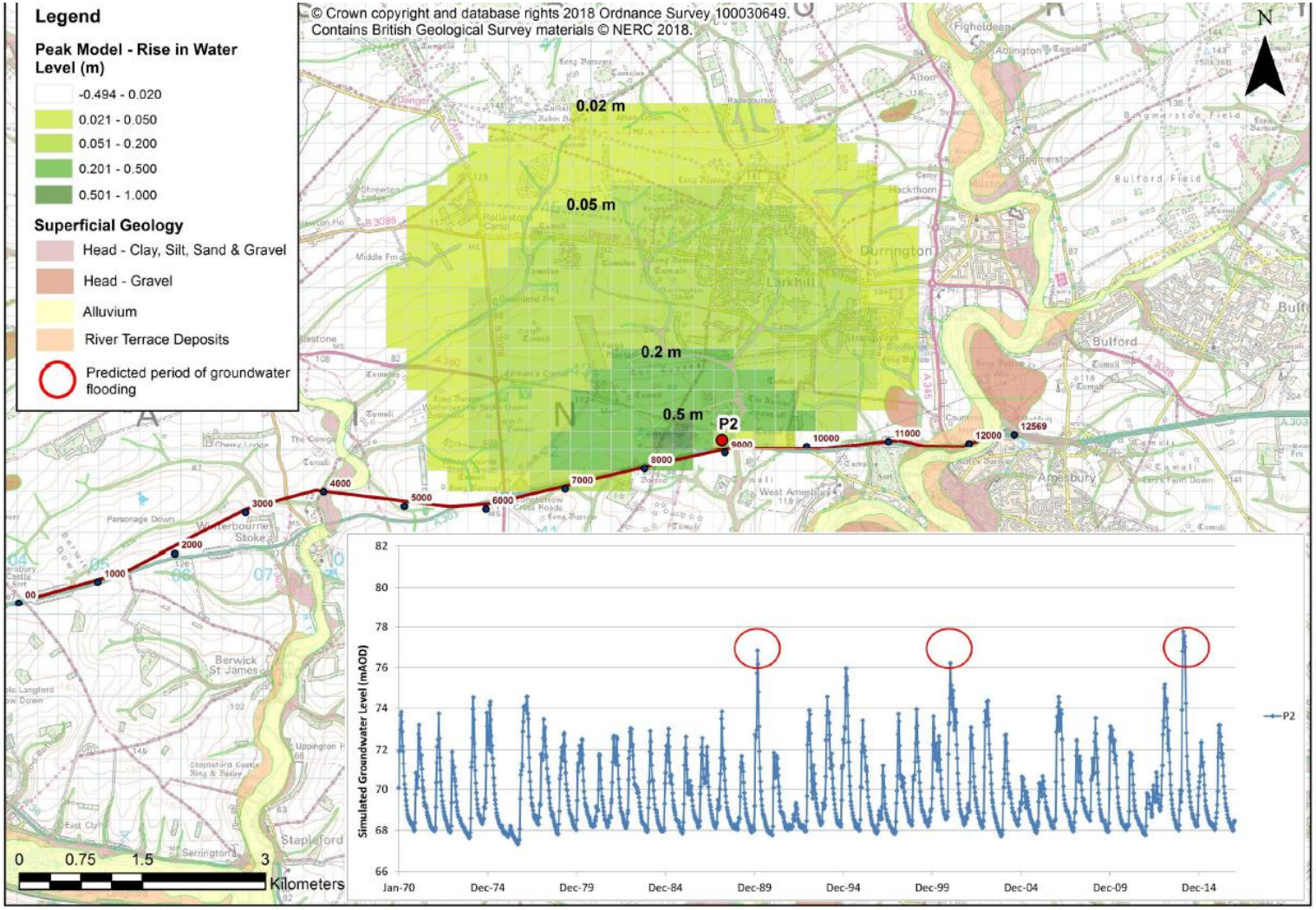
Technical Note

A303 Amesbury to Berwick Down

Annex 1 of Appendix 11.4 [APP-282], copies of Figures

Technical Note

A303 Amesbury to Berwick Down



Technical Note

A303 Amesbury to Berwick Down

Figure 4.1 Groundwater Level at Peak (flood) groundwater conditions

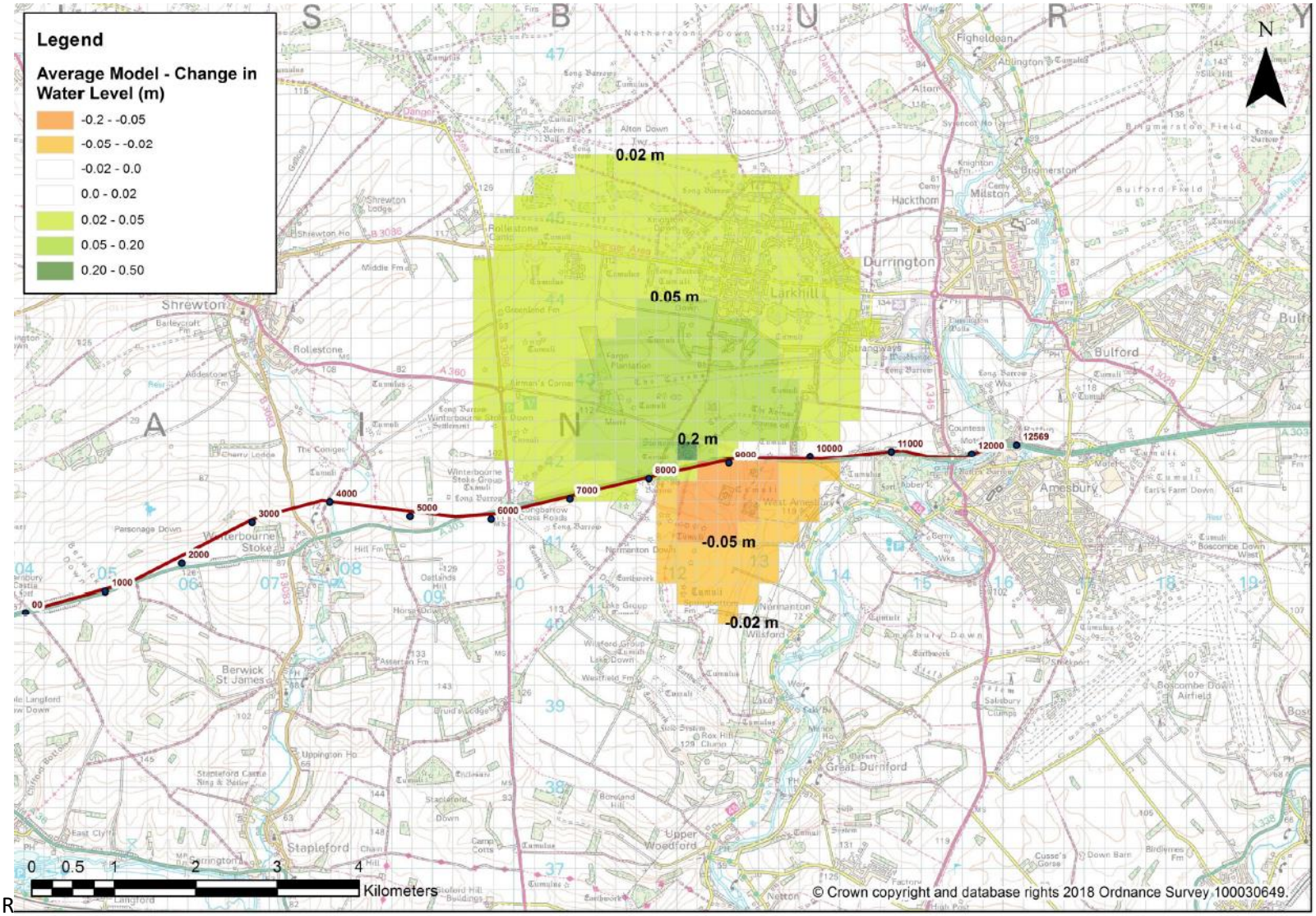


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Figure 4.6 Change in groundwater level at average summer low groundwater condition

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A303 Amesbury to Berwick Down

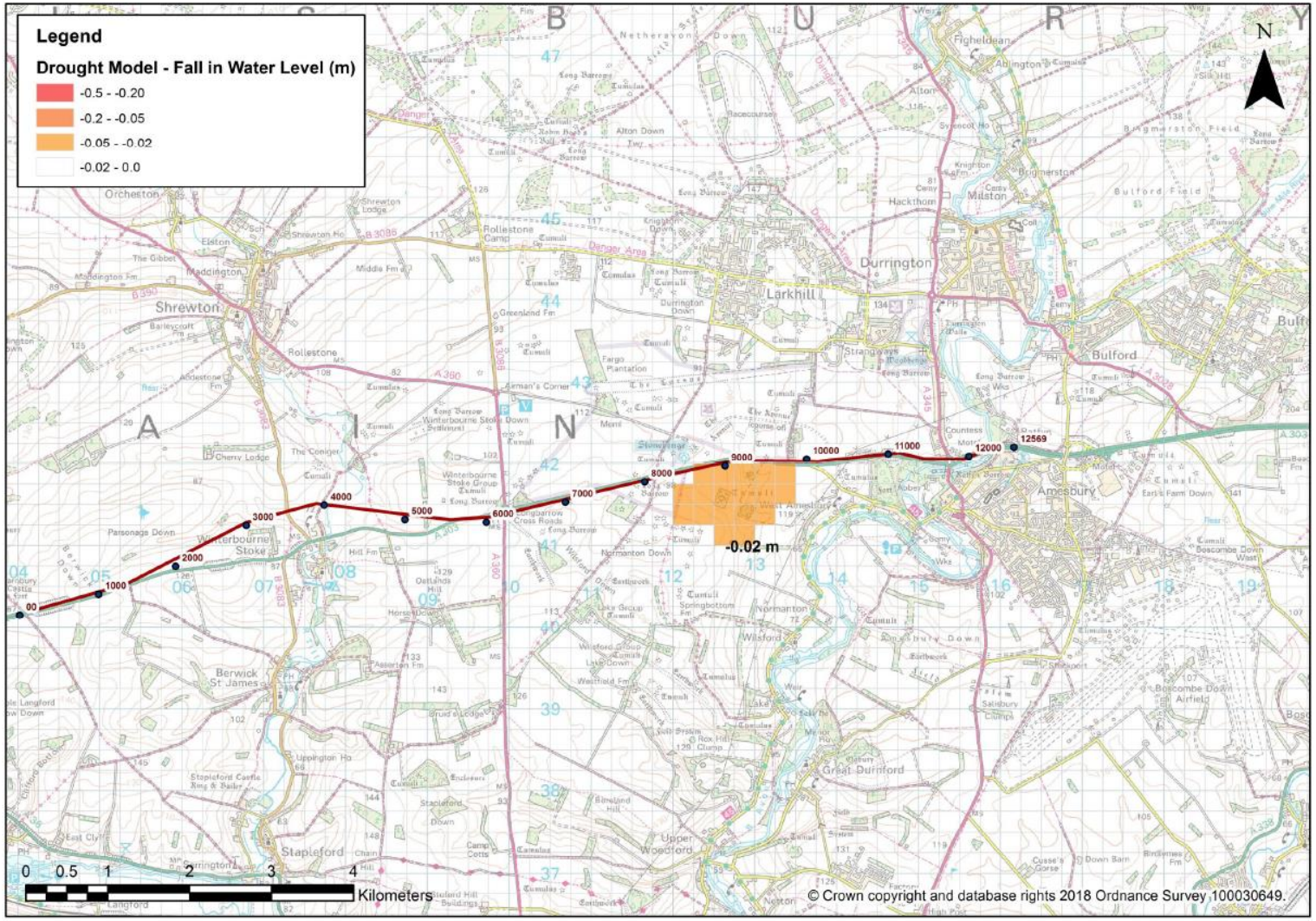

Figure 4.11 Fall in groundwater level at drought groundwater condition

Technical Note

A303 Amesbury to Berwick Down

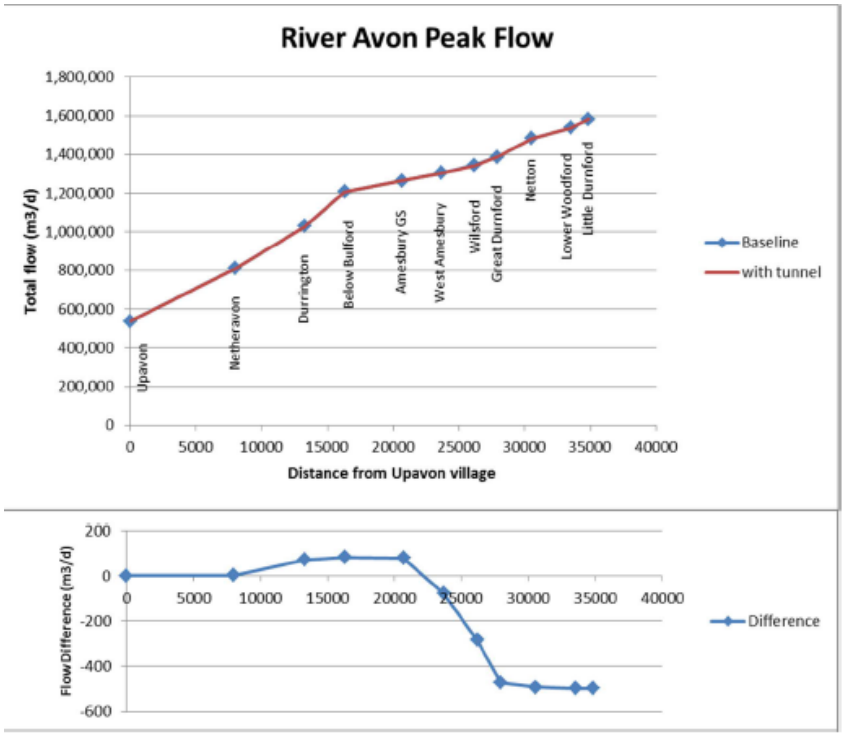

Figure 4.4 River Avon peak flow accretion profile

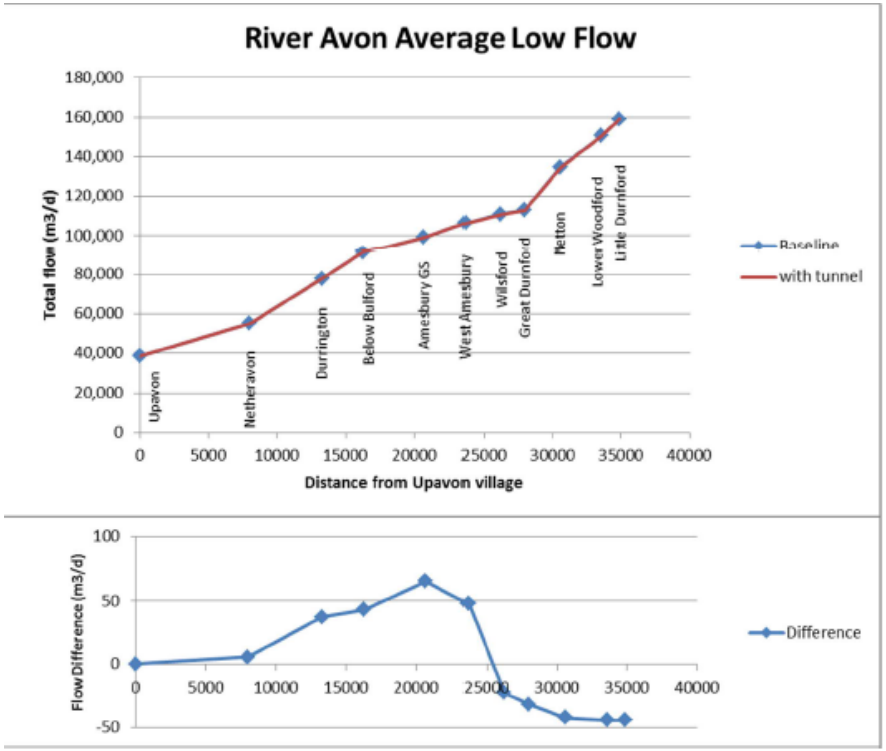

Figure 4.7 River Avon average low flow accretion profile

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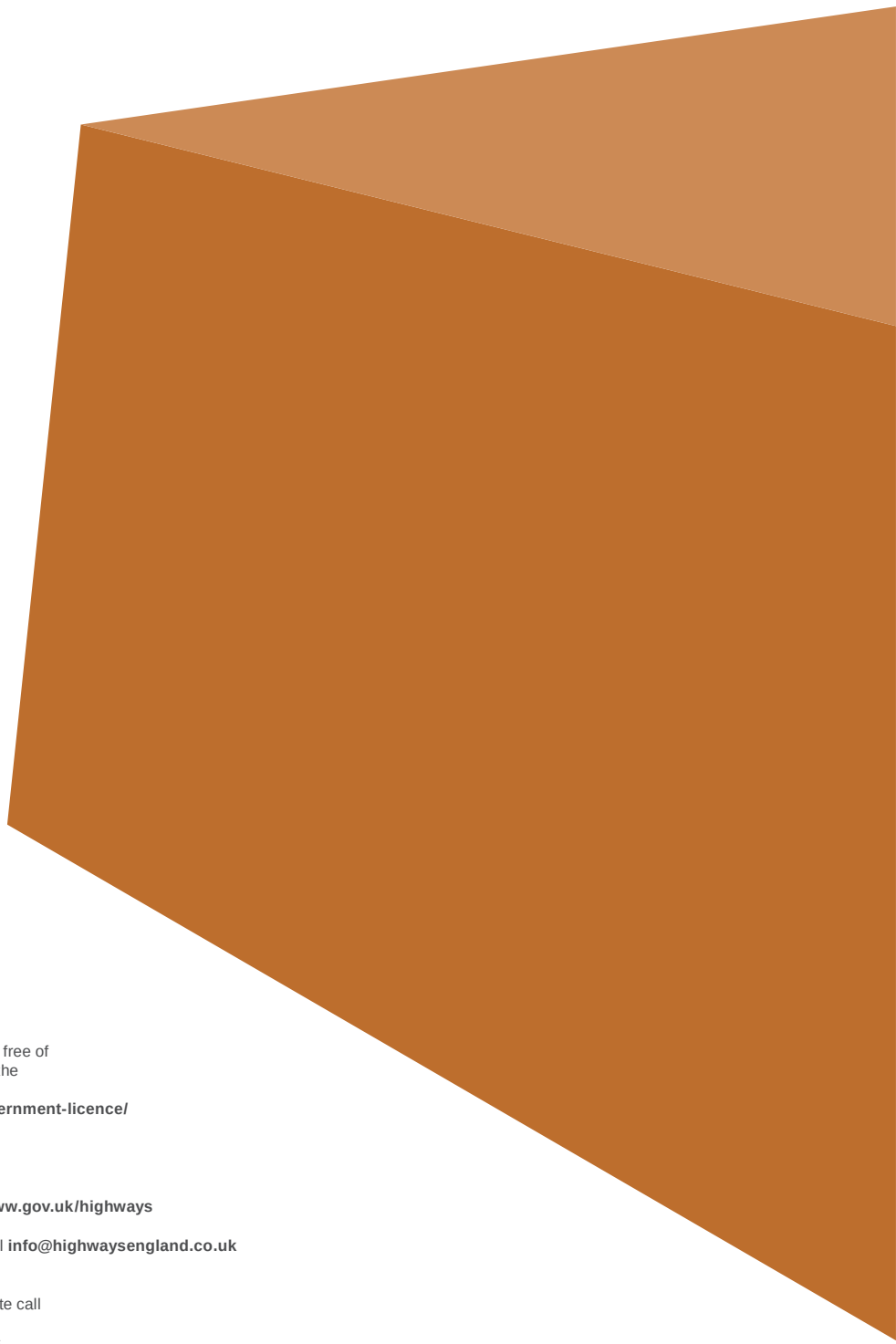

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