A303 Amesbury to Berwick Down

TR010025

Volume 6

6.3 Environmental Statement Appendices

Appendix 14.2 Summary of climate impact effects

APFP Regulation 5(2)(a)

Planning Act 2008

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

October 2018

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Executive Summary

This appendix provides a summary of an assessment of potential climate change impacts on the resilience of the Scheme. The focus of the assessment has been on the impact of climate change during the operation of the scheme. Climate resilience impacts on the Scheme during the construction phase are not expected to be significant due to the duration and nature of the construction activities.

1 Summary of climate resilience assessment impacts

1.1 Overview

1.1.1 This appendix provides a summary of an assessment of potential climate change impacts on the resilience of the Scheme. Climate resilience impacts on the Scheme during the construction phase are not expected to be significant due to the duration and nature of the construction activities. Therefore, these impacts have not been assessed.

1.1.2 The Scheme may, however, be vulnerable to a range of potentially significant impacts during the operational phase. These have been assessed in accordance with the methodology set out in Section 14.3 of the ES.

1.1.3 The assessment found that, based on the mitigation built into the design and assumed management practices, as well as the UKCP09 climate change projections (Ref 14.1), information from other environmental disciplines, and details on scheme design, that none of the potential impacts identified will be significant. These impacts are presented in Table 14-1 and include damage to assets, disruption to power supplies, increased incidence of pollution and increased risks to road users.

2 Assessment summary – climate change resilience

Table 14-1 Summary of non-significant effects – Operation (2080s)

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
End-users (members of public, commercial operators etc.) The assets and their operation, maintenance and refurbishment (i.e. pavements, structures, earthworks & drainage, technology assets, etc.).	Severe weather events	Health and safety risks to road users, and disrupted and/ or inaccessible network	Installation of appropriate emergency systems being in place, especially in the tunnel. Variable messaging systems (VMS) specified as part of the design Identification of suitable network redundancies and diversion routes Emergency response and contingency plans in place Standard operating procedures in place for use in the event of necessary road closure and/ or traffic diversion	Low	Moderate Adverse	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
			Regular maintenance of drainage systems			
	Increased frequency of heavy precipitation events	Damage to roads, tunnels, cuttings and drainage systems due to flooding.	Emergency response and contingency plans in place Incorporation of Sustainable Urban Drainage Systems where appropriate Road design includes future climate change allowances to improve its resilience. Use of attenuation features to detain runoff from all events expected to occur with 1% annual probability or more frequently Regular sweeping and cleaning to remove debris	Medium	Minor Adverse	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
			Regular maintenance of assets to detect deterioration and damage			
	Increased frequency of dry spells and heavy precipitation events	'Summer Ice' – Occurs after a prolonged period of no rain when dirt and oil residue builds up on the road. When the first rain event occurs this material becomes incredibly slippery and dangerous (similar to ice on the road)	Regular maintenance of drainage systems	Medium	Minor Adverse	Not significant
	Increasing average temperatures and increasing frequency of hot days and heatwaves	Material and asset deterioration due to high temperatures	Use of construction materials with properties suitable to increased toler-ance to fluctuating temperatures Regular maintenance of assets to detect deterioration and damage	Medium	Minor Adverse	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
			Deterioration models used identify appropriate maintenance regimes			
	Increasing average temperatures and increasing frequency of hot days and heatwaves	Overheating of tunnel and a potential fire risk	Provision of adequate space within tunnel and ventilation shafts for anticipated future cooling and ventilation requirements. Standard operating procedures in place for use in the event of necessary road closure and/ or traffic diversion Emergency response and contingency plans in place	Low	Moderate Adverse	Not significant
	Severe weather events	Increased slope instability leading to	Emergency response and	Medium	Minor Adverse	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
		subsidence and landslides	contingency plans in place Emergency response and contingency plans in place Requirement for regular slope stability/ geotechnical surveys, especially for clay embankments vulnerable to moisture fluctuations. Flood compensatory storage, alterations to the locations of embankments, or localised reprofiling of land			
	Severe weather events	Damage and disruption to power supply and other linked infrastructure	Emergency response and contingency plans in place	Medium	Minor Adverse	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
			Installation of appropriate emergency systems being in place. Variable messaging systems (VMS) specified as part of the design. Identification of suitable network redundancies and diversion routes specially during planned maintenance of tunnel bores			
	Increasing average temperatures and increasing frequency of hot days and heatwaves	Overheating of electrical equipment, such as information and communication systems	Emergency response and contingency plans in place Installation of equipment capable of withstanding high temperatures	Medium	Minor Adverse	Not significant
	Gradual climate change	Traffic related rutting and migration of	Use of construction materials with	Low	Moderate Adverse	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
	Severe weather events	materials	suitable properties (such as increased tolerance to fluctuating temperatures) Regular maintenance of assets to detect deterioration and damage Deterioration models used identify appropriate maintenance regimes			
	Increasing average temperatures and increasing frequency of hot days and heatwaves	Thermal expansion and movement of bridge joints and paved surfaces.	Use of construction materials with suit-able properties for use with increased tolerance to high temperatures Regular maintenance of assets to detect deterioration and damage	Low	Moderate Adverse	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
			Deterioration models used identify appropriate maintenance regimes			
	Increased frequency of dry spells and heavy precipitation events	Increased pollution from road runoff (including the pollutants discard into the Chalk aquifer) Increased sediment transport	Control surface water runoff at its source through the use of sustainable highways drainage techniques to manage road runoff	Low	Moderate Adverse	Not significant
	Gradual climate change Severe weather events	Longer vegetation growing seasons leading to reduced soil moisture and/or increased tree leaf coverage combined with an increased magnitude and frequency of storm events may result in tree fall and increased maintenance and management requirements.	Regular maintenance of assets to detect deterioration and damage Regular sweeping and cleaning to remove debris Regular maintenance of the soft estate	Medium	Negligible	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
	Severe weather events	Signs, tall structures and high-sided vehicles at risk from increasing wind speeds	Road user warning systems in place in areas exposed to high winds (i.e. non-tunnel sections of the Scheme) Effective vegetation maintenance Regular surveys, management and monitoring of street furniture such as street lighting to ensure asset stability.	Low	Minor Adverse	Not significant
	Severe weather events	Reduced safety and visibility as a result of standing water	Road user warning systems in place Regular maintenance and cleaning of drainage systems Emergency response and contingency plans in place	Low	Minor Adverse	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
	Gradual climate change	Safety risks due to snow and ice	Road user warning systems in place Ensure effective, essential winter maintenance Emergency response and contingency plans in place Standard operating procedures in place for use in the event of necessary road closure and/ or traffic diversion	Very low	Minor Adverse	Not Significant
	Snow and ice Increased frequency of heavy precipitation events Increasing average temperatures and	Reduced pavement friction coefficient	Use of construction materials with suitable properties for use with increased tolerance to fluctuating temperatures	Low	Minor Adverse	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
	increasing frequency of hot days and heatwaves		Regular maintenance of assets to detect deterioration and damage Deterioration models used identify appropriate maintenance regimes A high friction road surfacing on lengths of carriageway leading up to junction and pedestrian crossings such as the Longbarrow and Countess Junction Regular sweeping and cleaning to remove debris			
	Gradual climate change	Reduced pavement deterioration from less exposure to freezing, snow and	Regularly reviewed and updated winter maintenance plans	Low	Negligible	Not significant

Receptor	Climate event	Impact (climate event and hazard occurring together)	Mitigation Built into the Design/ Assumed Management Practices	Measure of Likelihood	Measure of Consequence	Impact Significance (Likelihood x Consequence)
		ice.	Regular monitoring and maintenance of pavement condition			
	Gradual climate change	Reduced need for snow clearing	Regularly reviewed winter maintenance plans	Low	Negligible	Not significant

3 In-combination Climate Change Impact (ICCI) Assessment

Table 14-1 Summary of potential in-combination effects

Receptor	Potential in-combination impact	Likelihood	Consequence	Significance	Additional Recommended Mitigation Measures
Groundwater and surface water	Intense and prolonged rainfall combined with soil exposure from ground disturbance during **construction phase** resulting in increased contaminant mobility and migration. Especially, in the construction compounds where potentially hazardous substances and temporary contaminated soils.	Low	Medium	Minor	-
Agricultural holdings	During the **construction phase**, spread of injurious weeds to adjacent agricultural land from soil and material stockpiles due to increased high winds. This might increase disruption to agricultural activities leading to unsuccessful crops and/or economic losses.	Low	Low	Negligible	-

Receptor	Potential in-combination impact	Likelihood	Consequence	Significance	Additional Recommended Mitigation Measures
Agricultural holdings	During the **construction phase**, interruption and/or contamination to drainage, irrigation and water supply systems may cause disruption to agricultural services. These impacts may be more significant if combined with an increase in heavy precipitation events and/or periods of drought as predicted with climate change.	Low	Low	Negligible	-.
Ecology and nature conservation – River Till and Avon	There is a potential for the River Till to be affected by pollution **during construction** with associated habitat degradation in the long-term to the vulnerable aquatic habitats. Dust deposition from construction works may also result in increased siltation of the River Till. These impacts may be more significant if severe weather events take place such as heavy rains and winds.	Low	Low	Negligible	-

Receptor	Potential in-combination impact	Likelihood	Consequence	Significance	Additional Recommended Mitigation Measures
Ecology and nature conservation – River Till and Avon	During the **construction phase**, deposition of dust on SAC vegetation close to the works leading to increased habitat degradation when combined due to increased high winds and periods of droughts. This potentially results in a negative impact on the calcareous habitats that are the primary reason for the designation of the site.	Low	Low	Negligible	-

4 Inter-Project Effects

4.1 GHG assessment

4.1.1 There is no emissions data to undertake a quantitative GHG assessment of the cumulative impacts from other schemes identified. Following a qualitative assessment of the identified schemes it is not anticipated there will be a significant cumulative impact with regard to GHG emissions.

4.2 Climate Change Resilience

4.2.1 As assessment has been conducted into whether there will be any cumulative (inter-project) impacts on the resilience of the proposed Scheme to climate change as a result of other proposed developments. Based on this review, given the location and nature of these other schemes, no cumulative inter- project impacts are anticipated. It is also expected that the identified 'proposed developments' will each be considering their own vulnerability to climate impacts as part of the UK planning system.

References

Ref 14.1 UK Climate Projections (UKCP09), UK Met Office. Accessed at: http://ukclimateprojections.metoffice.gov.uk/

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