MetroWest

Portishead Branch Line (MetroWest Phase 1)

TR040011

Applicant: North Somerset District Council
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CHAPTER 18

In-combination and Cumulative Effects Assessment

18.1 Introduction

18.1.1 This chapter assesses the in-combination and the cumulative effects associated with the construction and operation of the Portishead Branch Line (MetroWest Phase 1) Development Consent Order Scheme ("the DCO Scheme").

18.1.2 The in-combination and the cumulative effects are defined by the Institute of Environmental Management and Assessment ("IEMA") (IEMA, 2011, page 63) as follows.

- In-combination effects: "*These effects occur between different environmental topics within the same proposal, as a result of that development's direct effects*."
- Cumulative effects: "*These occur as a result of the likely impacts of the proposed development interacting with the impacts of other developments in the vicinity*."

18.2 In-combination Effects

18.2.1 To determine whether there are in-combination effects on receptors, a review of all residual effects from the construction and operation phases of the DCO Scheme reported in the technical topic Chapters 7 to 17 (DCO Document References 6.10 to 6.20) was undertaken, to identify any receptors that will experience more than one type of effect. For noise effects during construction and air quality effects during construction and operation, the assessment of significance in the topic chapters are for receptors in close proximity to the works along the whole route. For the in-combination effects assessment, these overall significance ratings were broken down to property/road level to match the scale of significance assessment for the other types of effects.

18.2.2 The residual effects and therefore the in-combination effects assessment take into account the mitigation embedded into the project design, any additional mitigation measures to be implemented, environmental management during construction (following measures that will be documented in the Code of Construction Practice ("CoCP") (DCO Document Reference 8.15) and the Master Construction Environmental Management Plan ("CEMP") (DCO Document Reference 8.14), and other measures regulated through legislation, consents and licences that will be required for the works to take place. The Environmental Statement ("ES") Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) provides more information on these different types of mitigation. A summary of environmental mitigation measures is provided in the ES Appendix 4.3 Schedule of Mitigation (DCO Document Reference 6.31) and the locations of environmental mitigation measures are shown on the Environmental Masterplan in Part 2 Plans of the DCO Document Reference 2.53.

18.2.3 Assessing the significance of in-combination effects requires subjective judgement about how well a receptor is able to accommodate the multiple changes that will occur as a result of the DCO Scheme. As a general rule, to ensure a consistent approach was used throughout the assessment as much as possible, the highest significance out of the individual effects was taken for each receptor. For example, if a receptor was likely to experience a slight adverse noise quality effect and a moderate adverse visual effect, the in-combination effect was taken to be moderate adverse. However, there was one exception to this rule; namely the Avon Gorge Woodlands Special Area of Conservation ("SAC"), Avon Gorge Site of Special Scientific Interest ("SSSI"), and Leigh Woods National Nature Reserve ("NNR"). This is explained in Paragraph 18.2.6. The results of the in-combination effects assessment are shown in Table 18.1 (construction phase) and Table 18.2 (operation phase), and a summary is presented below.

18.2.4 During construction, in-combination effects will occur for residential properties that adjoin or are located close to the proposed construction sites, construction compounds and haul routes. These receptors will experience adverse effects relating to noise, air quality, views and in some cases vibration, restricted use of gardens, and loss of garages and amenity land. These effects will be caused by activities at the construction sites and compounds, construction traffic, and works along the railway line. Many of the in-combination effects during construction are assessed as being **moderate** or **large adverse**, due to the significance of the visual effects at these locations.

18.2.5 During construction, within the Portbury Wharf Nature Reserve, the individual effects of loss of improved grassland, dust deposition and noise disturbance are neutral. When combined, the overall in-combination effect on the Nature Reserve is still considered to be **neutral**, as neither an individual receptor (a single species) nor the integrity of the designated site as a whole is anticipated to be affected in multiple ways.

18.2.6 During construction, the removal of rare Whitebeam trees and other vegetation within the Avon Gorge Woodlands SAC/Avon Gorge SSSI/Leigh Woods NNR will result in a slight adverse effect, and dust deposition, noise and lighting effects are neutral. Overall, the in-combination effect is considered to be **slight adverse**, however no individual receptor (a single species) is anticipated to be affected in multiple ways, and the integrity of the site is not anticipated to be adversely affected.

18.2.7 Construction effects will be temporary and many effects will not be experienced for the whole construction period, as they are associated with a particular package of work in that location.

18.2.8 During operation, in-combination effects will occur for residential properties that adjoin or are located close to the new stations and car parks, or are along the railway line. These receptors will experience adverse effects relating to noise, air quality, views, and in some cases transport/access, due to the operation of the railway and associated changes in parking. In-combination effects are considered for the year of opening. In addition the visual effects are also considered for 15 years after opening, by which time any new planting would be reaching sufficient maturity to provide screening. Most of the in-combination effects during operation are assessed as being **slight adverse.** Properties on Tansy Lane and Peartree Field are among

the receptors that are likely to experience **large adverse** in-combination effects during operation, due to their proximity to the proposed Portishead Station and reconstructed railway line with passing passenger trains.

18.2.9 During both construction and operation phases of the DCO Scheme, receptors such as residential properties set further back from the railway may also experience in-combination effects as a result of changes in air quality, noise and vibration, views and traffic/access. The significance of this effect will depend on the effectiveness of mitigation measures, the shielding effects of intervening property and the sensitivity of the receptor.

18.2.10 Further information on the in-combination effects presented in Table 18.1 is presented in the following documents.

- Chapter 7 Air Quality and Greenhouse Gases and Greenhouse Gases (DCO Document Reference 6.10)
- Chapter 8 Cultural Heritage (DCO Document Reference 6.11)
- Chapter 9 Ecology and Biodiversity (DCO Document Reference 6.12)
- Chapter 13 Noise and Vibration (DCO Document Reference 6.16)
- Chapter 15 Soils, Agriculture, Land Use and Assets (DCO Document Reference 6.18)
- Appendix 11.3 Visual Impact Assessment (DCO Document Reference 6.25)
- Appendix 16.1 Transport Assessment (DCO Document Reference 6.25).

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
Portishead			
Haven Lodge Care Home and Marina Healthcare Centre	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary moderate adverse** – Properties at this location will experience noise effects during road realignment and pavement works, construction of the station, car park and the railway line. The works will also produce dust and emissions from plant/vehicles. Views will be adversely affected by construction activities and vegetation removal to the south east of these buildings.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	
Properties on Peartree Field (south of the proposed station)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse Daytime vibration: Slight adverse from vibratory compaction of new railway line	**Temporary large adverse** – Properties at this location will experience noise and vibration effects during construction of the station, Trinity Primary School Bridge and the railway line. The works will also produce dust and emissions from plant/vehicles. Views from 6 properties will be adversely affected by construction activities associated with the station, access for works to the tracks to the east and the proposed acoustic barrier immediately north of Peartree Field, with the largest effect being experienced from the upper stories of the properties.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Large adverse	

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
Tansy Lane (north of proposed station)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse Daytime vibration: Slight adverse from bridge piling and from vibratory compaction of new railway line	**Temporary large adverse** – Properties at this location will experience noise and vibration effects during construction of the station, Trinity Primary School Bridge and the railway line. The works will also produce dust and emissions from plant/vehicles. Views will be adversely affected by construction features such as temporary fencing and lighting, heavy machinery, piling rigs and crane, and lay down areas for the Trinity Bridge components. Vegetation clearance will also open up the view.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Large adverse	
Properties on Holmlea Road and Tydeman Road (south of railway line) Community land – amenity grassland and shrubs in this area	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse Daytime vibration: Slight adverse for bridge piling and vibratory compaction of new railway line	**Temporary moderate adverse** – Properties at this location will experience noise and vibration effects during construction of the railway line. Properties on Holmlea Road will also experience noise and vibration effects during construction of Trinity Primary School Bridge. The works will also produce dust and emissions from plant/vehicles. There will be glimpsed views of construction features during summer

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	as they will be well screened by vegetation, but partial views during winter months when vegetation is more sparse. Residents of this road may also be affected by the loss of amenity land during the construction of Trinity Primary School Bridge. A temporary replacement crossing will be in place during construction.
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	
	Chapter 15 Soils, Agriculture, Land Use and Assets	Neutral	
Properties on Tarragon Place and Fennel Road (north of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse Daytime vibration: Slight adverse	**Temporary moderate adverse** – Properties at this location will experience noise and vibration effects during construction of the railway line. The works will also produce dust and emissions from plant/vehicles. There will be glimpsed views, from the upper storeys of the properties, of construction features such as heavy machinery and temporary fencing and lighting. In addition, haul roads serving Sheepway compound and moving construction traffic will be visible through the retained vegetation.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	
Portbury Wharf Nature Reserve North Somerset Wildlife Site (“NSWS”) Nature Reserve	Chapter 9 Ecology and Biodiversity	Neutral for loss of grassland Neutral for noise, dust and vibration disturbance effects	**Neutral effect** – The nature reserve will experience dust deposition during construction due to nearby activities such as setting up and operation of the compound, but this effect is assessed as neutral. There will be a temporary loss of improved grassland due to the

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
			installation of a construction compound, and permanent loss of improved grassland for construction of a maintenance track and permanent compound area. This habitat is used by barn owls for foraging but the DCO Scheme will not result in material losses of habitat and barn owls will be able to use the remaining habitat. There will be removal of vegetation along the boundary of the railway line, but some of this will be replanted. Construction noise is not considered sufficient to disturb birdlife in the Nature Reserve. Construction noise levels will decrease away from the disused railway, and Important Birds to the Severn Estuary SPA/Ramsar do not use the area in which the DCO Scheme construction activity will be undertaken, but are found further north. Neither an individual receptor (a single species) nor the integrity of the designated site as a whole is anticipated to be affected in multiple ways. The in-combination effect is therefore neutral. The potential cumulative effects on this ecological site associated with the DCO Scheme and the National Grid Hinkley Point C Connection project is discussed in Appendix 18.2: Matrix 2 Assessment Matrix (DCO

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
			Document Reference 6.25) and Section 18.3 of this chapter of the ES.
Portishead to Pill			
Shipway Gate Farm (north of railway line).	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary moderate adverse** – This property will experience noise effects during construction of the railway line. The works will also produce dust and emissions from plant/vehicles. Construction activities will be mainly screened by existing vegetation and existing farm buildings but during winter months there will be glimpsed views through the garden vegetation. There will also be filtered views to the haul road to the south of the railway line and to the construction compound off Sheepway. Another effect will be restricted access to the farm's land as there will be severance of the informal access across the disused railway to the south of the farm and the construction site along the railway will be fenced off from the start of construction. Mitigation in the form of the field off Sheepway improved access to is proposed. The potential cumulative effects on the Sheepway area associated with the DCO Scheme and the National Grid Hinkley Point C Connection project are discussed in Appendix 18.2: Matrix 2 Assessment Matrix (DCO
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Chapter 15 Soils, Agriculture, Land Use and Assets	Neutral	
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
			Document Reference 6.25) and Section 18.3 of this chapter of the ES.
Properties south of the railway line off Station Road: Cole Acre, The Meadows and Old Portbury Station.	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse Daytime vibration: Slight adverse for Old Portbury Station	**Temporary moderate adverse** – These properties will experience noise effects during construction of the railway line and the set up and operation of the Portbury Hundred construction compound. Old Portbury Station will also experience vibration effects. The works will also produce dust and emissions from plant/vehicles. There will be views, in close proximity (partially screened by retained vegetation in some cases), of construction activity including features such as heavy machinery, temporary fencing, lighting and vegetation removal. From Cole Acre and The Meadows there will be views into the compound, located at the western boundary.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	
Properties in Elm Tree Park (north of railway line). Elm Tree farmhouse Grade II listed building (HER 9036)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary slight adverse** – Properties at this location will experience noise effects during construction of the railway line. The works will also produce dust and emissions from plant/vehicles. Construction activities will be mainly screened by existing vegetation but during winter months there will be glimpsed views through of features such as heavy machinery, temporary fencing and lighting. There is no inter-visibility between Elm Tree farmhouse and the scheme.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Chapter 8 Cultural Heritage	Neutral	

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Court House Farm (south of the railway line). Court House Farm Grade II listed building (Historic Environment Record No. 2560)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary slight adverse –** This property will experience noise effects during construction of the railway line. The works will also produce dust, and emissions from plant/vehicles. Views towards works along the disused line will be partially screened by the cargo storage area associated with Royal Portbury Docks. The construction of the railway would not change the setting of the listed farmhouse.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Chapter 8 Cultural Heritage	Neutral	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Pill			
Properties off Marsh Lane and on Beechwood Road (south of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary slight to moderate adverse** – Properties at this location will experience noise, dust and other disturbance effects from the construction of the railway line, set up and operation of the Lodway construction compound. There will be views of construction activity, particularly in relation to the haul route.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
	Chapter 15 Soils, Agriculture, Land Use and Assets	Slight to moderate adverse – relating to use of adjacent land as a construction compound	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Properties on The Breaches (south of the railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary large adverse** – Properties at this location will experience noise, dust and other disturbance effects from the construction of the railway line, set up and operation of the Lodway construction compound. There will be views of construction features such as heavy machinery, temporary fencing and lighting, vegetation removal and ballast storage mounds.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Chapter 15 Soils, Agriculture, Land Use and Assets	Slight to moderate adverse – relating to use of adjacent land as a construction compound	
	Appendix 11.3 Visual Impact Assessment	Large adverse	
Properties in Lodway Close (south of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary very large adverse** – Properties at this location will experience noise effects from the construction of the railway line, set up and operation of the Lodway construction compound, embankment works, Avon Road

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
	Chapter 15 Soils, Agriculture, Land Use and Assets	Large adverse for 5 properties	Bridge and earthworks, and car park construction. The works will also produce dust and emissions from plant/vehicles. Residents of 5 properties will be affected by temporary use of part of their rear gardens for access to Avon Road embankment and bridge. Gardens will be reinstated on completion of works. There will be direct open views of the construction works, which will be increased by loss of vegetation including large trees, also opening up view beyond the M5.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Very large adverse	
Avon Road (north of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary moderate to large adverse** – Properties at this location will experience noise effects from the works to the railway line, embankment works, Avon Road Bridge and earthworks and compound construction. The works will also produce dust and emissions from plant/vehicles. There will be some views to construction activity at the nearby compounds, and views south to the car park construction as works progress.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	
Properties on Severn Road and Monmouth Crescent (north of the railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary large adverse** – Properties at this location will experience noise effects from the works to the railway line, earthworks and car park construction. The works will also produce dust and emissions from plant and vehicles.

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	There will be direct views of the compound and car park construction activity, including temporary fencing, lighting, heavy machinery and vegetation removal.
	Appendix 11.3 Visual Impact Assessment	Large adverse	
Properties on Hardwick Road (south of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse Daytime vibration: Slight adverse	**Temporary slight/moderate adverse** – Properties at this location will experience noise and vibration effects from the works to the railway line, earthworks, car park and fencing replacement along the back gardens of properties once construction is complete. The works will also produce dust and emissions from plant/vehicles. There will be changes to views as construction features will be visible (both car park construction and works on the railway line).
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Slight/Moderate adverse	
Properties on Sambourne Lane (south of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse Daytime vibration: Slight adverse	**Temporary large adverse** – Properties at this location will experience noise and vibration effects from the works to the railway line, earthworks in cutting, fencing replacement along the back gardens of properties once construction is complete, station construction and set up, and operation of the construction

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	compound in the proposed station forecourt adjacent to Sambourne Lane. The works will also produce dust and emissions from plant/vehicles. There will be changes to views as construction features will be visible (station construction, compound and works on the railway line).
	Appendix 11.3 Visual Impact Assessment	Large adverse	
Properties on Station Road (south of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary slight adverse** – Properties at this location will experience noise and vibration effects from the works to the railway line, station construction and set up and operation of the construction compound in the proposed station forecourt adjacent to Sambourne Lane. The works will also produce dust and emissions from plant/vehicles. There will be changes to views as construction features will be visible (station construction, compound and works to the Memorial Club car park and bus stop).
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Properties on Monmouth Road (north of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary large adverse** – Properties at this location will experience noise effects from the works to the railway line, station construction and set up, and operation of the construction compound at the proposed main station car park off Monmouth Road and in the proposed station forecourt adjacent to Sambourne Lane. The works will also produce dust and emissions from plant/vehicles. There will be changes to
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
	Appendix 11.3 Visual Impact Assessment	Large adverse	views as construction features will be visible (station construction, car park construction and compound).
Properties on Back Lane and Crusty Lane (north of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary slight/moderate adverse** – Properties at this location will experience noise effects from the works to the railway line, station construction and set up and operation of the construction compound at the proposed main station car park off Monmouth Road and in the proposed station forecourt adjacent to Sambourne Lane. The works will also produce dust and emissions from plant/vehicles. There will be changes to views as construction features will be partially visible (station construction and compound).
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Slight/moderate adverse	
Properties on New Road and Star Lane (south of railway line) and Chapel Row (north of railway line	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary moderate adverse** – Properties at this location will experience noise effects from the works to the railway line, station construction and set up and operation of the construction compound adjacent to Sambourne Lane. The works will also produce dust and emissions from plant/vehicles. There will be views to construction activity associated with works to the viaduct, including scaffolding erection, repointing, waterproofing and track works and machinery/trains on top of viaduct. Some of the works to repair the viaduct will require access from gardens and roped access from the top of the viaduct.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
Properties on Underbanks and Watchhouse Road (north of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary slight adverse** – Properties at this location will experience noise effects from embankment strengthening works, set up and operation of construction compound at Underbanks Road and works at Pill Viaduct. The works will also produce dust and emissions from plant/vehicles. There will be changes to views as construction features will be visible (station construction and compound). There will be views to construction activity associated with works to Pill Viaduct, including scaffolding erection, repointing, waterproofing and track works and machinery/trains on top of viaduct.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Properties on Mount Pleasant, Eirene Terrace and Ham Green Road (south of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary large adverse** – Properties at this location will experience noise effects from embankment strengthening works, set up and operation of construction compound at Underbanks Road and works at Pill Viaduct. The works will also produce dust and emissions from plant/vehicles. Direct views north-east from back windows of properties towards construction activity associated with construction of the line including views of temporary fencing and lighting, soil nailing, earthworks, heavy machinery and vegetation removal. Some properties on Mount Pleasant will also be affected by temporary restrictions on access to their gardens, as a precaution, while the
	Chapter 15 Soils, Agriculture, Land Use and Assets	Slight adverse for some properties on Mount Pleasant.	
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Large adverse	

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
			embankment strengthening works east and south of Pill Viaduct are being undertaken.
Properties on Chapel Pill Lane and Fitzharding Road (north of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary moderate/large adverse** – Properties at this location will experience noise and dust effects, and emissions from plant/vehicles due to set up and operation of the Ham Green construction compound, works for Pill Tunnel permanent access and maintenance compound, and vegetation removal along the railway line. Glimpsed views looking southwest across lake and through vegetation towards construction activity associated with the construction of Pill Tunnel access and maintenance compound, including view of site compound and haul route, temporary fencing and lighting, small diggers and excavators, earthworks and vegetation removal. Limited and filtered elevated views through vegetation in the summer and partial views through vegetation in the winter.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Moderate/large adverse	

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
Avon Gorge Woodlands SAC/Avon Woods SSSI/Leigh Woods NNR/Ancient woodland. Habitats: woodland and trees, grassland, structures within SAC and footpaths	Chapter 9 Ecology and Biodiversity	Slight adverse for woodland clearance. Neutral for construction site noise, pollution incidents, dust, lighting and vibration.	**Slight adverse effect** – Dust deposition will occur as a result of the works. Clearance of woodland and vegetation will result in loss or damage of rare or important plants, loss of habitat, loss of rare Whitebeam trees and there is potential for the spread of invasive species or pathogens. The Avon Gorge Vegetation Management Plan (ES Appendix 9.11, DCO Document Reference 8.12) will mitigate this and include measures such as removing invasive non-native plant species and planting rare Whitebeam trees. Although the in-combination effect is anticipated to be slight adverse, no individual receptor (a single species) is anticipated to be affected in multiple ways, and the integrity of the site is not anticipated to be adversely affected.
Bower Ashton/Ashton Gate			
Properties on Clanage Road (west side of railway line)	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary moderate adverse** – Properties at this location will experience noise and dust effects and emissions from the set up and operation of the Clanage Road construction compound. Residents of these properties will also be adversely affected by traffic travelling on Clanage Road to access the compound, views of the compound and fencing and loss of amenity land for the compound and
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	

Table 18.1: In-combination effects during construction

Receptor	Chapter	Residual effect reported in the topic chapter	Assessment of in-combination effects
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	compensation for flood conveyance. There will be a negligible adverse effect on the setting of the Bower Ashton Conservation Area (which includes these Clanage Road properties) during construction.
Land at Clanage Road	Chapter 15 Soils, Agriculture, Land Use and Assets	Slight adverse	
Bower Ashton Conservation Area	Chapter 8 Cultural Heritage	Neutral	
Properties on Winterstoke Road, Marsh Road and Barons Close (east of railway line) and Ashton Vale Road	Chapter 13 Noise and Vibration	Daytime noise: Slight adverse Night time noise (if works take place at night): Slight adverse	**Temporary slight adverse** - Properties (mainly commercial and industrial) at this location will experience noise and dust effects and emissions from plant/vehicles. Views will be adversely affected by the highway works on Winterstoke Road, ramp construction works between Ashton Vale Road and Ashton Road, and signalling works.
	Chapter 7 Air Quality and Greenhouse Gases	Slight adverse	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Receptors further back from the railway line but within the vicinity of the works.	N/A	N/A	Receptors such as residential properties set further back from the railway line are likely to experience in-combination effects to some extent relating to air quality, noise and traffic/access. This effect is difficult to quantify but may be significant in some cases.

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
Portishead			
Marina Healthcare Centre and Haven Lodge Roads - Harbour Road (Between Quays Avenue and Newfoundland Road) and Haven View (From Harbour Road to Haven View)	Chapter 7 Air Quality and Greenhouse Gases	Negligible	**Slight adverse** – These properties will experience increased NO_2 from changes in traffic associated with access to and from the station and car park, but the air quality would still be well below the Air Quality Strategy Objectives[1] (ie within acceptable limits) Residents may be affected by an increase in parking demand/use of the local highway network. Residents will have views towards the main station car park with the station beyond, as well as vertical features such as lighting, screened by existing vegetation. Over time as vegetation establishes, views will improve and there will be dense screening in summer months and glimpsed view in winter months.
	Appendix 16.1 Transport Assessment	Minor adverse	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Properties on Peartree Field	Chapter 13 Noise and Vibration	Slight adverse	**Large adverse** – Properties at this location will experience noise effects from the operation of the railway (the proposed noise barrier will reduce noise levels at this location) and emissions from trains. These properties will experience small increase in NO_2 associated with the scheme, but the air quality would still be well below the Air Quality Objectives. Six properties will experience a large adverse effect
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Large adverse	

[1] See Chapter 7 Table 7.1 for the Air Quality Strategy Objectives in UK legislation

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
			of changed views from the upper storeys, with the introduction of proposed 10 m high lighting columns, Trinity Primary School Bridge, fencing and passenger trains. Properties not affected by these changes in views would experience a smaller in-combination effect.
Properties further back from Portishead Station and railway line on South side (i.e. behind Peartree Field)	Chapter 13 Noise and Vibration	Slight adverse	**Minor adverse** – Properties further away will experience lower noise effects from the operation of the railway and emissions from trains and road traffic. Residents will experience changed views with the introduction Trinity Primary School Bridge and associated night-time lighting, fencing and occasional glimpsed views of passenger trains. Views will improve over time as planting matures.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Tansy Lane	Chapter 13 Noise and Vibration	Slight adverse	**Large adverse** – Properties on Tansy Lane will experience noise effects from the operation of the railway and emissions from trains. Residents will have direct views of Trinity Primary School Bridge, the railway line and associated fencing and passenger trains. There will be oblique views to the station and platform. Some visual screening provided by proposed trees and planting. Whilst a line of tree planting is proposed north of the bridge to help screen the new bridge, due to the proximity of the receptors, and associated massing and lighting of the bridge, there will still be a large adverse impact.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Large adverse	

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
Further back from Portishead Station and railway line on North side (i.e. north of Tansy Lane)	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** – Properties on this road will experience noise effects from the operation of the railway and emissions from trains.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
Holmlea and Tydeman Road	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** – Properties on these roads will experience noise from the operation of the railway and emissions from trains. Residents will have direct, oblique or upper storey views of Trinity Primary School Bridge, the railway line and associated fencing and passenger trains. There will be oblique views to the station and platform from some properties.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
North of the rail line in the area of Fennel Road and Tarragon Place	Chapter 13 Noise and Vibration	Slight adverse	**Moderate adverse** – Properties on these roads will experience noise from the operation of the railway and emissions from trains. After 15 years of opening there will be a glimpsed view, from upper floors, of the reconstructed railway line, its associated fencing and passing trains, which are well screened by hedgerow vegetation. Partial views through vegetation in winter months and dense screening during the summer months.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	
Trinity Primary School	Chapter 13 Noise and Vibration	Slight adverse	**Moderate adverse** – Trinity Primary School will experience noise from the operation of the

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	railway and emissions from trains. There will be open views of Trinity Primary School Bridge, its associated fencing and passing passenger and freight trains, which are well screened by vegetation in places. Views will improve over time as additional planting establishes itself. As proposed planting establishes to the south west of the School, views to Trinity Primary School Bridge will be partially screened. In addition, whilst views of occasional passenger trains will be filtered by additional planting to the southern boundary of the School, new features such as lighting on the bridge, and proposed fencing, will be visible and detract from the tranquillity of existing views.
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	
Portishead to Pill			
Shipway Gate Farm	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** – Shipway Gate Farm will experience noise from the operation of the railway . There will be glimpsed views of the reconstructed railway line through vegetation in winter months and dense screening during the summer months.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Old Station House, Portbury.	Chapter 13 Noise and Vibration	Slight adverse	**Large adverse** – This property will experience noise from the operation of the railway,

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	although a noise barrier will be installed to reduce noise levels. There will be open views in close proximity to the reconstructed railway line behind its associated fencing and passing passenger trains.
	Appendix 11.3 Visual Impact Assessment	Large adverse	
Buildings on the southern edge of Elm Tree Park Elm Tree farmhouse Grade II listed building (HER 9036)	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** – Properties in this area will experience noise effects from the operation of the railway. There will be glimpsed views of the reconstructed railway line, associated fencing and passing passenger trains in winter months and dense screening of the line during summer months. Views will improve over time as vegetation is established. There is no inter-visibility between Elm Tree farmhouse and the scheme.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Chapter 8 Cultural Heritage	Neutral	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Court House Farm (south of the railway line) Court House Farm Grade II listed building (HER 2560)	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** - This property will experience noise from the operation of the railway. Views to the cargo storage area and the track with passing trains beyond. The operation of the railway would not change the setting of the listed farmhouse.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Chapter 8 Cultural Heritage	Neutral	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
Portbury and Western edge of Pill			
Dwellings within Portbury and on the western edge of Pill (e.g Church Road, The Breaches)	Chapter 13 Noise and Vibration	Neutral	**Slight adverse** – Properties in this area will experience air quality effects from the operation of the railway. There will be views through boundary vegetation towards restored fields as well as the reconstructed railway line in the distance, its associated fencing and passing passenger and freight trains beyond. Views will improve over time as vegetation is established.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Pill			
North of the railway in Pill (Avon Road and Severn Road)	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** – Properties in this location will experience noise from the operation of the railway. There will views to the new station car park, which will become more screened over time as vegetation is established.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Neutral/slight adverse	
South of the rail line on the western side of Pill, in the area around Lodway Close and the western end of Hardwick Road	Chapter 13 Noise and Vibration	Slight adverse	**Slight/moderate adverse** – Properties in this location will experience noise and air emissions from trains. There will views to the new station car park, which will become more screened over time as vegetation is established. From Lodway Close there will also be views to the new embankment and Avon Road Bridge, new fence line on the rail boundary and of passing passenger and freight trains, which will become
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Slight/moderate adverse	

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
			partially screened by replacement planting on the embankment. The widening of the railway to accommodate a second track will result in steeper embankments and trains running closer to residential properties along Lodway Close with no opportunity to effectively screen the trains using new mitigation planting. Views above embankment to M5 beyond afforded above boundary fencing.
Southern side of proposed station location, in the area of Sambourne Lane	Chapter 13 Noise and Vibration	Slight adverse	**Slight/moderate adverse** – Properties in this location will experience noise from the operation of the railway. Views to Pill Station and platform will be limited from houses along Sambourne Lane due to the elevated nature of these receptors. There will be less car parking to the north on Monmouth Road due to the introduction of a new footpath to serve the station. There will also be parking regulations in place on Station Road. Views will include new fencing to the top of Harwick cutting and the new station forecourt including disabled parking and drop off facilities, ticket machines, waiting area, seating and cycle parking.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Slight/moderate adverse	
	Appendix 16.1 Transport Assessment	Minor adverse	
North of the proposed station, in Monmouth Road and Monmouth Court	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** – Properties in this location will experience noise from the operation of the railway and associated car park, and emissions from traffic to and from the car park. From Monmouth Road there will be views of the
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
	Appendix 11.3 Visual Impact Assessment	Slight adverse	station, the reinforced cutting, the ramp and stairs between the station entrance and platform, platform features including a shelter and lighting and new fencing. Residents may also be affected by new parking restrictions on a section of Monmouth Road. From Monmouth Court there will be views of the new station car park and permanent maintenance compound with associated fencing, principal supply point (for signalling equipment), lighting columns and ticket machines. Over time, views of the car park and permanent maintenance compound will be screened by vegetation.
	Appendix 16.1 Transport Assessment	Minor adverse	
Further back from the front line of properties in Monmouth Road to the north	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** – Properties in this location will experience lower noise effects from the operation of the railway and emissions from traffic.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
Immediate south east of the proposed station, between Station Road and Pill Viaduct (i.e. properties in the area of Chapel Row, New Road and Star Lane)	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** – Properties in this location will experience noise from the operation of the railway. There will be oblique views from residential buildings looking towards the repointed viaduct with occasional passing passenger and freight trains line on top. Residents may also be affected by new parking
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
	Appendix 16.1 Transport Assessment	Minor adverse	regulations on Chapel Row, New Road and Myrtle Hill Gyratory.
Eastern side of Pill, between Pill Viaduct and Pill Tunnel western portal.	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** – Properties in this location will experience noise from the operation of the railway. For some properties, such as those on Watchhouse Road, there will be oblique views looking towards the repointed viaduct with occasional passing passenger and freight trains line on top. The views from property on Mount Pleasant and Eirene Terrace towards the reconstructed railway line, new fencing and passing trains.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Eastern side of the Pill Tunnel	Chapter 13 Noise and Vibration	Slight adverse	**Slight/moderate adverse** – Properties in this location will experience noise from the operation of the railway. For properties on Chapel Pill Lane and upper storeys of properties on Hart Close and Fitzharding Road, there will be views of the permanent compound off Chapel Pill Lane, which will be less intrusive during the summer due to screening by vegetation.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Slight/moderate adverse	

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
Avon Gorge Woodlands SAC / Avon Woods SSSI / Leigh Woods NNR / Ancient woodland, woodland and trees, grassland, structures within SAC and footpaths	Chapter 9 Ecology and Biodiversity	Slight adverse for increased noise and lighting disturbance Neutral for peregrine falcon (loss of breeding and foraging habitat within 3 m of the running rail)	**Slight adverse** – Clearance of woody vegetation within 3 m of the running rail will be undertaken in line with Network Rail's Site Management Statement ("SMS") and Vegetation Management Plan ("VMP") to control disturbance impacts. The SMS will be reviewed in 2023. Rock face works will require consent from Natural England. The predicted increase in nitrogen deposition is small and current deposition is already above the critical load. Loss of trackside vegetation to install new fencing, to undertake the rock stabilisation works on the cliff faces, and tree removal as part of the Avon Gorge Vegetation Management Plan will open up views of the track and passing trains in places. In this instance, the worst-case significance of effect (moderate adverse) has not been taken as no individual receptor (a single species) is anticipated to be affected in multiple ways, and the integrity of the site is not anticipated to be adversely affected. The moderate adverse visual effect would not affect the integrity of the site.
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	
Dwellings closest to the River Avon in	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** – Properties in this location will experience noise from the operation of the

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
Shirehampton (eastern side of the River Avon)	Chapter 7 Air Quality and Greenhouse Gases	Negligible	railway. There will be views across the River Avon towards Pill and the repointed viaduct with occasional passing passenger trains on top. The new features would not be discernible due to the scale of the change in relation to the overall scene.
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Receptors closest to the railway line at Bower Ashton between Avon Gorge and Brunel Way	Chapter 13 Noise and Vibration	Slight adverse	**Moderate adverse** - Properties in this location will experience noise from the operation of the railway. There will be views towards the Clanage Road compound, which will be screened by boundary planting, and towards passing passenger trains.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Moderate adverse	
Receptors closest to the railway line – Ashton Vale Industrial Estate and Winterstoke Road	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** - Properties in this location will experience noise from the operation of the railway. Views towards the line with an increase in passing trains with the passenger service, new pedestrian and cycle ramp between Ashton Vale Road and Ashton Road, and revised highway layout, tempered by the new skew bridge built for MetroBus.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	
	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Receptors closest to the railway line – allotments and housing between Ashton Vale Level	Chapter 13 Noise and Vibration	Slight adverse	**Slight adverse** - Properties in this location will experience noise from the operation of the railway and views towards passing passenger trains.
	Chapter 7 Air Quality and Greenhouse Gases	Negligible	

Table 18.2: In-combination effects during operation

Receptor	Chapter	Residual effect reported in chapter	Assessment of in-combination effects
Crossing and Ashton Junction	Appendix 11.3 Visual Impact Assessment	Slight adverse	
Receptors further back from the railway line but still within the vicinity of the works.	N/A	N/A	Receptors such as residential properties set further back from the railway line are likely to experience in-combination effects to some extent relating to air quality, noise, traffic/access and views.

18.3 Cumulative Effects

18.3.1 The assessment of cumulative effects with other developments was undertaken in line with the guidance set out in the Advice Note 17: *Cumulative Effects Assessment* (The Planning Inspectorate, 2015) and updated several times during the study. The assessment has been reviewed in the light of the recent update of Advice Note 17 (The Planning Inspectorate, August 2019) and it was decided that the assessment is still appropriate.

18.3.2 Consideration of cumulative effects as a result of the likely impacts of the DCO Scheme interacting with other developments is presented within the technical topic chapters. This chapter, together with Appendices 18.1 and 18.2 (DCO Document Reference 6.25), brings together the assessment of cumulative effects of other developments with the DCO Scheme.

Approach to the Assessment of Cumulative Effects

18.3.3 The Cumulative Effects Assessment ("CEA") follows the four-stage approach set out in Advice Note 17.

- Stage 1 – Establish the zone of influence (“ZoI”) of the Nationally Significant Infrastructure Project ("NSIP") and a long list of other developments.
- Stage 2 – Identify a short list of other developments for the assessment.
- Stage 3 – Gather information on the other developments.
- Stage 4 – Assessment.

18.3.4 Advice Note 17 recommends the types of other development that should be considered in the assessment, which are categorised into tiers reflecting the level of certainty and quantity of information available (Table 18.3).

18.3.5 A long list of other developments was created and discussed with lead planners at North Somerset District Council (“NSDC”) and Bristol City Council (“BCC”) based on:

- Other NSIPs within 10 km of the railway line;
- Planning applications submitted to NSDC and BCC within 500 m of the railway line;
- Schemes included in:
  - the NSDC Site Allocations Plan (NSDC, 2018);
  - BCC Site Allocations and Development Management Policies (part of the Local Plan) (BCC, 2014);
  - the West of England Joint Spatial Plan and Transport Study Draft Strategy (2016); and
  - the draft Joint Local Transport Plan 4 (2019) Bristol Area;
- Other major schemes in the Bristol Area, such as Bristol Temple Quarter Enterprise Zone ("TQEZ") and the Avonmouth/Severnside Enterprise Area Ecology Mitigation and Flood Defence project; and

- Other railway works to be implemented under permitted development rights, including works required for MetroWest Phase 1.

Table 18.3: 'Other Development' for inclusion in the Cumulative Effects Assessment

Tier 1	a) Under construction	Decreasing level of detail likely to be available ↓
	b) Permitted application(s), whether under the Planning Act 2008 or other regimes, but not yet implemented	
	c) Submitted application(s) whether under the Planning Act 2008 or other regimes, but not yet determined	
Tier 2	Projects on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted	
Tier 3	a) Projects on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted	
	b) [Projects] identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption) recognising that there will be limited information available on the relevant proposals.	
	c) [Projects] identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.	

Source: Based on The Planning Inspectorate (2015, 2019)

18.3.6 The long list of other developments are described in Matrix 1 (Appendix 18.1 in the ES Volume 4 Technical Appendices, DCO Document Reference 6.25). Figure 18.1 Sheets 1 to 5 in the ES Volume 3 Book of Figures (DCO Document Reference 6.24) shows other developments that lie within 500 m of the centreline of the railway that meet the criteria above. The long list of other developments was revised periodically, most recently on 1st July 2019.

18.3.7 Developments were progressed to the short list for inclusion in the CEA if they met the following additional criteria (Stage 2):

- overlap in temporal scope with the DCO Scheme in construction and/or operation phase, and
- scale and nature of development may cause it to have a significant effect on a receptor which lies within the Zone of Influence ("ZOI") for the DCO Scheme.

18.3.8 Developments that are likely to be completed before the start of the construction of the DCO Scheme have been considered to form part of the future baseline for the DCO Scheme within the construction and operational assessments of the technical topic chapters and have therefore not been considered in the CEA.

18.3.9 The ZOI was defined by the potential distance over which the DCO Scheme may affect the environment. The ZOI varies from topic to topic and between the construction and operation phases in some cases, as illustrated in Table 18.4 below.

Table: 18.4 Zone of Influnece of potential environmental effects during the construction and operation of the DCO Scheme

Topic	ZOI during Construction	ZOI during Operation
Air Quality	200 m	Same as construction
Cultural Heritage	50 m for non-designated heritage assets, 500 m for designated heritage assets and further away for assets that have intervisilibity with the scheme	Same as construction
Ecological sites and protected species	500 m for protected species and locally/nationally designated sites, 5 km for internationally designated sites and 30km for sites with a bat qualifying feature	Same as construction
Ground conditions	500 m for contaminated land and 2 km for source protection zones	Same as construction
Landscape and Visual impacts	National Character Areas and Local Authority Landsacpe Character areas, 500 m for site specific landscape character assessment, and covering the Zone of Theroretical Visibility for visual effects	Same as construction
Materials and waste	N/A	N/A
Noise and vibration	Initially 100 m, with extensions at locations where there are significant effects within the 100 m	Initially 500 m, with extensions at locations where there are significant effects within the 500 m
Socio-economics	Settlements of Portishead and Pill for the local area, and West of England for a regional overview	Same as construction
Soils, Agriculture, Assets and Land Use	250 m	Same as construction
Transport, Traffic and Non-Motorised Units	Relevant pedestrian links and cycling networks, Ashton Gate level crossing, junctions along the route	Same as construction, and parking locations in Portishead and Pill, Bristol and the wider

Table: 18.4 Zone of Influnece of potential environmental effects during the construction and operation of the DCO Scheme

Topic	ZOI during Construction	ZOI during Operation
		area for the strategic operational impact
Water Resources, Drainage, and Flood Risk	250 m for surface water impacts and 500 m for groundwater impacts	Same as construction

18.3.10 Information on other developments was gathered from the planning documents available on the planning portals. Where information was lacking, the potential for environmental impacts arising from other developments was based on professional experience.

18.3.11 Matrix 2 (Appendix 18.2 in the ES Volume 4 Technical Appendices, DCO Document Reference 6.25) shows the results of the CEA. Each development is described and the significance of any cumulative effects, mitigation measures proposed, and residual cumulative effects are documented. The level of detail in the assessment is proportionate to the level of information and certainty that could be gained for each development, as shown by the 'Tier' classification system and additional explanation.

Stakeholder Consultation

18.3.12 A summary of consultations undertaken to date regarding the CEA is presented in Table 18.4 below. Further information on the consultation process is presented in Chapter 5 Approach to the Environmental Statement (DCO Document Reference 6.8) of the ES. Responses to consultation exercises undertaken in 2015 and 2017 are available on the MetroWest project website at the following address https://travelwest.info/metrowest while the Consultation Report is provided at DCO Document Reference 5.1.

Table 18.4: Summary of consultation responses on cumulative effects and how/where these have been addressed within the ES

Organisation	Summary of Response	Consideration within ES
Scoping Opinion Responses (August 2015)		
Planning Inspectorate	Paragraph 3.14. To consider the use of tables to identify and collate … cumulative impacts.	Tabular format has been used to present the cumulative impacts in this chapter and Appendices 18.1 and 18.2 (DCO Document Reference 6.25).
	Paragraph 3.17. The approach to the environmental assessment should be discussed and agreed with the relevant local planning authorities. The assessment should consider the relationship	The approach to the cumulative effects and the other developments to be considered in the assessment has been discussed with the relevant

Table 18.4: Summary of consultation responses on cumulative effects and how/where these have been addressed within the ES

Organisation	Summary of Response	Consideration within ES
	and timing between the other developments forming part of the MetroWest programme and ensure that the assessment is based on the worst case scenario for potential effects.	local authorities (see below in this table).
	Paragraph 3.18. Appendix 3 of this Scoping Opinion (DCO Document Reference 6.1) provides further information on the recommended approach to assessing cumulative impacts.	Appendix 3 has been considered in the cumulative impacts assessment.
	Paragraph 3.29. Sufficient evidence was not provided in the Scoping Report (DCO Document Reference 6.1) to scope out: - Air Quality: cumulative air quality effects with other development. - Geology, Hydrogeology, Ground Conditions, and Contaminated land: cumulative effects with other development. - Cumulative impacts with the construction of the Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling, and Bathampton Turnback and the operation of additional services to be provided under MetroWest Phase 1. The characteristics of these works and relationship with the DCO works have not been sufficiently explained.	Cumulative effects with other development and with the construction of other elements of MetroWest Phase 1 have been assessed in this chapter. Appendices 18.1 and 18.2 (DCO Document Reference 6.25) contain the detailed assessment, set out all developments considered and describes the characteristics of the other MetroWest Phase 1 works. The Air Quality and Greenhouse Gases and Geology, Hydrogeology, Ground Conditions and Contaminated Land chapters (7 and 10) (DCO Document References 6.10 and 6.13) summarise the CEA for those topics.
	Appendix 3 Presentation of the Environmental Statement.	Appendix 3 has been considered in the cumulative impacts assessment.

Table 18.4: Summary of consultation responses on cumulative effects and how/where these have been addressed within the ES

Organisation	Summary of Response	Consideration within ES
Historic England	The assessment needs to include cumulative impacts on historic assets.	The cumulative impacts on heritage assets is considered in Chapter 8 Cultural Heritage (DCO Document Reference 6.11) and Appendix 18.2 (DCO Document Reference 6.25).
Natural England	The assessment needs to include the cumulative effect of the scheme with other developments.	The cumulative impacts on ecology is considered in Chapter 9 Ecology and Biodiversity (DCO Document Reference 6.12), Appendix 9.12 Habitats Regulations Assessment (DCO Document Reference 5.5), and Appendix 18.2 (DCO Document Reference 6.25).
Public Health England	Impacts arising from construction and decommissioning needs to include cumulative impacts.	The cumulative impacts arising from construction are discussed in the technical topic chapters and this chapter. Decomissioning has been scoped out of the assessment as explained in Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) of the ES.
Stage 1 Formal Consultation (22 June to 3 August 2015)		
No comments on cumulative effects were received.		
Stakeholder Consultation		
North Somerset Council, meeting 22 March 2016.	Meeting to discuss the approach to the cumulative impacts assessment and discuss the other developments in NSC's jurisdiction to be considered for the assessment. A technical note and initial list of other developments was provided by CH2M on 8 March 2016 in advance of the meeting.	The projects incorporated into the assessment are presented in Appendices 18.1 and 18.2 (DCO Document Reference 6.25).

Table 18.4: Summary of consultation responses on cumulative effects and how/where these have been addressed within the ES

Organisation	Summary of Response	Consideration within ES
Bristol City Council, email response 4 April 2016 from BCC to email from CH2M on 21 March 2016.	Provision of comments on the approach and other developments to be included in the cumulative impacts assessment.	Comments considered in the development of the cumulative impacts assessment for the Preliminary Environmental Information Report and the ES.
Stage 2 Formal Consultation (23 October to 4 December 2017)		
North Somerset Council	The Council's Ecologist raised the need to consider the cumulative impact on reptiles and amphibians.	The cumulative effects of other developments on ecology is presented in Chapter 9 Ecology and Biodiversity (DCO Document Reference 6.12). Appendix 18.2 (DCO Document Reference 6.25) summarises the potential for ecological cumulative effects on other developments.
Bristol City Council	No comments were made regarding the CEA.	No action.
National Grid	Following a number of meetings with NSDC it appears likely that there will be an overlap in the construction of both projects. It will therefore be essential to work together and agree a form of liaison procedure to ensure any potential interactions / conflicts can be proactively managed and resolved.	This comment refers to National Grid's Hinkley Point C Connection DCO Scheme. Potential cumulative effects resulting from the two schemes have been assessed in Matrix 2 (Appendix 18.2 in the ES Volume 4 Technical Appendices, DCO Document Reference 6.25). NSDC is working with National Grid on an agreement of construction phasing and transport routes to minimise the interaction of the two schemes in the vicinity of Sheepway.

Table 18.4: Summary of consultation responses on cumulative effects and how/where these have been addressed within the ES

Organisation	Summary of Response	Consideration within ES
Historic England	Cumulative impacts on heritage assets should be considered.	The cumulative effect on heritage assets is considered in Chapter 8 Cultural Heritage (DCO Document Reference 6.11) of the ES, in this chapter and in Appendix 18.2 (DCO Document Reference 6.25).
Public	Cumulative assessment should consider impact on residential amenity from air quality, cultural heritage, landscape and visual impacts, noise and vibration, socioeconomics and transport and access.	The cumulative assessment presented in this chapter and Appendix 18.2 (DCO Document Reference 6.25) considers a range of different types of impacts.
Public	Member of the public does not feel that the combined effect of noise, light, privacy etc. to local residents has been cumulatively assessed.	The in-combination effects of different elements of the DCO Scheme on local residents was not presented in the Preliminary Environmental Information Report prepared for the statutory S42 consultation, but has been assessed in this chapter, Section 18.2.
Informal Consultation		
Joint meeting with NSC and BCC planners, 9 March 2018 and 13 April 2018	Meetings to discuss the potential requirements for the DCO. NSDC and BCC lead planners requested a list of other developments considered as part of the cumulative impact assessment.	The then current version of Matrix 1 with the long list of other developments was emailed to the Local Planning Authorities in March 2018.

Summary of Cumulative Effects

18.3.13 Developments with the potential to have likely significant cumulative effects with the DCO Scheme are discussed in the technical topic chapters and shown in the ES Appendix 18.2, Matrix 2 (DCO Document Reference 6.25).

18.3.14 The majority of adverse cumulative effects are anticipated to occur during the construction phase of the DCO Scheme, if and when it coincides with the construction phases of other developments. The main receptors likely to be affected are landscape character and views around the proposed Portishead Station and Ashton Junction during construction, and ecology.

18.3.15 Beneficial cumulative effects are expected to occur relating to landscape character and views around the proposed Portishead Station during operation, socio-economics and regeneration (due to the creation of jobs and increased connectivity between home and workplaces), and traffic and transport where other transport schemes will complement the DCO Scheme and improve accessibility in the wider Bristol area. In addition to Phase 1 the MetroWest Programme includes Phase 2, a range of station re-opening and new station projects, and smaller scale enhancement projects for the West of England local rail network. These form part of a strategic integrated transport network that aim to deliver economic outputs by increasing the connectivity for the skilled workforce residing in the region particularly for the TQEZ and the West of England's various Enterprise Areas.

18.3.16 A summary of the developments identified as having the potential to give rise to likely significant cumulative effects with the DCO Scheme is provided below. A likely significant cumulative effect in relation to the EIA Regulations is taken to be moderate or higher.

National Grid Hinkley Point C Connection

18.3.17 The National Grid Hinkley Point C Connection DCO Scheme has potential to result in cumulative effects with the Portishead Branch Line DCO Scheme. The alignment of the transmission lines crosses the Portishead Branch Line DCO Scheme on the eastern outskirts of Portishead near Sheepway and passes through the Portbury Wharf Nature Reserve. The programme for the construction phase for the National Grid DCO Scheme was reported to be between 2018 and 2024 in the ES. The programme has been delayed and pre-construction ecological works commenced in summer 2019. There could be significant interaction with the Portishead Branch Line DCO Scheme, particularly around the location of construction compounds, haul roads, and construction traffic routes, potentially leading to cumulative effects on farmland, the Portbury Wharf Nature Reserve and nearby residents. NSDC is working with National Grid on an agreement to optimise the phasing of construction works in the Sheepway area, in order to avoid the two schemes interacting with each other and to minimise risk of working in the same areas at the same time. The proposed construction compounds for the Portishead Branch Line have been selected to avoid the sites preferred by National Grid and the Order limits for the Portishead Branch Line include haul roads to facilitate access by National Grid. The development of off-site mitigation in the Portbury Wharf Nature Reserve will take into consideration the potential impact of the construction of the National Grid scheme. This phasing and programming of works will help minimise any adverse cumulative effects. Following mitigation, the cumulative effect of the National Grid project with the Portishead Branch Line is anticipated to be minor adverse in localised areas for landscape and views and neutral for other topics. Overall, the construction and operation of the Portishead Branch Line with the National Grid Hinkley Point C Connection is not predicted to result in likely significant effects in relation to the EIA Regulations.

Ashton Gate Stadium site

18.3.18 Plans have been announced to develop a new sports and convention centre, hotels, residential and office development and associated transport infrastructure (including a multi-storey car park) on the Ashton Gate Stadium

site, close to Ashton Gate level crossing. A formal request for a Scoping Opinion has been submitted (reference 19/01796/SCO). If this proposal went ahead, it would replace the current commercial and retail development with development which is larger in scale. This would result in a denser urban environment with more enclosure created by the proposed buildings. Both schemes will have an urbanising effect on views, and the introduction of new urbanising features in the landscape will result in a moderate adverse cumulative effect for both views and character. However, the main contribution to this effect will be the proposed Ashton Gate redevelopment, as the DCO Scheme at this location will consist of only small scale highway works and and an increase in train movements. Following mitigation, all other residual effects (including construction effects) are anticipated to be neutral. Overall, the construction and operation of the DCO Scheme with the Ashton Gate Stadium redevelopment is not predicted to result in likely significant effects in relation to the EIA Regulations.

Court House Farm

18.3.19 The Bristol Port Company's proposal for hardstanding for cargo storage and a bridge over the railway line at Court House Farm (NSDC planning reference 16/P/1987/F) was approved in 2016 and the cargo storage area is now built and in operation. The bridge has not yet been built but is expected to be in place before the construction of the DCO Scheme railway line begins at this location, to enable continued operations of the port. Construction of both developments is therefore not anticipated to coincide. Once the DCO Scheme is operational there may be a slight adverse cumulative effect on ecology due to lighting levels. Given the limited inter-visibility between the Grade II listed Court House Farm, the DCO Scheme and the additional planting proposed by the Bristol Port Company as part of this development, and the change in landscape from a rural to an industrial setting, the operation of an hourly to hourly plus service with the DCO Scheme will not materially change the setting of Court House Farm, views or the landscape character further. The cumulative effect will therefore be neutral for cultural heritage, landscape and views. Overall, the construction and operation of the Portishead Branch Line with the Court House Farm development is not predicted to result in likely significant effects in relation to the EIA Regulations.

Bristol City Council's Site Allocations and Development Management Policies - Alderman Moore's Allotments

18.3.20 A fourth major development that may interact with the DCO Scheme is a residential development consisting of 133 dwellings on a vacant site adjacent to Alderman Moores Allotments in Bristol (BCC planning reference 17/06559/FB). A variety of dwelling types will be included within the development, with associated private gardens, car parking, open space, access roads and pedestrian access to the adjacent MetroBus route. A wildlife corridor, orchard and wetland area will also be included within the development. Construction has begun. It is considered unlikely that the construction phase of this development and the DCO Scheme will overlap, but if they do, when combined with the effects of other proposed developments close to Ashton Junction, there is likely to be a moderate adverse cumulative effect on landscape character and views. However, the

main contribution to this effect will be the proposed housing development, as the only effect of the DCO Scheme during construction at this location will be small scale highways works. Following mitigation all other construction-related residual cumulative effects (noise, dust and traffic) will be neutral. During operation both developments will have an urbanising effect on views, with the introduction of passing passenger trains and the urbanising effect of the proposed housing development. Overall, the construction and operation of the DCO Scheme with the development of Alderman Moore's Allotmnets for housing is not predicted to result in likely significant effects in relation to the EIA Regulations.

West of England Development Plans

18.3.21 The four West of England Councils – NSDC, Bath and North East Somerset Council ("B&NES"), BCC and South Gloucestershire Council ("SGC") – have prepared the West of England Joint Spatial Plan ("JSP"). This emerging plan will be a statutory Development Plan Document once adopted, providing the strategic overarching development framework for the West of England to 2036. "*In tandem with the JSP, a Joint Transport Study ("JTS") was undertaken to recommend how to address both current transport challenges, including carbon reduction, and forecast growth. The JTS, developed in partnership with Highways England, identified potential future strategic transport proposals for delivery up to 2036, that address current challenges and inform future development proposals in the JSP. The JTS set out the following approach for transport: "Transport in the West of England will be transformed over the next 20 years through a programme of complementary measures designed to address underlying challenges and to enable the sustainable delivery of new housing and employment growth."* (see the draft JTLP4, page 6).

18.3.22 The West of England Local Transport Plan 3, last refreshed in 2013, will be superseded by the emerging Joint Transport Local Transport Plan 4 2019 – 2036 ("JTLP4"), which has been developed to progress the JTS. The draft JLTP4 prepared by the West of England Combined Authority and the four West of England local authorities identifies road congestion and other transport issues as key constraints on economic growth. At the same time, the policy documents explicitly emphasise the prominent role that rail investment can play in driving economic development. In accordance with national planning policy, local policy emphasises transport infrastructure investment as an enabler of economic development. The MetroWest Phases, which are identified as early investment schemes to ensure a programme of works can be delivered in the short, medium and longer term of the draft JLTP4 period, are identified as schemes significantly to improve local and suburban rail travel and services across the area.

18.3.23 The following schemes identified in the draft JLTP4 Appendix 4 Major Scheme Details potentially have a bearing on the CEA for the DCO Scheme:

- Corridor Scheme Packages
  - M5 Junctions 19 and 20. Multi-modal connections for Nailsea and Backwell to M5 Junction 19 (Portbury) and Junction 20 (Clevedon), including bus priority.

- Early Investment Schemes
  - Bristol South West Economic Link. Package 6: Rail Options: Bristol Airport Rail Link Phase One: Bristol Airport to Bristol Temple Meads
  - M5 Junction 19. Improvements to M5 Junction 19 to improve access between the M5 and the Royal Portbury Dock, Portishead, Portbury and Pill.
  - Passenger Rail Service and Capacity Improvements, Station Upgrades and New Stations Package. Package of rail improvement measures: Rail service improvements, bringing the frequency of local rail services up to a minimum of 2 trains per hour, plus hourly rail services from Weston-super-Mare to London.
  - Smart Motorways: on the M4 and M5. These will complement the recently delivered schemes.

18.3.24 These strategies include several proposals that may result in adverse cumulative effects on multiple receptors when combined with the DCO Scheme. However, as these proposals are in the early stages of development, the significance of potential effects are uncertain at this point. Once all schemes are in operation, including housing development that could increase traffic volumes in the area, there would be a **beneficial cumulative effect** on traffic and transport and socio-economics and economic regeneration due to capacity for higher traffic volumes and increased connectivity between residential and employment areas.

Permitted Development Railway Projects

18.3.25 The other works required for MetroWest Phase 1 considered in this assessment are Parson Street Junction including Liberty Lane Sidings, Parson Street Station, the Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling, and Bathampton Turnback works.

18.3.26 These works are small-scale construction projects, which will be built on Network Rail land under permitted development rights. The work required to deliver improved services on the Severn Beach / Avonmouth line have been built as part of the Filton Four Track works, although the new timetable has not been implemented.

18.3.27 No likely significant cumulative effects have been idenitified during the construction phase.

18.3.28 During operation, a **slight adverse** cumulative noise effect is predicted in the vicinity of Ashton Gate, Parson Street Junction and Parson Street Station due to the increased services, but this is not considered significant in relation to the EIA Regulations. The works will have a **moderate beneficial effect** on traffic and transport, as together with the DCO Scheme they will complement other transport schemes in the Bristol area.

18.4 Limitations Encountered in Compiling the ES

18.4.1 There is no established methodology for undertaking in-combination effects assessments. Each receptor may vary in its ability to accommodate multiple effects from any one development, and so the assessment of significance of in-combination effects is subjective. The assessment was based on professional judgement and a review of similar assessments for other NSIPs.

18.4.2 The main limitation in undertaking the CEA was the lack of available information about other developments, particularly in relation to construction programmes, proposed mitigation (to mitigate their own environmental impacts), and construction methods. Not all of the projects were supported by environmental documentation, in which case the potential for significant effects arising was based on the consultants' professional judgement.

18.5 Conclusions

18.5.1 The majority of receptors of in-combination effects are residential properties located close to construction sites, haul roads, and/or the operational railway line. These properties will experience effects associated with noise levels, air quality, views, traffic/access and loss of land. Avon Gorge Woodlands SAC, Avon Gorge SSSI, and Leigh Woods NNR may also experience in-combination effects due to dust deposition, vegetation removal and noise. Construction in-combination effects are generally anticipated to have a higher significance level than operation effects, but the significance does vary with the receptor.

18.5.2 Both adverse and beneficial cumulative effects resulting from the interaction of other developments with the DCO Scheme have been identified, relating to ecology, landscape and views, traffic and transport and socio-economics and economic regeneration. This assessment was based on the most up-to-date information available; where information was lacking, assessment of significant effects was based on the consultants' professional judgement.

18.6 References

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18.7 Abbreviations

BCC	Bristol City Council
BSWEL	Bristol South West Economic Link
CEA	Cumulative Effects Assessment
CoCP	Code of Construction Practice
DCO	Development Consent Order
ES	Environmental Statement
IEMA	Institute of Environmental Management and Assessment#
JLTP4	Joint Local Transport Plan 4
JSP	Joint Spatial Plan
JTS	Joint Transport Study
NNR	National Nature Reserve
NSDC	North Somerset District Council
NSIP	Nationally Significant Infrastructure Projects
SAC	Special Area of Conservation
SMS	Site Management Statement
SSSI	Site of Special Scientific Interest
TQEZ	Temple Quarter Enterprise Zone
VMP	Vegetation Management Plan
ZOI	Zone of Influence