

PORTISHEAD BRANCH LINE PRELIMINARY
ENVIRONMENTAL INFORMATION REPORT
VOLUME 2

CHAPTER 13

Noise and Vibration



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CHAPTER 13

Noise and Vibration

13.1 Introduction

13.1.1 The Portishead Branch Line (MetroWest Phase 1) Development Consent Order Scheme (“the DCO Scheme”) has the potential to give rise to significant effects on noise and vibration. This Chapter:

- describes the relevant legal and policy framework which will inform the undertaking of the assessment;
- describes the methodology proposed for the identification and assessment of likely significant noise and vibration effects in this Preliminary Environmental Information Report (“PEI Report”);
- describes the noise and vibration baseline having regard to the existing train movements and maintenance;
- describes the measures that have been adopted as part of the DCO Scheme;
- identifies and assesses the likely significant effects that could result from the DCO Scheme during construction, operation and decommissioning phases;
- considers mitigation of likely significant effects and assesses residual effects;
- considers the cumulative effects of other developments in combination with the DCO Scheme on noise and vibration;
- identifies the limitations encountered in compiling the PEI Report; and
- provides a summary of the residual effects for the mitigated DCO Scheme.

13.1.2 This chapter should be read in conjunction with Chapter 4 Description of the Works.

13.2 Legal and Policy Framework

EU and National Legislation

Environmental Noise Directive 2002/49/EC and The Environmental Noise (England) Regulations 2006 (as amended)

13.2.1 The Environmental Noise Regulations have been introduced into the UK to implement the Assessment and Management of Environmental Noise Directive 2002/49/EC. This Directive relates to the assessment and management of environmental noise in EU Member States. The production of strategic noise maps and action plans are legal requirements set out in the Environmental Noise (England) Regulations. From these noise maps, certain areas alongside the major roads and railways have been identified as 'Important Areas' (“IA”), where dwellings are subject to noise levels considered high enough to warrant further investigation. The investigations are the responsibility of the noise making authority who should report possible mitigation measures at each IA to Defra. The noise making authority for the railways is Network Rail.

Land Compensation Act 1973

13.2.2 Part I of the Land Compensation Act provides a means by which compensation can be paid to owners of land or property due to a loss in value of these assets caused by the public

works, such as new or improved railways and roads. Noise and vibration are two of the factors which would be considered in any claims for compensation, but the claim should consider all changes and effects, including betterment. Part II of the Act imposes a duty on authorities to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings. This is subject to meeting certain criteria given in the Noise Insulation Regulations.

The Noise Insulation Regulations 1975 (Amended 1988)

- 13.2.3 Where alterations are made to a highway, the Noise Insulation Regulations (1975) ("NIR") may apply. Specific circumstances need to be present for the Regulations to apply. Where there is an 'additional carriageway' the authority has a duty (i.e. they must) to carry out insulation work or to make grants. For an 'altered highway', the authority has a power (i.e. they can) to carry out insulation work or to make grants.

The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996

- 13.2.4 The Noise Insulation (Railway) Regulations ("NIRR") were introduced to meet a need to consider the impact of railways, tram systems and other guided transport systems upon existing residential properties along their route, and to consider the need for noise insulation measures to those properties as a result of the development of the transport system. The Regulations provide a duty to install noise insulation for eligible dwellings affected by noise from the operation of a new or additional railway line or guided transport system, and powers to carry out similar works for properties affected by altered existing rail systems. The criteria for eligibility are defined in the Regulations.
- 13.2.5 It should be noted that the NIRR only apply to noise from moving railway vehicles, so no account is taken of noise from stationary rail vehicles when considering applicability.

National Policy

Noise Policy Statement for England

- 13.2.6 The Government's noise policy is set out in the Noise Policy Statement for England ("NPSE"). It contains the high level vision of promoting good health and good quality of life (wellbeing) through the effective management of noise. It is supported by three aims and together they provide the necessary clarity and direction to enable decisions to be made in any particular situation, both nationally and locally, regarding what is an acceptable noise burden to place on society. These three aims are:
- to avoid significant adverse impacts on health and quality of life;
 - to mitigate and minimise adverse impacts on health and quality of life; and
 - where possible, contribute to the improvement of health and quality of life.
- 13.2.7 In defining these aims, the terms 'significant adverse' and 'adverse' are used for which the NPSE (para 2.20) notes that:

"There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation ("WHO"). They are:

NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.”

13.2.8 The three aims of the NPSE are reiterated in other relevant policy documents.

National Policy Statement for National Networks

13.2.9 The first of these is the National Policy Statement for National Networks (“NPSNN”), which advises on noise and vibration in the context of nationally significant infrastructure projects (“NSIP”) on the road and rail networks. It sets out the policy and reasoning by which the Secretary of State for Transport will make decisions on NSIPs. Table 13-1 sets out advice on an applicant's assessment of direct relevance to this assessment and the location where the advice is considered in this PEI Report.

Table 13-1: Summary of relevant NPSNN advice on the noise and vibration

Summary of NPSNN provision	Consideration within the PEI Report
Paragraph 5.189 states that a noise assessment should be undertaken for EIA developments likely to result in significant noise impacts. The guidance includes advice for applicants to consider best available techniques to mitigate noise.	This chapter presents the noise assessment for the DCO Scheme.
Paragraph 5.190 states that the potential noise impacts elsewhere that is directly associated with the project should be assessed.	This chapter assesses noise arising from the additional rail on the existing network. The potential modal shift from rail to car will be assessed in the environmental Statement.
Paragraph 5.191 advises on appropriate assessment methodologies.	The assessment methodology for noise and vibration is explained in Section 13.3.
Paragraph 5.192 states that the applicant should consult with Natural England regarding the noise assessment as far as it affects protected sites and wildlife.	Consultation with Natural England is presented in Chapter 9 Ecology and Biodiversity.

13.2.10 Paragraphs 5.186 to 5.188 of the NPSNN set out an introduction to noise and vibration in the context of NSIPs for National Networks. Advice on decision making in respect of noise is provided at paragraphs 5.193 to 5.196 whilst advice on mitigation is provided at 5.197 to 5.200. Of particular relevance is the advice in paragraph 5.195 of the NPSNN, which repeats the aims of the NPSE and states *“The Secretary of State should not grant development consent unless satisfied that the proposals will meet, the following aims, within the context of Government policy on sustainable development:*

- *avoid significant adverse impacts on health and quality of life from noise as a result of the new development;*
- *mitigate and minimise other adverse impacts on health and quality of life from noise from the new development; and*
- *contribute to improvements to health and quality of life through the effective management and control of noise, where possible.”*

National Planning Policy Framework

13.2.11 The second associated policy document is the National Planning Policy Framework (“NPPF”). The NPPF paragraph 109 states that the planning system should contribute to and enhance the natural and local environment by, among other things, preventing new and existing development from contributing to noise pollution. Paragraph 123 goes on to state that “*Planning policies and decisions should aim to:*

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions.”*

Planning Practice Guidance – Noise

13.2.12 Finally, the Planning Practice Guidance – Noise (Department for Communities and Local Government, 2014), provides guidance on the application of government noise policy. This document reaffirms the effect levels set out in the NPSE and also adds an additional term of Unacceptable Adverse Effect Level (“UAEL”) at which noise should be prevented from reaching at sensitive receptors. Table 13-2 is from Planning Practice Guidance – Noise (paragraph 005), and summarises the noise exposure hierarchy, based on the likely average response.

Table 13-2: Noise exposure hierarchy and effect levels

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Noise can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up the television volume; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Noise affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid

Table 13-2: Noise exposure hierarchy and effect levels

Perception	Examples of Outcomes	Increasing Effect Level	Action
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation / awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

13.2.13 None of the policy documents assign numeric values to the effect levels. This is because the effect level should reflect the nature of the noise source, the sensitivity of the receptor and also local context. The effect levels for this project are defined in Section 13.3, with the rationale behind each described in more detail in Appendix 13.1 in the PEI Report Volume 4 Appendices.

Local Policy

13.2.14 An overview of the local policy framework is provided in Chapter 6 Planning Framework. The local planning development framework for North Somerset and Bristol City Council are relevant. Table 13-3 shows how the local policies on noise are aligned with national policies.

Table 13-3: Summary of how local noise policy is aligned with national noise policy

Local policy	National policy
Policy CS3 in the North Somerset Council Core Strategy Adopted January 2017 (North Somerset Council, 2017). Specifically to noise, in paragraph 3.42 of the strategy, it is stated that <i>“In applying this policy the council will have regard to the scale, nature and type of existing land uses in the surrounding area”</i> .	The North Somerset Council Core Strategy acknowledges that the NPPF and NPSE set the planning policy context for noise sensitive / related developments.
In the Bristol City Council Core Strategy adopted in June 2011 (Bristol City Council, 2011), Policy BCS23 states that development should be sited and designed in a way as to avoid adversely impacting upon environmental amenity or biodiversity of the surrounding area by reason of fumes, dust, noise, vibration, smell, light or other forms of air, land, water pollution, or creating exposure to contaminated land.	This would align with the first aim of the government noise policy (NPSE para 1.7): <i>“avoid significant adverse impacts on health and quality of life from noise as a result of the new development.”</i>
Within the Site Allocations and Development Management Policies Local Plan (Bristol City Council, 2014) is policy DM35 – Noise Mitigation. This Policy states (para 2.35.3) that for a noise generating development, <i>“Development will not be permitted if mitigation cannot be provided to an appropriate standard with an acceptable design, particularly in proximity to sensitive existing uses or sites”</i> .	This would align with the first aim of the government noise policy (NPSE para 1.7): <i>“avoid significant adverse impacts on health and quality of life from noise as a result of the new development.”</i>

13.3 Methodology

Guidance and Best Practice

- 13.3.1 The noise and vibration assessment has been based on guidance and best practice published by government and professional bodies:
- Design Manual for Roads and Bridges ("DMRB") Volume 11, Section 3, Part 7 (HD213/11), Noise and Vibration
 - Department of Transport Calculation of Road Traffic Noise ("CRTN") 1988
 - Department of Transport Calculation of Railway Noise ("CRN") 1995
 - British Standard 5228-1:2009 +A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 (Noise).
- 13.3.2 The Noise Action Plan: Railways (Including Major Railways), Defra January 2014 (Department for Environment Food and Rural Affairs, 2014b) is also relevant in terms of mitigation options. This Action Plan is designed to address the management of noise issues and effects from existing railways and it provides a summary of the impact from railway noise as determined by the strategic noise mapping undertaken in 2012. The Action Plan also describes possible mitigation measures for railway noise.

Consultations

- 13.3.3 A summary of consultations undertaken to date is presented in Table 13-4. Further information on the consultation process is presented in Chapter 5 Approach to the Environmental Assessment, and the Consultation Report on the informal stakeholder consultations undertaken in 2015 is available on the MetroWest project website at the following address <http://travelwest.info/project/metrowest-phase-1>.

Table 13-4: Summary of consultation responses

Organisation and date	Summary of response	Consideration within PEI Report
Scoping Opinion Responses (August 2015)		
Planning Inspectorate	Paragraph 2.44 requires that the ES includes a description of the trains and emissions, including noise and vibration.	Noise and vibration emissions associated with the trains will be presented within the ES.
	Paragraph 3.29 states that insufficient data were provided to scope out cumulative effects of the Project in combination with other works required for MetroWest Phase 1 on noise and vibration.	The cumulative impact assessment is provided in Section 13.7.
	Paragraph 3.73 requires the noise assessment to cover the construction of the proposed development and any associated/ancillary and consequential development.	Construction noise is assessed in Section 13.6.
	Paragraph 3.74 includes the need to assess the potential noise from train wheels, especially if there is a risk of wheel squeak.	Train operating noise is assessed in Section 13.6.
	Paragraph 3.75 states that all potential noise sources from the development are to be described.	All potential noise sources are described in Section 13.6.
	Paragraph 3.76 states that the assessment methodology and choice of receptors should be agreed with the relevant authorities.	See section on consultation with the local planning authorities below.
	Paragraph 3.77 states that in the event of any uncertainty in train timetabling, the noise modelling should consider a range of scenarios, including the potential worse case.	The proposed modelling scenarios and any uncertainty will be explained fully in the ES.
	Paragraph 3.78 requires the noise assessment during the construction phase to take account of traffic movements along access routes and provide information to inform the ecological assessment.	Construction traffic noise is dealt with in Section 13.6 and the impact of noise on ecology is addressed in Chapter 9 Ecology and Biodiversity Section 9.6.
	Paragraph 3.79 states that the potential noise and vibration from piling operations should be addressed.	Construction noise is addressed in Section 13.6.
	Paragraph 3.80 states that noise mitigation measures, noise and vibration monitoring during construction and operation, and how the need for additional mitigation will be determined should be covered in the noise assessment.	The need for and requirements of any further noise mitigation will be described within the ES.

Table 13-4: Summary of consultation responses

Organisation and date	Summary of response	Consideration within PEI Report
Natural England	An assessment of noise is needed to assess the impacts on designated sites and wildlife.	The impact of noise on designations and wildlife is presented in Chapter 9 Ecology and Biodiversity Section 9.6.
Public Health England	The applicant should liaise with the local authorities with various matters, including noise.	The applicant has liaised with the local authorities, see entries directly below for North Somerset Council and Bristol City Council.
Stakeholder consultation		
North Somerset Council	Meeting held on the 14 th January 2016.	The outcome of the discussion has been used throughout the noise assessment. One key outcome was the suggestion of more baseline noise monitoring within Pill.
Bristol City Council	Meeting held on the 14 th January 2016.	The outcome of the discussion has been used throughout the noise assessment.

Definition of the Study Area

- 13.3.4 There is no specific guidance on defining the study area for the assessment of noise for a rail project. The NIRR have an eligibility range of 300 m, but this is a cut-off point relevant only to a statutory instrument and not one based on impact assessment.
- 13.3.5 Paragraph 5.188 of the NPSNN lists factors that will determine the likely scope of the noise impact assessment. These are wide ranging and include locations that cannot be defined by a set distance range from the project. Paragraph 5.190 states *“The potential noise impact elsewhere that is directly associated with the development, such as changes in road and rail traffic movements elsewhere on the national networks, should be considered as appropriate”*.
- 13.3.6 An examination of two recent large rail schemes, High Speed 2 (“HS2”) (Department for Transport, 2013a) and Crossrail (RPS, 2005), has found the following in relation to the study area. It should be noted that both these assessments use the term ‘Spatial scope’ as opposed to ‘Study area’.
- 13.3.7 HS2 (Department for Transport, 2013a) (para 14.3.15): *“Spatial scope for direct effects - for a mitigated Proposed Scheme and taking account of reasonably foreseeable worst case assumptions, the following screening distances will be used which are consistent with HS1 and in excess of guidance from sources such as US Federal Railroad Administration Guidance for high speed rail:*
- *Construction (from BS5228-1) – 300 m from any construction activity or the area within which sound levels from the Proposed Scheme are forecast to give rise to potential impacts, whichever is the greater; and*
 - *Operational Proposed Scheme – 500 m and 1 km from the centreline of the line of route in urban and rural areas respectively, or the area within which sound levels from the Proposed Scheme are forecast to give rise to potential impacts, whichever is the greater.”*
- 13.3.8 Crossrail (RPS, 2005) (selected extracts): (para 5.7) *“The spatial scope of the noise and vibration assessment includes the following geographic coverage:”*
- *“Areas within approximately 100 m of construction worksites for the central route section and within approximately 250 m of the outer route sections, including grout shafts, excavated material and general materials handling facilities and utilities worksites, where significant activities may affect sensitive receptors. These distances were not strictly applied but used as a guide to limit the geographic distribution of receptors. The initial modelling included all receptors likely to be subject to a significant impact but receptor distribution was extended, if modelling indicated that further receptors could be subject to significant impacts;*
 - *Rail routes which will experience direct or indirect changes in service patterns where sensitive receptors may be affected. The assessments have generally been carried out for receptors within 100 m of rail routes but this does vary slightly with ambient levels.”*
- 13.3.9 Both these approaches recognise that the study area cannot be strictly defined and allow flexibility to take account of possible impacts. In addition the need to allow for a different study area between rural and urban areas is relevant to the Portishead Branch Line (MetroWest Phase 1) DCO Scheme.
- 13.3.10 The study area has therefore been defined as follows:

- Construction - An initial area of 100 m from any construction activities was examined to determine potential impacts. Where significant impacts were identified at 100 m then the study area was extended to a distance where these are not significant.
- Operation - An initial area of 500 m from the centreline of the route was examined to determine potential impacts. Where significant impacts were identified at 500 m then the area around these impacts was extended to a distance where these are not significant.

13.3.11 In accordance with the NPSNN this approach was also applied to vibration, although the distance where impacts from vibration may be significant would be less than that for noise. Typically these would be reduced tenfold compared with those distances for noise.

Use of Significance Criteria

13.3.12 The approach to significance is described in detail in Appendix 13.1 in the PEI Report Volume 4 Appendices for noise and vibration during construction and operation. The paragraphs below provide an overview of the approach adopted for operational noise for the DCO Scheme.

Value/Sensitivity of the Resource

- 13.3.13 No formal guidance is available on the value of noise sensitive resources. The Institute of Environmental Management and Assessment (“IEMA”) Guidelines for Environmental Noise Impact Assessment (IEMA, 2014) includes as noise sensitive receptors dwellings, schools, hospitals and commercial premises. However, it should be noted that the degree of sensitivity may not be the same for all of them. For instance, since residential premises are intended to be used as permanent living and resting places, their value is considered to be ‘High’.
- 13.3.14 Non-residential premises, such as schools, hospital, offices and commercial buildings, are not places of permanent residence. Given that their degree of noise sensitivity may vary depending on the use of the receptor, this (i.e. not being a place of permanent residence) has not been considered when classifying the magnitude of the noise impact during the construction and operation phase. The classification of magnitude has been determined based on the uses of the building.
- 13.3.15 Table 13-5 provides the outline in determining the value of a receptor for noise, and is applicable to the value when assessing both construction and operation. This is followed in most cases for this assessment, but any deviations for special cases are noted in the assessment.

Table 13-5: Value of environmental receptors

Value (sensitivity)	Receptor type
Very High	International designated area, Special cases for noise sensitivity
High	Residential, Schools, Hospitals, National designated areas
Medium	Places of worship, Community facilities
Low (or lower)	Commercial buildings (e.g. offices), Sports facilities
Negligible	Farmland, Industrial premises

13.3.16 In addition to a receptor being defined for its environmental value (Table 13-5), a receptor is also defined by the baseline level for comparison with the Government policy effect

levels. These are shown Table 13-6 and an explanation of how these have been defined is provided in Appendix 13.1 in the PEI Report Volume 4 Appendices.

Table 13-6: Operation noise effect levels for residential receptors

Effect level	Period	Noise level ¹
UAEL	Day	74 dB LAeq,16h
	Night	-
SOAEL	Day	66 dB LAeq,16h
	Night	55 dB LAeq,8h
LOAEL	Day	50 dB LAeq,16h
	Night	40 dB LAeq,8h

¹ All levels are free-field. A free-field level is one that does not contain the contribution from reflections from nearby buildings.

Magnitude of Impact

13.3.17 The magnitude of impact levels used for operational noise are defined in Table 13-7. The noise bands used for the impact (i.e. change in noise) have been taken from the noise chapter of the DMRB HD213/11 Revision 1 Noise and Vibration (Highways Agency and Welsh Office, 2011). These are applicable to both increases and decreases in noise, and applicable to both the construction and operation phases. HD213/11 provides a scale for both short term and long term changes in noise and these are shown in Table 13-7.

Table 13-7: Magnitude of Impact – change in noise, dB

Magnitude of change	Short term	Long term
No change	0	0
Negligible	0.1 – 0.9	0.1 – 2.9
Minor	1.0 – 2.9	3.0 – 4.9
Moderate	3.0 – 4.9	5.0 – 9.9
Major	5.0 +	10.0 +

Significance of Effect

13.3.18 The significance of effect is determined from the combination of the value / sensitivity of the resource and the magnitude of impact as shown in Table 13-8. It should be noted that this deviates from the example provided in Table 5-3 of Chapter 5 Approach to the Environmental Statement. For a receptor of 'high' value and a 'minor' change in noise, Table 5-3 of Chapter 5 Approach to the Environmental Statement proposes an effect of Moderate is used. If this was used for the noise impact assessment then significant effects would have been identified for minor changes in noise and would have resulted in an unrealistic high level of mitigation being proposed. The approach presented in Table 13-8 is consistent with that used for the M4 Junctions 3 to 12 Smart Motorway scheme (Highways England, 2015).

Table 13-8: Significance of effect for noise and vibration

Magnitude of Impact	Value / Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
Major	Vary Large	Large	Large	Moderate	Slight
Moderate	Large	Moderate	Moderate	Slight	Neutral
Minor	Moderate	Slight	Slight	Neutral	Neutral
Negligible	Slight	Slight	Neutral	Neutral	Neutral
No Change	Neutral	Neutral	Neutral	Neutral	Neutral

13.3.19 A significant effect, under the meaning of the environmental impact assessment regulations (“EIA Regulations”), is taken to mean an adverse or beneficial effect of moderate, large, or very large significance of effect.

Approach to Mitigation

13.3.20 The approach to mitigation is determined by both policy impacts and environmental impacts.

13.3.21 A policy impact would be one that is against the aims of government policy on noise. This defines levels of effect on health and quality of life. These are:

- No observed effect;
- Adverse observed effect;
- Significant observed adverse effect; and
- Unacceptable adverse effect.

13.3.22 The thresholds that have been used to define these effects are shown in Appendix 13.1 in the PEI Report Volume 4 Appendices. These relate to an absolute level of noise and not a change in noise. An impact that is against these aims would be considered as a policy impact. However, mitigation may not always be considered for each policy impact. In determining whether mitigation is to be provided, the change in noise and number of dwellings affected has been considered.

13.3.23 An environmental impact would be one that causes ‘likely significant effects’. An impact of this type would be where the change in noise is at or above the level defined to be significant as described in Appendix 13.1 in the PEI Report Volume 4 Appendices.

13.3.24 Table 13-9 shows the effect levels and assigned noise levels, together with the approach adopted for policy and environmental impacts. This table is for operational noise only. For clarity, the absolute levels given in the table refer to that with the project.

Table 13-9: Approach to mitigation for operational noise

Government policy mitigation approach	Environmental assessment mitigation approach
Prevent	N/A – level would be prevented from occurring
Unacceptable Adverse Effect Level (UAEL). Day – 74 dB L _{Aeq,16h}	
Avoid - Reduce noise level through scheme design	Mitigate any increase in noise from project that is above 1 dB ¹
Significant Observed Adverse Effect Level (SOAEL). 66 dB L _{Aeq,16h} and 55 dB L _{Aeq,8h}	
No specific action unless environmentally significant	Mitigate where increases are environmentally significant (i.e. > 3 dB(A)) in the short term
Lower Observed Adverse Effect Level (LOAEL) 50 dB L _{Aeq,16h} and 40 dB L _{Aeq,8h}	
No specific action unless environmentally significant	Mitigate where increases are environmentally significant (i.e. > 5 dB(A)) in the long term

¹ To reflect the adverse health effects of being above the SOAEL, a smaller increase in noise is considered sufficient to determine the need for mitigation to be considered. This is reflected in PPG-Noise by “*In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur*”.

- 13.3.25 It should be noted that this approach is not fixed, as there may be special cases where mitigation is considered where not indicated in Table 13-9. An example could be where a large number of dwellings are close to experiencing a significant change in noise and also close to the SOAEL. The engineering feasibility of such measures and the views of local stakeholders are also factors that would need to be taken into consideration.
- 13.3.26 For mitigation options, the NPSNN (para 5.198) states that: “*Mitigation measures for the project should be proportionate and reasonable and may include one or more of the following:*
- *engineering: containment of noise generated;*
 - *materials: use of materials that reduce noise, (for example low noise road surfacing);*
 - *lay-out: adequate distance between source and noise-sensitive receptors; incorporating good design to minimise noise transmission through screening by natural or purpose built barriers;*
 - *administration: specifying acceptable noise limits or times of use (e.g., in the case of railway station PA [public announcement] systems).”*
- 13.3.27 If mitigation is considered necessary at any location then the principal of source-path-receiver will be used. This principle is widely used when considering mitigation and examines the option in the order stated, as these are considered to be the most effected in terms of noise reduction.
- 13.3.28 Mitigation at source considers issues such as track type and train type. These would be considered as the most effective as they would provide mitigation for the entire route. In the path, mitigation options are mainly through the use of barriers. These are less effective as they would only work at locations where barriers are installed, as the benefit from a noise barrier is also reduced over distance from the barrier. At the receiver, which

would generally be a specific receptor or a group of receptors, mitigation would involve noise insulation of the property. This is the less favoured technique of mitigation as it would only work at the receptor and would also only be effective for those inside of the receptor (i.e. it would provide no benefit for noise reduction in a garden).

- 13.3.29 In addition, when considering mitigation the NPSNN states “*Applicants should consider using best available techniques to reduce noise impacts*”.
- 13.3.30 If options for mitigation from rail are considered within the ES, reference will be made to the Rail Noise Action Plan (defra, 2014), which is aligned with Government noise policy. This Action Plan states (para B7) “*Through the operation of the land use planning system, a noise assessment would normally be carried out for any proposed residential development that may be affected by railway noise. The National Planning Policy Framework sets out the overall policy to be applied by local planning authorities in their plan making and decision taking. Those policies are consistent with the Government’s policy on noise as set out in the NPSE*”.

Key Receptors

- 13.3.31 The key receptors along the route are residential properties and also ecological areas. Specifically, these are:
- Residential properties
 - Houses that either front or back onto the proposed line in Portishead.
 - Sheepway Farm.
 - Old Station House and Elm Tree Park at Portbury.
 - Houses that either front or back onto the proposed line in Pill.
 - Houses in the area of Ashton Gate that are close to the existing line.
 - Other noise sensitive receptors
 - NHS Marina Healthcare Centre and Haven Lodge.
 - Trinity Anglican Methodist Primary school.
 - Ecological sites
 - The Avon Gorge Woodlands Special Area of Conservation (“SAC”) and Avon Gorge Site of Special Scientific Interest (“SSSI”).
 - The Portbury Wharf Nature Reserve.

Defining the Baseline

- 13.3.32 The baseline ambient noise climate has been determined through a series of noise measurements. The locations of noise measurements are shown on Figure 13.1 in the PEI Report Volume 3 Book of Figures. These locations were representative of receptors likely to be affected by noise during the construction and operational phases of the project.
- 13.3.33 The noise measurements were conducted at locations along the DCO Scheme route between April 2014 and September 2016, with the majority of surveys being undertaken in September and October 2015.
- 13.3.34 These noise surveys were a combination of short term attended and long term unattended surveys. The short term measurements were used to gain an initial appreciation of an area, especially at locations where the noise climate was not thought to vary much throughout the day. Long term (generally 48 hours) noise measurements were used at locations where an appreciation was needed of the day and night time noise levels.

- 13.3.35 The noise surveys focussed on areas where the existing noise climate could not be predicted due to a lack of dominant noise source(s), for example in rural areas where the noise climate is not dominated by highway traffic.
- 13.3.36 In addition to the surveys along the line of the route, some noise measurements were also undertaken at the areas where the General Permitted Development works are to be undertaken as part of the MetroWest Phase 1 programme. These were undertaken in order to assist with the examination of potential cumulative impacts at these locations.
- 13.3.37 A series of vibration measurements were also undertaken at selected locations in March 2016. These were used to gain an understanding of the current levels of exposure from freight traffic using the operational railway line in Pill. The locations selected were where the receptor was close to the existing line used by freight traffic.
- 13.3.38 In addition to the surveys in Pill, measurements of vibration were also undertaken at Oxford Station to monitor vibration from freight trains and also a Class 166 Diesel multiple unit ("DMU") under similar conditions. Although these cannot be used to determine the baseline for the DCO Scheme, the measurements provide data to enable a comparison to be made between the vibration generated by the two types of train that are likely to be using the DCO Scheme.

Assessment of Construction Impacts

- 13.3.39 The assessment of construction noise was undertaken following BS5228. Construction noise was estimated for the main construction activities and combined with monitored ambient noise levels taken at appropriate times of the day at nearby sensitive receptors. The combined noise levels were compared with the ambient noise levels to assess the predicted change in noise levels during construction.
- 13.3.40 At this stage of assessment, with the exact equipment and techniques still unknown, no assessment of vibration has been undertaken.

Assessment of Operational Impacts

- 13.3.41 The operational impacts from the proposed new line have been determined by comparing the existing noise level with that expected with the passenger trains. Two methods have been adapted for this comparison, and the use of either method depends upon the existing noise sources in the area of assessment.
- 13.3.42 The first method was used where there is no dominant noise source in the area and the existing (or baseline) noise level cannot be predicted due to a lack of noise source(s). Areas such as this are where the proposed line passes close to houses in Portishead, Sheepway, and some parts of Pill. In these situation noise measurements have been used to determine the existing noise climate. The survey locations have been determined to be representative of individual or groups of receptors where knowledge of the noise climate is required.
- 13.3.43 In order to predict the impact of the DCO Scheme, the noise level generated by the operation of the passenger trains is required. A computerised noise model using proprietary noise modelling software has been used to predict these expected noise levels. The input data for the noise model are based on the expected usage of the line and the other related noise sources. The Method 1 approach is summarised in Table 13-10.

Table 13-10: Method 1 approach to determining operational noise impact

	Do-Minimum (A)	Do-Something (B)	Impact¹
Approach	Measured	Measured + Predicted from Portishead Branch Line	B – A
Sources included	All existing noise sources during the measurement period.	As Do-Minimum, plus: <ul style="list-style-type: none"> • Noise from the movement of the proposed passenger services. • Noise from trains when stationary at stations. • Noise from station announcements. • Noise associated with the operation of the proposed car parks. 	

¹ Change in noise with the DCO Scheme.

13.3.44 The Method 1 approach does have to make the assumption that the measured level from 2015 / 2016 will still be a valid representation of the noise climate in 2020 when the DCO Scheme is due to open. Since the same measured level is used for determining the Do-Minimum and Do-Something scenarios this is considered to make no difference to the determination of the impact (i.e. the relative change in noise).

13.3.45 Method 2 was used where there was a sufficiently dominant noise source in the Do-Minimum scenario to enable the existing noise climate to be predicted. Examples of these situations were close to the M5 motorway and near to the A370 / A3029 junction in the Ashton Gate area. For the Do-Something scenario the noise climate without the DCO Scheme was also calculated and then added to the predicted level from the DCO Scheme. This approach is summarised in Table 13-11.

Table 13-11: Method 2 approach to determining the impact

	Do-Minimum (A)	Do-Something (B)	Impact¹
Approach	Predicted	Predicted + Predicted from Project	B – A
Sources included	Existing sources from main roads.	As Do-Minimum, plus: <ul style="list-style-type: none"> • Noise from the movement of the proposed passenger services. • Noise from trains when stationary at stations. • Noise from station announcements. • Noise associated with the operation of the proposed car parks. 	

¹ Change in noise with the DCO Scheme.

Assessment of Freight Traffic Impacts

13.3.46 The number of freight trains using the operational railway line between Portbury Dock and the southwest main line between Bristol and Taunton varies year by year and also week by week. Table 13-12 shows the number of coal movements over the last six years.

Table 13-12: Freight train movements over the past six years¹

Year	Number of movements²
2010	510
2011	712
2012	1,417
2013	1,784
2014	1,317
2015	424 ³

¹ Source: Communication with The Bristol Port Company.

² A movement is defined as a train entering the port, being loaded with coal, and departing. So one movement is two passes of a train through Pill.

³ As of 21/12/2015.

- 13.3.47 With the majority of the noise surveys being undertaken in 2015 it can be seen that these measurements were undertaken in conditions with less freight train movements than the previous five years. This would have resulted in a measured noise level that would have been lower than previous years. With this lower baseline noise level, this does mean that when using method 1 (described above) the impact from the DCO Scheme services would be worst case, since a higher baseline level would mean the passenger services would contribute less to the noise climate.
- 13.3.48 In Pill there is currently a voluntary 10 mph speed limit for freight rail traffic. With the DCO Scheme this will be removed and it is assumed that the freight trains will operate at a higher speed, and through Pill this could be up to 30 mph. Using the CRN, the predicted noise level from four freight trains (two on power, two rolling) with 28 wagons travelling at 10 mph is higher than one travelling at 30 mph. This higher noise level at a lower speed is because the power noise from a diesel locomotive reduces with speed, and at these low speeds the contribution from rolling noise, which increases with speed, is less than that from the power unit (CRN chart A1.1 and A1.2, Department of Transport, 1995). This lower noise level from freight trains in the with-Scheme scenario has not been taken into consideration, but it does mean that the assumed baseline level in the with-Scheme scenario is a worst case.
- 13.3.49 In order to focus on the impact from the DCO Scheme, no noise contribution from freight traffic has been assumed in either the Do-Minimum or Do-Something scenarios when using method 2.

Assessment Years

- 13.3.50 The assessment for noise considers the impact on opening, which is compared with a Do-Minimum scenario in that same year.
- 13.3.51 A future year scenario is also considered and for this the predicted noise level in the 15th year after opening is calculated. This is compared with the 2020 Do-Minimum condition to show the long term impact.
- 13.3.52 In relation to the operation of the DCO Scheme, the only difference between the Do-Something scenarios in the year of opening and 15 years after opening is the number of coaches of the unit. In 2020 it is assumed that the DMUs in use are 3-coach Class 166. For 2035 it is assumed that the units in use will be comprised of 5-coaches, a 3 coach Class 166 unit coupled to a 2 coach Class 165 unit.
- 13.3.53 The noise study, completed before the change in the DCO Scheme from a half hourly to an hourly scheme, is based on an opening year of 2020 and future year of 2035. A review of the difference in traffic flows and noise levels indicated that the incremental increase in noise for the later opening year to be very small. It was decided to present the assessment in this PEI Report, which represents a worse case than the updated assessment for the later opening year. The noise study will be updated for the new opening year once the final GRIP 3 design has been completed and will be presented in the ES.

Assessment of Decommissioning Impacts

- 13.3.54 No specific plans have been formulated for the decommissioning phase of the Portishead Branch Line. It is expected that the services will continue for as long as there is a business case for doing so. Closure of railways is a regulated process, overseen by the Office of Rail and Road. Disposal of railway assets is also regulated by the Office of Rail and Road under the terms of Network Rail's licence.
- 13.3.55 Railways are not designed to be decommissioned, although in accordance with paragraph 5.85 of the NPSNN, development plan policies [and Network Rail's Sustainable

Development Strategy], consideration will be given to the sustainability of materials used in construction, including their embodied carbon content, where choice is available and some information on this is provided in Chapter 12 Materials and Waste. For the NSIP, in the event that the train operating company decides to cease services on the Portishead Branch Line, it is likely that the railway assets will remain in place, as occurred after traffic ceased in the 1980s. Previous practice following railway closures suggests that the railway formation will remain available either for re-development over time or finding an alternative transport use such as a guided busway or a cycle path. Such proposals would be subject to their own assessment including consideration of environmental effects. As such proposals are not reasonably foreseeable, the likely impacts cannot be assessed.

- 13.3.56 For any abandoned part of the railway track bed, vegetation would gradually encroach upon the railway line, with herbaceous plants, shrubs and trees gradually recolonising the railway corridor. The assets comprising the trackbed would gradually fall into disrepair due to the action of erosion and corrosion from rain, plants and animals. As the railway to be authorised by the DCO is largely laid at surface level between Portishead and Pill it is not anticipated that there would be significant need for ongoing maintenance work for embankments or cuttings. Ongoing maintenance of the cuttings and embankments would still be required along the operational railway from the Port to the main line. Network Rail would probably recover (and ideally re-use) items of value such as wiring, signalling equipment and principal supply points ("PSP").
- 13.3.57 Remaining assets such as fencing would continue to be maintained. The bridges carrying highways over the DCO scheme and public rights of way would continue to be maintained to standards appropriate for the public use, as a result of the obligations of North Somerset District Council as local highway authority.
- 13.3.58 It is anticipated the line between Royal Portbury Dock and Parson Street would remain open for services to the Port. The currently operational railway would remain open for freight traffic even if passenger services ceased and any decision regarding the cessation of freight services would be one for the Freight Operating Companies and Bristol Port Company, so decommissioning the operational railway is not considered relevant or foreseeable for assessing the DCO Scheme. Were any decommissioning of all or part of the operational railway to be proposed in the future, a separate project would be developed, which would be accompanied by a specific assessment of the implications for the Avon Gorge Woodlands SAC.
- 13.3.59 It is not anticipated that the associated development comprising highway works or car parks at Portishead would be altered as a result of the cessation of rail passenger services between Portishead and Bristol. Similarly it is anticipated the car parks at Pill would remain as car parks albeit for all of the car parks development proposals might come forward over time and would be assessed for their planning impacts and any environmental effects at such time as such schemes came forward for the local planning authority to consider. Changes to the UK's use of fuel for transport mean that the nature of emissions from vehicles undertaking any removal of items could only be a matter of speculation.

Assessment of Cumulative Effects

- 13.3.60 The assessment of cumulative effects has included committed developments identified along the Portishead Branch Line from searches of the planning portals for Planning Inspectorate and the relevant local authorities, North Somerset District Council ("NSDC") and Bristol City Council ("BCC").
- 13.3.61 The cumulative operational effects from the use of the Bedminster Down Relief Line and the additional services on the Severn Beach / Avonmouth line and Bristol to Bath line have

been considered alongside the existing services to determine if the increase will cause a significant change in the noise level. These assessments have been undertaken by examining the noise levels before and after the works. As with the assessment of operation impacts from the Portishead Branch Line, these impacts have been determined by either applying method 1 or 2 described earlier.

- 13.3.62 The cumulative effects associated with the construction of the Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling, and Bathampton Turnback have been scoped out of this assessment. This is because the works at these locations are minor and would take place at distances that are beyond that where noise from construction works may contribute to one another.

13.4 Baseline, Future Conditions and Value of Resource

Regional Overview

- 13.4.1 The wider Bristol area is served by the north-south main line railway between Birmingham and the south west of England, and the east-west line between London and Wales. These lines carry intercity trains, local services, and freight trains with some operating at night. Without any other dominant noise source in the area, the noise climate close to these routes is likely to be dominated by the trains.
- 13.4.2 Other less used lines, such as that from Bristol Temple Meads to Severn Beach, also serve the Bristol area.
- 13.4.3 The additional services provided by MetroWest Phase 1 will vary from introducing trains to a location where there are currently none, to a few additional trains on an existing route. The subsequent operational impacts will therefore vary along the route.

Portishead - Noise

- 13.4.4 The noise survey results for the Portishead area are summarised in Table 13-13. The noise survey locations are shown in Figure 13.1 in the PEI Report Volume 3 Book of Figures. However, it should be noted that not all noise survey locations are shown on this figure due to some being outside of the figure scale.

Table 13-13: Noise survey locations¹ around Portishead

Sample Number - Location	L _{Aeq} dB	
	Day (07:00 – 23:00)	Night (23:00 – 07:00)
LT6 - 28 Conference Avenue	46.0	41.2
LT7 - 15 Peartree Field	54.2	48.2
LT8 - 10 Tydeman Road	44.8	38.2
LT12 - 14 Peartree Field	48.9	43.7
LT15 - 16 Tydeman Road	49.1	43.3
ST1 - Tansy Lane	52.5	42.5
ST2 - Tydeman Road	51.0	46.1

¹ Locations that begin with 'LT' are where unattended measurements were undertaken over a period of at least 24-hours. Those that begin with 'ST' are short term attended measurements and the noise level presented is the average of the samples taken in the respective time period.

- 13.4.5 The measured daytime noise levels within Portishead range generally between 45 and 55 dB(A). In terms of effect levels this would place them either just above or just below the LOAEL (see Table 13-9). At all locations the noise climate was not comprised of a single source, and was made up of various noise sources such as the distant M5 motorway, local

traffic, bird song, high aircraft, and, at certain times of the day, noise from activities at the Trinity Anglican Methodist Primary School.

- 13.4.6 Given its location close to Quays Avenue, it is unsurprising that LT7 has the highest overall daytime noise level due to the contribution of noise from local traffic. At the location with the lowest overall daytime level (LT8) the orientation of the surrounding houses meant that the noise logger was screened from the M5 motorway.
- 13.4.7 During the night the levels are typically 5 dB less than the day. With the exception of LT8, all locations were between the LOAEL and the SOAEL for night time noise. At LT8 the night time noise level was below the LOAEL.

Sheepway - Noise

- 13.4.8 The noise survey results for the Sheepway area are summarised in Table 13-14.

Table 13-14: Noise survey locations¹ around Sheepway

Sample Number - Location	L _{Aeq} dB	
	Day (07:00 – 23:00)	Night (23:00 – 07:00)
LT2 - Sheepway Meats	52.8	48.1
LT3 - New House	53.0	49.6
LT4 - Springfield Cottage	49.0	45.4
LT5 - The Bungalow	53.0	49.4
LT13 - Old Portbury Station House	55.2	51.8
ST3 – South west corner of Portbury Wharf Nature Reserve	50.6	45.3
ST11 - Bunting Lane	46.4	-
ST12 - Wharf Lane	50.4	-
ST13 – Northern end of Portbury Wharf Nature Reserve	46.8	-

¹ Locations that begin with 'LT' are where unattended measurements were undertaken over a period of at least 24-hours. Those that begin with 'ST' are short term attended measurements and the noise level presented is the average of the samples taken in the respective time period.

- 13.4.9 With the exception of LT4 the daytime levels at the long term monitoring location sites are just above the LOAEL of 50 dB. At LT4 the day time level is just below the LOAEL. The dominant noise source at these locations is the distant M5 motorway, traffic on the local roads, bird song, and occasional aircraft. The highest measured daytime level was at the Old Station House, where the noise climate has a high contribution of noise from the M5 motorway.
- 13.4.10 At the locations within the Portbury Wharf Nature Reserve where sample measurements were undertaken, the level varies between 46 and 50 dB. The locations with the lower levels are those more remote from noise sources such as local traffic.
- 13.4.11 During the night the levels are generally between 4 and 5 dB lower than day time levels and are all between the LOAEL and SOAEL.

Pill - Noise

13.4.12 The noise survey results for the Pill area are summarised in Table 13-15.

Table 13-15: Noise survey locations¹ around Pill

Sample Number - Location	L _{Aeq} dB	
	Day (07:00 – 23:00)	Night (23:00 – 07:00)
LT1 - 38 Hardwick Road	51.0	48.3
LT17 - 1 Sunnyside	50.4	43.2
LT18 - 25 Avon Road	50.8	48.1
LT19 - 23 Avon Road	53.7	48.0
LT20 - 3 Star Lane	53.9	47.4
LT21 - 16 New Road	51.1	48.8
LT22 - 11 Mount Pleasant	47.0	44.6
ST4 - Monmouth Road	52.7	40.9
ST5 - Ham Green Park	52.7	41.7
ST17 - Chapel Pill Lane 1	39.5	-
ST18 - Chapel Pill Lane 2	46.5	-
ST19 - Chapel Pill Lane 3	48.4	-
ST20 - 5 Monmouth Road	57.0	-

¹ Locations that begin with 'LT' are where unattended measurements were undertaken over a period of at least 24-hours. Those that begin with 'ST' are short term attended measurements and the noise level presented is the average of the samples taken in the respective time period.

- 13.4.13 The long term measured levels within Pill are generally around the LOAEL of 50 dB, with the noise climate comprised of distant motorway noise, local traffic, and bird song. In addition, LT20 was influenced by a dog barking and the surveys along Avon Road were influenced by some vegetation clearance on the operating freight line. Any passing freight trains were audible at all locations.
- 13.4.14 At the short term measurement positions ST4 and ST5, the noise level was just above the LOAEL. At ST17, which was remote from many localised noise sources, the measured level was 39.5 dB.
- 13.4.15 The long term and short term levels measured at night within Pill were between the LOAEL and SOAEL. For the long term measurements the difference between the day and night levels generally ranged between 3 and 7 dB(A).
- 13.4.16 From discussions with the Environmental Health Officer at North Somerset Council it was stated that there is a history of complaints from residents concerning noise from freight trains. The nature of these complaints is understood to be related to freight trains that stop on the line while awaiting clearance to proceed into Portbury Dock. The DCO Scheme will not change the need for trains to stop on the line at this location.
- 13.4.17 In addition to the ambient noise that was measured during the surveys, there is also occasional noise from activities associated with the maintenance of the existing track. The activity likely to generate the highest noise level would be from maintenance tamping of the line to retain line the appropriate alignment for the line speed.

Avon Gorge to Bristol - Noise

13.4.18 The noise survey results for the area through Avon Gorge to Ashton Gate are summarised in Table 13-16.

Table 13-16: Noise survey locations¹ in the Avon Gorge and Ashton Gate

Sample Number - Location	L _{Aeq} dB	
	Day (07:00 – 23:00)	Night (23:00 – 07:00)
Avon Gorge		
ST14 - Avon Gorge SAC	58.7	-
Ashton Gate		
LT9 - 61 Swiss Drive	50.7	44.6
LT10 - 56 Ashton Drive	49.8	44.5
LT11 - 55 Ashton Drive	48.9	46.4
Paxton Drive		
ST6 - Paxton Drive	54.0	62.6 ²

¹ Locations that begin with 'LT' are where unattended measurements were undertaken over a period of at least 24-hours. Those that begin with 'ST' are short term attended measurements and the noise level presented is the average of the samples taken in the respective time period.

² This survey was undertaken between 06:00 and 07:00. Although this is within the night period of between 23:00 and 07:00, it is not considered as representative of the noise climate over an 8-hour period. However, it is reported here for completeness.

- 13.4.19 In the Avon Gorge the noise climate was dominated by traffic noise from the A4 on the eastern shore of the river.
- 13.4.20 In the Ashton Gate area the measured day time levels are very consistent and around the level of the LOAEL at 50 dB. At these locations the noise climate was comprised mainly of local traffic. Any passing freight trains were also clearly audible at the survey locations. At night the noise levels were also very consistent at around 45 dB, which is between the LOAEL and SOAEL.
- 13.4.21 At Paxton Drive the noise climate was also mainly from traffic noise on nearby main roads.

General Permitted Development Works - Noise

- 13.4.22 The noise survey results for the areas where the General Permitted Development Works are being undertaken for MetroWest Phase 1 Project are summarised in Table 13-17. These are areas around Parson Street, Bedminster, Avonmouth to Severn Beach and Bathampton.
- 13.4.23 At Parson Street the day and night time measured noise levels are both between the respective between the LOAEL and SOAEL. However, the survey at LT16 was undertaken in weather conditions that were outside of the range where reliable and repeatable measurements should be undertaken due to the windy conditions. This has resulted in levels being measured that are higher than what would be expected under suitable conditions. The noise climate at both these locations consisted mainly of local road traffic and trains using the Great Western Main Line.

- 13.4.24 The area around Parson Street Station has been defined as an Important Area under the Environmental Noise Regulations (see Section 13.2). Action to investigate this is the responsibility of Network Rail as the noise making authority.
- 13.4.25 At Bedminster the noise climate comprised of similar noise sources to the Parson Street measurements.
- 13.4.26 At Avonmouth there was a high contribution of noise from traffic using the Portview Road and also trains using the Severn Beach spur line. The surveys at Severn Beach contained mainly local and distant traffic noise sources.

Table 13-17: Noise survey locations¹ in the areas of the General Permitted Development Works for MetroWest Phase 1 Project

Sample Number - Location	L _{Aeq} dB	
	Day (07:00 – 23:00)	Night (23:00 – 07:00)
Parson Street		
LT14 - 29 Nelson Street	50.5	45.1
LT16 – 6 Willada Close	56.6	53.8
Bedminster		
ST9 - Cotswold Road North	52.5	-
Severn Beach		
ST15 - Albert Road	48.9	-
ST16 - Riverside Park	53.0	-
Avonmouth		
ST10 - Napier Road	56.3	-
Bathampton Turnback		
ST7 - Meadow Lane	54.0	-
ST8 - Grosvenor Bridge	50.8	-

¹ Locations that begin with 'LT' are where unattended measurements were undertaken over a period of at least 24-hours. Those that begin with 'ST' are short term attended measurements and the noise level presented is the average of the samples taken in the respective time period.

- 13.4.27 The noise climate at the survey locations near to the Bathampton Turnback was comprised mainly of distant road traffic noise, bird song, and also trains using the Great Western Main Line.

Vibration Measurements

- 13.4.28 The existing level of vibration has been measured at three locations within Pill. From records of freight trains using the line an attempt has been made to align the passage of a freight train with the measured level of vibration. Table 13-18 below shows the maximum measured level from the passage of a freight train at each location.

Table 13-18: Maximum vibration levels associated with the passage of a freight train

Location	Maximum level, peak particle velocity (PPV ¹)	Distance to closest rail head
LT17	0.32	13 m
LT20	0.32	18 m
LT21	0.34	15 m

¹ PPV is defined as the maximum instantaneous positive or negative peak of the vibration signal. It is specified in millimetres per second (mm/sec). It is important to note that the PPV refers to the movement within the ground of molecular particles and not surface movement.

- 13.4.29 These measured levels are all just above the level that may be considered as ‘just perceptible in residential environments’ in accordance with the scale of magnitude presented in Table 13-1-7 of Appendix 13.1 in the PEI Report Volume 4 Appendices. These would be considered as being just above the LOAEL. In relation to potential for building damage the levels are below the level of negligible risk of building damage (Table 13-1-6 in Appendix 13.1 in the PEI Report Volume 4 Appendices).
- 13.4.30 Vibration measurements were also made at Oxford station from passenger and freight trains, to be used in the assessment of vibration for the DCO Scheme at locations along the disused section of the scheme where there is no existing baseline and to support the assessment of vibration from the DCO Scheme along the operating freight line.

Future Conditions

- 13.4.31 Given the higher specification and line speed of the DCO Scheme, the maintenance regime would be to a higher standard than at present. As with the existing situation, the highest noise level from routine maintenance activities is likely to be from maintenance tamping of the line to retain line the appropriate alignment for the line speed. Other routine maintenance activities would be low noise activities, apart from where drain clearing is required. The regular track inspections are likely to be undertaken by line walking or on a road rail buggy. Where major maintenance is required this would involve more equipment and would require possessions. This maintenance would mainly involve ballast cleaning, tamping and lining, which have the potential to generate high levels of noise due to the equipment used as all have the potential to generate high noise levels.

13.5 Measures Adopted as Part of the Project

- 13.5.1 A number of measures have been included as part of the project design in order to minimise certain environmental effects. This includes:
- careful designing of the project to ensure key receptors are avoided where possible;
 - construction adopting best practices techniques, which will be set out in Code of Construction Practice ("CoCP") - this document will be submitted with the DCO application;
 - compliance with regulatory and legislative regimes as required by law.
- 13.5.2 The ES will fully set out and detail any further mitigation measures which have been adopted for noise and vibration.
- 13.5.3 Due to the early stage of the construction strategy for the DCO Scheme, only a high level indicative assessment of impacts can be undertaken. Given this the adoption of any specific measures to mitigate the noise or vibration from construction activities would be

premature and potentially misleading, and therefore none has been considered during the assessment.

13.6 Assessment of Effects

Construction Phase

- 13.6.1 The potential impact from construction activities on ambient noise levels are summarised in Table 13-19. This considers impacts from both construction activities of the stations and the works along the disused railway and the operating freight line.
- 13.6.2 The expected works along the route have been first broken down into locations, and then into specific work areas. Each specific work area is comprised of a number of activities.
- 13.6.3 Table 13-19 shows the range of noise levels predicted from these activities, and lists the activity that is expected to generate the highest level of noise for each work area. The final column in the table states the distance of the closest sensitive receptor.

Table 13-19: Predicted levels from construction noise

Location of works / work areas	Range of noise levels from activities at the closest receptor ¹	Activity associated with highest noise level	Distance to closest receptor, m	
Portishead	Station works	59-72	Station foundations	25
	Compound	63-65	Import of plant & equipment to compound	40
	Rail works	69-78	Trackbed preparation	15
	Footbridge	70-75	Piling	25
	Line of route works	72-84	Vegetation removal	15
	Realigned road	77-83	Earthworks	10
Sheepway and Portbury	Compound	65-67	Import of plant & equipment to compound	30
	Rail works	69-82	Old track removal	5
	Line works	72-84	Vegetation removal	15
Pill	Station works	65-80	Soil nailing and cuttings works	10
	Compound	75-77	Import of plant & equipment to compound	10
	Rail works	66-75	Trackbed preparation and ballasting	20
	Line works	76-84	Vegetation removal	15
	Road bridge	65-74	Excavation	25
	Track renewal	50-80	Tamping	15

Table 13-19: Predicted levels from construction noise

Location of works / work areas		Range of noise levels from activities at the closest receptor ¹	Activity associated with highest noise level	Distance to closest receptor, m
Rest of line	Compound	52-54	Import of plant & equipment to compound	140
	Rail works	79-83	Track upgrading	10
	Junction works at Parson Street	81-83	Track reinstatement	10
	Track renewal	60-69	Tamping	25
Whole route	Line works	72-82	Culverting	10

¹ These are in terms of daytime level. It is likely that some activities will need to be undertaken during the night. However, the extent of these is currently unknown.

- 13.6.4 Table 13-19 shows some activities would produce noise levels above the daytime SOAEL (75 dB(A) from Table 13-1-4 in Appendix 13.1 in the PEI Report Volume 4 Appendices), with some being close to the UAEL of 85 dB(A). Given the baseline day time noise level at most locations is around 50 dB(A), the increase in noise at the closest receptors to the works for most activities would be between 15 and 20 dB(A). This would be a **temporary significant effect**.

Operation Phase - Noise

- 13.6.5 The impact of the Portishead Branch Line is presented below. For each area identified below, the expected change in the noise climate is described for the short term (i.e. on opening) and the long term (i.e. 15 years after opening). Unless an area is represented only by an individual receptor, the assessment discusses the expected change in an area and not a specific location.
- 13.6.6 The measurement locations are shown in Figure 13.1 in the PEI Report Volume 3 Book of Figures, with the assessment locations shown in Figure 13.2 in the PEI Report Volume 3 Book of Figures. Each assessment location is intended to be represent either a number of properties or an individual property.

Portishead - Residential

- 13.6.7 Method 1 (see Table 13-10) was used to determine the impacts where there is currently no dominant noise source in the area that could be modelled for the baseline.
- 13.6.8 Before mitigation, the area to the south of the proposed station in Pear Tree Field was forecast to experience an increase in ambient noise levels of more than 5 dB(A), with the absolute level between the LOAEL and SOAEL. This is a significant major adverse magnitude of impact, mainly caused by the noise from the trains when idle at Portishead Station. At this location, a 2 m high noise barrier has been included within the embedded design. With this barrier, from the end of the station to the start of The Vale Park, this impact would be reduced to just under 1 dB(A). With the overall level below the SOAEL this would result in a **slight adverse** significance of effect. In the future assessment year the increase in noise is predicted to be at worst 1.3 dB(A), which using the long term impact scale would also be a **slight adverse** significance of effect.

- 13.6.9 Further back from Portishead Station and railway line, due to distance and the screening provided by other houses, the magnitude of impacts would be below 1 dB(A), which is a negligible magnitude of impact resulting in a **slight adverse** significance of effect.
- 13.6.10 To the immediate north of the proposed station, along Tansy Lane, the increase in noise is predicted to be around 1 dB(A) in the short term which is a minor magnitude of impact. This is less than the predicted on the south side of the rail line due to the screening provided by the platform and station buildings. This increase in noise would be a **slight adverse** significance of effect. Further back from the front line of houses, due to distance and the screening provided by other houses, the impacts would be below 1 dB(A), which is a negligible magnitude of impact, resulting in a **slight adverse** significance of effect. In the long term the increase in noise would at worst be around 3 dB(A) which would be a minor magnitude of impact resulting in a **slight adverse** significance of effect.
- 13.6.11 Further to the east and to the south of the rail line, around Holmlea and the western end of Tydeman Road, the maximum increase in noise is predicted to be 1 dB(A) which would be a minor magnitude of impact and a **slight adverse** significance of effect. This increase is not considered sufficient to require mitigation since the overall levels are just above or just below to LOAEL. In the long term the maximum increase in noise would around 1.5 dB(A) which would be a negligible magnitude of impact and a **slight adverse** significance of effect.
- 13.6.12 For the properties to the far east of Tydeman Road that are built parallel to the rail line, the background noise level at the rear of the properties is low due to screening from the M5 motorway. At the most exposed of these the increase in noise is predicted to be 2.3 dB(A), which is a minor magnitude of impact. The impact here is considered to be a **slight adverse** significance of effect. In the long term the increase in noise at these locations is predicted to be at highest 3.3 dB(A) which would be a minor magnitude of change and a **slight adverse** significance of effect.
- 13.6.13 To the north of the rail line in the area of Fennel Road and Tarragon Place the highest increase in noise is predicted to be just under 2 dB(A), which would be a minor magnitude of impact and a **slight adverse** significance of effect. This increase is higher than that predicted in the area of Holmlea and the western end of Tydeman Road because of the higher speed of the trains they move further from the station. In the long term the highest increase in noise is predicted to be just under 3 dB(A) which would be a minor magnitude of change and a **slight adverse** significance of effect.

Portishead - School

- 13.6.14 At the Trinity Anglican Methodist Primary School, the increase in noise at the closest point of the building is predicted to be just under 1 dB(A), a negligible magnitude of impact, which would increase the ambient noise level to just under 50 dB $L_{Aeq,16h}$. In the long term the increase in noise is predicted to be around 1.5 dB(A), a negligible magnitude of impact and a **slight adverse** significance of effect.
- 13.6.15 For outdoor play areas, it is recommended (Institute of Acoustics and the Association of Noise Consultants, 2015) that the noise levels in unoccupied playgrounds, playing fields and other outdoor areas should not exceed 55 dB $L_{Aeq,30min}$ and there should be at least one area suitable for outdoor teaching activities where noise levels are below 50 dB $L_{Aeq,30min}$. At the closest point of the railway line to the school playing field, approximately 15m, the overall ambient noise level is predicted to be around 52 dB $L_{Aeq,16h}$ dB in the short term and 53 dB $L_{Aeq,16h}$ dB in the long term. This will be an increase just under 3 dB(A) in the short term and 4 dB(A) in the long term. These increases are at a level that would be considered as a significant environmental effect if the school buildings were at this close distance to the railway line. However, since this is an open space and not buildings, a

comparison is only made with the absolute level against the guideline level. Towards the middle of the playing field at 45m from the railway line and closer to the school, the absolute level is predicted to be about 3 dB(A) lower, with the increase less than 2 dB(A) in both the short and long term. Around the perimeter of the school building there are areas where the overall level would remain below 50 dB $L_{Aeq,30min}$. The overall noise level is therefore predicted to remain within the guideline levels.

Portishead – NHS Marina Healthcare Centre and Haven Lodge

- 13.6.16 At the Marina Healthcare Centre and Haven Lodge in Portishead the noise level is expected to increase by less than 1 dB(A) in the short term. Being newly constructed buildings it is assumed they will have been constructed in a way to mitigate the noise levels from the existing situation. The predicted noise from the operation of the Portishead Station should not alter this existing noise climate.

Portishead – Harbour Crescent

- 13.6.17 A noise assessment was undertaken for the planned development at Harbour Crescent (Kimber Acoustics Ltd, 2015) that considered the suitability of the area for residential development. In considering the expected noise climate at the development location, the assessment took into consideration the expected noise from the MetroWest Phase 1 Project. Therefore, since the assessment for the expected development at Harbour Crescent has taken into consideration the potential noise from the MetroWest Phase 1 Project and has designed mitigation accordingly, it is not included as a sensitive receptor for this assessment.

Sheepway - Residential

- 13.6.18 At the locations on the western side of Sheepway, the increase in noise is predicted at worst to be 0.5 dB(A), which is a negligible magnitude of impact. With an overall noise level below the SOAEL this would be a **slight adverse** effect. In the long term the increase is predicted to be less than 1 dB(A) which would also be a **slight adverse** effect.
- 13.6.19 Further away from the rail line in Sheepway, including properties on Wharf Lane, the increase in noise is predicted to be below 1 dB(A) in both the short and long term. This would be a **slight adverse** significance of effect.
- 13.6.20 At the location closest to the rail line on the eastern side of Sheepway, a **moderate adverse** significance of effect is predicted at the Old Station House. This is due to an increase of just over 3 dB(A) in the short term. A 2 m high noise barrier is included within the embedded design at this location and this will reduce the increase in noise in the short and long term to below 1 dB(A) which would be a **slight adverse** effect.
- 13.6.21 For the buildings on the southern edge of Elm Tree Park the increase in noise is predicted to be around 1.5 dB(A) in the short term. The absolute level of 56.7 dB $L_{Aeq,16h}$ is below the SOAEL and therefore this increase would be a **slight adverse** effect and mitigation would not be considered. In the long term the highest increase is predicted to be below 3 dB(A) which would be a **slight adverse** effect.

Portbury and the Western Edge of Pill

- 13.6.22 For the dwellings within Portbury and on the western edge of Pill (e.g. Church Road and The Breeches) there is predicted to be no change in noise with the DCO Scheme, thus the impact would be a **neutral** effect. This is because the noise climate at these locations is dominated by noise from the M5 motorway, which lies between the DCO Scheme and these properties, and the DCO Scheme will not increase the ambient noise level at these

properties. For Marsh Farm there is also predicted to be no change in the short term which is a **neutral** effect.

- 13.6.23 In the long term at all the locations considered there is predicted to be an increase of up to 0.5 dB(A). However, this change is due to the forecast increase in traffic on the M5 motorway and not due to the DCO Scheme.

Pill

- 13.6.24 In the area to the north of the railway line in Pill (Avon Road and Severn Road) there is predicted to be at worst an increase in noise of just under 2 dB(A) in the short term, which is a minor adverse magnitude of impact. The absolute level is around 52.5 dB $L_{Aeq,16h}$ which is between the LOAEL and SOAEL and which would be considered as a **slight adverse** significance of effect. In the long term this increase would be below 3 dB(A) which would also be a **slight adverse** effect. Further from the railway line the increase in noise is below 1 dB(A) due to the distance from the line and screening provided by other houses.
- 13.6.25 To the south of the rail line on the western side of Pill, in the area around Lodway Close and the western end of Hardwick Road, there are predicted to be increases just below 2 dB(A) in the short term and around 2.5 dB(A) in the long term, which are both considered to represent a minor adverse magnitude of impact. This increase in noise is due to operation of the DCO Scheme services. The absolute level is around 53 dB $L_{Aeq,16h}$ which is between the LOAEL and SOAEL and therefore the impact would be considered as a **slight adverse** significance of effect.
- 13.6.26 Towards the area of Pill where the station is proposed to be, on the southern side in the area of Sambourne Lane, the increase in noise is predicted to be at worst 1.5 dB(A) in the short term (minor adverse magnitude) and just below 2 dB(A) in the long term (negligible adverse magnitude). The potential impacts here are reduced by the natural topography of the area and also the platform providing screening from the noise from a stationary train. These impacts would be a **slight adverse** significance of effect. Further back from the front line of properties, the short term increase is predicted to be less than 1 dB(A), which represents a negligible adverse magnitude of impact and a **slight adverse** significance of effect.
- 13.6.27 To the north of the proposed station, in Monmouth Road, the day time increase is predicted to be just above 1 dB(A) in the short term and 1.5 dB(A) in the long term, which both represent a minor adverse magnitude of impact. This increase is mostly from the noise of the trains when stationary at the station. With the absolute noise level around 58 dB(A), this location is between the LOAEL and the SOAEL.
- 13.6.28 Further back from the front line of properties in Monmouth Road to the north, the short term increase is predicted to be less than 1 dB(A), which is a negligible magnitude of impact and a **slight adverse** significance of effect.
- 13.6.29 To the immediate south east of the proposed station, between Station Road and the viaduct (i.e. properties in the area of Chapel Row, New Road and Star Lane), the day time short term increase in noise is predicted to be less than 1 dB(A). This increase is not higher due to the natural topography of the area and also the existing walls alongside the railway line providing screening. In the long term the increase is predicted to be just above 1 dB(A). Both these would be a **slight adverse** significance of effect.
- 13.6.30 On the eastern side of Pill, for the properties from Pill viaduct to the western portal of the Pill Tunnel, there are predicted to be increases in noise of around 2.5 dB(A) in the short term and just under 3 dB(A) in the long term. These increases are due to the noise from the operation of the trains along the elevated railway line. A background noise level below

the LOAEL at some locations is also a contributing factor to the relatively high increase in noise. This increase would be a **slight adverse** significance of effect.

- 13.6.31 To the eastern side of the Pill Tunnel, an increase of less than 1 dB(A) is predicted for the short and long term (minor adverse magnitude of impact) at properties along Chapel Pill Lane. The measured baseline level is below the daytime LOAEL and the impact is a **slight adverse** significance of effect.

Eastern side of the River Avon

- 13.6.32 Noise predictions have been undertaken at some locations on the eastern side of the River Avon to determine any possible impact from the DCO Scheme. The receptors considered are those closest to the River Avon in Shirehampton, Stoke Bishop, and Clifton. In addition a small number of predictions have also been undertaken on the western edge of Leigh Wood, to the west of the River Avon. Impacts at these locations are expected to be low due to the distance from the railway line and the level of background noise due to roads, such as the A4 Portway.
- 13.6.33 The highest increase predicted in the short term is 0.5 dB(A) at the dwellings closest to the River Avon in Shirehampton. This increase is 1 dB(A) in the long term, and for both short and long term would be a negligible magnitude and a **slight adverse** significance of effect.

Ashton Gate – Brunel Way area

- 13.6.34 At the closest sensitive receptors to the railway line in the area around the Brunel Way, the highest day time increase in noise is predicted to be 0.5 dB(A) in the short term and just under 1 dB(A) in the long term. This is on the western side of the housing complex on Paxton Way.

Operational Phase - Vibration

- 13.6.35 The assessment of possible operation impacts from vibration in Pill has been undertaken by showing that the proposed passenger trains will not result in any more vibration than a freight train. Measurements of vibration were undertaken on the approach to Oxford station where there were passing freight trains and also passenger trains similar to those proposed for the DCO Scheme, that is the Class 166. At Oxford there were freight train passing through the station at a slow speed (assumed to be around 10 mph) and also Class 165/166 DMUs slowing to stop at the station. These slowing DMUs were assumed to be at the approximate same speed as the freight trains.
- 13.6.36 A summary of the measured levels of vibration is provided in Table 13-20.

Table 13-20: Maximum vibration levels from slow moving trains at Oxford station

Source	Maximum vibration level, PPV ¹	Distance ²	Number of observations
Freight	0.52	6.5 m	3
Class 165 / 166	0.44	4 m	10

¹ This was the maximum level measured from the observations of each train type.

² The distance from the vibration monitor to the closest rail.

- 13.6.37 At this location the freight traffic was using a different line to the passenger trains and so measurements were not possible of the different trains on the same track. However, from the levels presented in Table 13-20 it can be seen that the freight traffic produced a higher level of vibration despite being further from the vibration monitor. This would indicate

that a freight train generates a higher level of vibration than a passenger train, which is unsurprising given the weight difference between the two train types.

- 13.6.38 As has been discussed in the baseline section of this assessment when examining the actual measured levels of vibration from freight trains measured in Pill (see Table 13-18), the absolute level is of 0.34 mm/s of a freight train pass-by is below the 5 mm/s where the risk of building damage is considered to be negligible (see Table 13-1-6 of Appendix 13.1 in the PEI Report Volume 4 Appendices). Compared against the level for an indication of human annoyance, the measured levels from Table 13-18 are just above being 'just perceptible in residential environments' in accordance with the scale of magnitude presented in Table 13-1-7 of Appendix 13.1 in the PEI Report Volume 4 Appendices. Given that these levels are such that they would not be considered as significant, the impact from passenger trains in Pill is also considered to be not significant.
- 13.6.39 In Portishead, where the receptors are not currently exposed to vibration from any rail traffic, the overall level is considered. Along the route through Portishead the closest receptors to the line are approximately 18 m. From the measurements undertaken at Oxford, the level of vibration from a Class 166 is 0.24 mm/s at 13.5 m. Compared against the level for an indication of human annoyance, this level is just above being 'just perceptible in residential environments' in accordance with the scale of magnitude presented in Table 13-1-7 of Appendix 13.1 in the PEI Report Volume 4 Appendices. Given that these levels are such that they would not be considered as significant, the impact from passenger trains in Pill is also considered to be not significant.

Noise Insulation (Railway) Regulations

- 13.6.40 The predicted overall noise levels at locations where the noise level change is predicted to change by more than 1 dB(A) are not above the trigger level of 68 dB $L_{Aeq,18h}$. Therefore, Part 2 of the Noise Insulation (Railway) Regulations would not be triggered.

Decommissioning Phase

- 13.6.41 For the reasons set out at 13.3.53 – 13.3.58 it is not possible to identify realistic options for decommissioning for assessment and no basis on which to consider that there would be reasonably foreseeable significant environmental impacts on noise and vibration resulting from decommissioning.

13.7 Mitigation and Residual Effects

- 13.7.1 Potential significant temporary effects have been identified during construction. Possible measures for mitigation will be considered and reported on, as appropriate, in the ES.
- 13.7.2 Two noise barriers have been included within the embedded design in order to mitigate likely significant operational environmental effects, these are located at Portishead Station and Old Portbury Station.
- 13.7.3 No further mitigation has been identified at this stage of project design and the residual effects remain as described above. The residual effects are not significant in terms of the EIA Regulations.
- 13.7.4 Other mitigation measures are being considered where adverse (but not significant effects in relation to the EIA Regulations) are identified. This will be fully documented as part of the Environmental Statement and there will be ongoing discussions with key stakeholders to consider this further between now and the submission of the DCO application.

13.8 Cumulative Effects

Other Projects along the Portishead Branch Line

- 13.8.1 There are no identified other projects in the area that are likely to cause cumulative effect for either operation or construction in relation to ambient noise levels. Summary commentary is provided in Chapter 18 In-combination and Cumulative Effects Assessment.

Other Works for MetroWest Phase 1

Ashton Gate – Ashton Drive Area

- 13.8.2 In the area where Ashton Drive passes under the railway line and there are houses close by, the predicted increase during the day in the short term is just above 2 dB(A) and in the long term it is just above 3 dB(A). These increases would mean a minor adverse magnitude of impact and a **slight adverse** significance of effect.
- 13.8.3 Away from those properties that directly front the railway line, the increases in noise are predicted to reduce to levels where the significance of effect would be **slight adverse**.
- 13.8.4 For the properties that back onto the railway line along Swiss Drive there are predicted to be increases in noise of below 1 dB(A) in the short and long term. These changes are a negligible magnitude of impact and the significance of the effect would be **slight adverse**.

Parson Street Junction

- 13.8.5 In the vicinity of the Parson Street Junction the highest increases in noise are expected to be at those properties close to the junction along Nelson Street and Trafalgar Terrace. Increases in noise in the day time short term are predicted to be up to 1 dB(A) (minor adverse magnitude) and in the day time long term are predicted to be around 1.5 dB(A) (negligible magnitude of effect). These increases would result in a **slight adverse** significance of effect.

Other Works for MetroWest Phase 1

- 13.8.6 Other elements of MetroWest Phase 1, namely the Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling and Bathampton Turnback comprise small scale works, confined within the existing railway land. These works will also be undertaken by Network Rail under their permitted development rights and do not form part of the DCO Application.
- 13.8.7 Given the small scale nature of these works and the distances between these projects and the Portishead Branch Line, it is considered that there are no significant cumulative effects during the construction of these projects on the ambient noise and vibration. Consequently, these works have been scoped out of further cumulative impact assessment for Portishead Branch Line (MetroWest Phase 1) DCO Scheme.

13.9 Limitations Encountered in Compiling the PEI Report

- 13.9.1 The main limitations associated with the DCO Scheme are the assumptions that were made with regard to the operation of the new passenger service. This is because no Train Operating Company (“TOC”) has been appointed. Consequently, assumptions have been made based on professional knowledge from the acoustics project team and agreed with NSDC and NRIL. These are assumptions are related to:
- The class of passenger train that will be used.

- The frequency and noise level associated with station platform announcements. This includes the location and directionality of speaker systems.
- The operating characteristics (e.g. speed) of the trains along the route.
- The operating characteristics of the first and last services of the day.

13.9.2 Limitations have also been encountered for the construction assessment as the contractor has not been appointed yet. Assumptions have been made regarding the majority of equipment to be used and the techniques used to construct a new railway line, stations and car parks. The assumptions made have been based on professional knowledge of the acoustics project team.

13.9.3 A number of mitigation measures are still being considered as part of the environmental impact assessment. As the PEI Report only demonstrates those environmental effects at a certain point in time pre-application, these will be further refined as the Environmental Statement to be submitted with the DCO application is finalised.

13.10 Summary

13.10.1 A summary of the impacts of the construction and operation of the DCO Scheme is presented in Table 13-21.

Table 13-21: Potential impacts, mitigation and residual impacts of the DCO Scheme on noise and vibration

Aspect of Project	Impact	Receptors	Mitigation	Residual Impact
Construction activities				
Construction of the stations in Portishead and Pill, new road infrastructure, and the new line between Portishead and Pill.	Temporary increase in noise.	Nearby sensitive receptors, which would include dwellings and schools.	Use of Best Practicable Means (“BPM”). Some activities will be temporary. Possible use of Section 61 notice.	Magnitude: Major adverse Significance of Effect: Large adverse Significant for EIA legislation: Significant (temporary)
Operation activities				
New rail services.	Increased noise and vibration levels as trains pass.	Nearby sensitive receptors, which would include dwellings and schools.	Use of modern track and trains. Reduced speed of the trains on the approach to Pill. Restrictions on operating hours. Noise barriers.	Magnitude: Minor adverse Significance of Effect: Slight adverse Significant for EIA legislation: Not significant
Changes to road traffic using the local road network to the stations.	Changes in ambient noise due to traffic flow.	Nearby sensitive receptors, which would include dwellings and schools.	Provision of parking near the stations. Parking restrictions in the residential areas of Portishead and Pill. Increased bus services and cycle routes to the stations.	Magnitude: Minor adverse Significance of Effect: Slight adverse Significant for EIA legislation: Not significant
Operation of the new stations, including announcements, idling trains, fixed plant.	Increased ambient noise levels around stations during operating hours	Nearby sensitive receptors, which would include dwellings and schools.	Careful station design. Use of announcements only at certain times of the day. Fixed plant facing away from sensitive receptors and use of quiet equipment.	Magnitude: Minor adverse Significance of Effect: Slight adverse Significant for EIA legislation: Not significant

Table 13-21: Potential impacts, mitigation and residual impacts of the DCO Scheme on noise and vibration

Aspect of Project	Impact	Receptors	Mitigation	Residual Impact
Cumulative Effects				
Modal shift from highway traffic to the railway.	Changes in ambient noise levels depending on changes to traffic flows.	Receptors along the main highway commuter routes to Bristol and along the railway.	Modal shift is a positive benefit of the project and mitigation is not required.	Magnitude: Minor adverse Significance of Effect: Slight adverse Significant for EIA legislation: Not significant
Additional services on the Portbury Freight Line outside the DCO Scheme	Increase in noise along the Portbury Freight Line.	Receptors near Ashton Drive underpass.	N/A	Magnitude: Minor adverse Significance of Effect: Slight adverse Significant for EIA legislation: Not Significant
Increase in noise (e.g. idling, accelerating) from trains using the Bedminster Down Relief Line.	Slight increase in ambient noise	Receptors close to the Bedminster Down Relief Line.	To be considered by NR under permitted development.	N/A
Increase in noise from additional services on surrounding rail network MetroWest Phase 1.	Increase in ambient noise.	Receptors close to the other MetroWest Phase 1 schemes.	To be considered by NR under permitted development	N/A

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13.12 Abbreviations

BPM	Best Practicable Means
BCC	Bristol City Council
CoCP	Code of Construction Practice
CRN	Calculation of Railway Noise
CRTN	Calculation of Road Traffic Noise
DB	Decibel
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges
DMU	Diesel Multiple Unit
EIA	Environmental impact assessment
EU	European Union
GRIP	Governance for Railway Investment Projects
HS2	High Speed 2
IA	Important Area
IEMA	Institute of Environmental Management and Assessment
LOAEL	Lowest Observed Adverse Effect Level
NSDC	North Somerset District Council
NIR	Noise Insulation Regulations
NIRR	Noise Insulation (Railway) Regulations
NPPF	National Planning Policy Framework
NPSNN	National Policy Statement for National Networks
NOEL	No Observed Effect Level
NPSE	Noise Policy Statement for England
NRIL	Network Rail Infrastructure Limited
NSC	North Somerset Council
NSIP	Nationally Significant Infrastructure Project
PEI Report	Preliminary Environmental Information Report
PSP	Principal supply point
PPV	peak particle velocity
PPG	Planning Practice Guidance
SAC	Special Area of Conservation
SOAEL	Significant Observed Adverse Effect Level
SSSI	Site of Special Scientific Interest
TOC	Train Operating Company
UAEL	Unacceptable Adverse Effect Level
WHO	World Health Organisation