

TRANSPORT AND WORKS ACT 1992

Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006

THE NETWORK RAIL (EAST WEST RAIL WESTERN SECTION PHASE 2) ORDER

DRAFT ENVIRONMENTAL STATEMENT

CHAPTER 8: AIR QUALITY

Document Reference	133735-PBR-REP-EEN-000009
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Date	June 2017
Date of revision and revision number	June 2017 2.0

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8. AIR QUALITY

Summary

An air quality assessment has been undertaken, which has assessed the impacts during construction works using a qualitative approach and impacts from operation of EWR2, using a semi-quantitative approach. The assessment of the impact of operational traffic and modal shift on air quality is currently being undertaken and will be presented in the final draft of the ES.

Baseline Studies

A baseline monitoring survey was undertaken with reference to the Project Boundary, locations of existing and long term air quality monitoring undertaken as part of local authorities' LAQM duties and potentially sensitive receptors within 350m of the Project Boundary and any potential access route.

Effects

Construction – Impacts from emissions arising from construction activities and construction traffic. In the absence of mitigation, significant effects resulting from loss of amenity or harm to sensitive habitats due to dust deposition during construction and increased exposure to air pollution due to construction traffic. An assessment of construction traffic will be reported in the Final ES.

Operation – Impacts from changes to emissions to air from road and rail transport. An assessment will be reported in the Final ES. At the local scale, no significant effects are likely to result from these emissions due to the low background concentrations of NO₂ along the route of the Project.

Mitigation

Construction – Site specific mitigation principles to minimise impact on air quality during the construction phase are identified. Dust deposition mitigation includes regular monitoring of the construction site, use of hard surfaces haul routes to minimise risk of trackout and dampen down surfaces when needed. No significant effects are expected from construction traffic due to the low number of HDVs expected.

Operation – The increase in emissions due to the Project will be partially, if not wholly offset by a decrease in emissions from road transport. This draft assessment has not undertaken a formal quantification of this offset for air pollutants, though the final ES will provide a quantification of this offset.

Residual Effects

No residual effects are predicted.

8.1 Introduction

8.1.1 This chapter of the Draft ES identifies and assesses the effect of the Project on air quality during construction and operation phases.

8.1.2 The draft assessment of the air quality effects of the Project considers impacts from changes to emissions to air during construction works and the longer term effects arising from the operation of East West Rail Phase 2 (EWR2). The scope of the draft assessment undertaken is summarised as follows:

- During construction:
 - Qualitative assessment of impacts from emissions arising from construction activities and construction traffic; and
- During operation
 - Semi-quantitative assessment of impacts from changes to emissions to air from road and rail transport.

8.1.3 This chapter is supported by Appendices 8.1 to 8.6 as follows:

- Appendix 8.1 Project specific baseline monitoring results;
- Appendix 8.2 Construction dust assessment criteria;
- Appendix 8.3 Detailed construction dust assessment;
- Appendix 8.4 Operational emissions calculations;
- Appendix 8.5 Best practice dust management measures for application at all sites; and
- Appendix 8.6 Construction traffic assessment.

8.2 Limitations and Assumptions

8.2.1 The assessment is undertaken using semi-quantitative methodologies. This is appropriate given the low risk of significant effects and accords with best practice air quality guidance^{59,60}. In addition to the limitations and assumption described in Section 4.11 in Chapter 4 (EIA Methodology) further details are included in the following.

⁵⁹ Highways Agency (2007) Design Manual for Roads and Bridges (DMRB), Volume 3, Section 11, Air Quality (HA207/07), London

⁶⁰ Defra (2016), Part IV of the Environment Act 1995, Local Air Quality Management (LAQM), Technical Guidance LAQM TG(16)

- 8.2.2 Detailed forecasts of road traffic, whether during construction or during operation, are in the process of being agreed with Local Highway Authority (LHA) stakeholders. As such, in this draft assessment, detailed modelling of exposure to air pollution or quantification of the benefits of modal shift from private to public transport or impacts due to construction traffic on haul routes have not been undertaken. The assessment has, however, included a screening exercise to assess any areas potentially at risk from increased exposure to emissions from rail transport. The final assessment will take account of road traffic forecasts for both construction and operational phases of the Project.
- 8.2.3 Emissions from rail transport have been calculated from generic factors provided in Department for Transport (DfT) guidance⁶¹. This is appropriate since specific engine types and their emission performance could not be specified at this stage.
- 8.2.4 The specific construction methods, associated plant requirements and phasing of works are still under development as part of the on-going preparation of the Construction Strategy. Professional judgement has been applied, in accordance with guidance⁶², to assess the risk of emissions of dust from different construction activities e.g. track construction, use of construction compounds, based on sequential works. Where significant potential for cumulative impacts was identified this is noted in the assessment of risks and assessed in Chapter 15 (Cumulative Effects).
- 8.2.5 Baseline monitoring of particulate matter was undertaken. Candidate sites for monitoring were identified in late 2015 based on construction information available at the time. The final and specific selection of sites for monitoring was, however, largely dictated by the requirements for a power supply and security. Therefore, whilst the monitoring has covered a

⁶¹ Department for Transport (2015) WebTAG: TAG unit A3 environmental impact appraisal [online] <https://www.gov.uk/government/publications/webtag-tag-unit-a3-environmental-impact-appraisal-december-2015>, accessed 07/01/2017

⁶² Guidance on the Assessment of Dust from Demolition and Construction v1.1, Institute of Air Quality Management (2016), London

good temporal range, the spatial distribution is limited, but, regardless, a robust assessment has been undertaken

8.2.6 The Institute of Air Quality Management (IAQM)⁶³ has developed guidance for the assessment of dust and particulate matter from construction activities. It is based on assessing the potential magnitude of emissions of dust from activities classed as demolition, earthworks, construction or trackout⁶⁴. The IAQM guidance document is not specifically aimed at sites of the scale of EWR2 although it is noted in the guidance that the method can be taken as a starting point for such assessments provided it is used with appropriate modifications. As such, the IAQM guidance, and in particular the consideration of the source-pathway-receptor concept, has been adapted using a pragmatic approach for application to the assessment of the Project. Further details are provided in Section 8.4, but in summary, the IAQM criteria for earthworks and trackout, and the sensitivity of areas to effects were adapted to specify criteria - based on the type of construction activity and the numbers and proximity of receptors to works - for identifying locations at high and medium risk of impacts. This information was then used to propose appropriate mitigation on a location by location basis. Under this approach, the construction activities were not classified using the IAQM classes (demolition, earthworks etc.), rather the activities were categorised using the broad categories of works identified in the draft Construction Strategy:

- Compounds Use;
- Earthworks/Track Construction;
- Station Construction/Modification;
- Structures and Crossings Construction/Modification; and
- General and Ancillary Civils.

8.2.7 Project-specific monitoring data for nitrogen dioxide were collected for a 12 month period between mid-2015 and mid-2016. The air quality standard for annual mean nitrogen dioxide is based on concentrations for

⁶³ Guidance on the Assessment of Dust from Demolition and Construction v1.1, Institute of Air Quality Management (2016), London

⁶⁴ Trackout is the inadvertent transport of material offsite on the wheels and undercarriage of construction vehicles.

a calendar year. As such, the monitored concentrations must be adjusted to a calendar year (2016), a process known as annualisation. This adjustment is based on continuous monitoring data from the national Automatic Urban and Rural Network (AURN), operated by Defra. At the time of the draft assessment, some of this Defra data was 'provisional' data that had undergone basic quality assurance but had not undergone formal ratification (Fully ratified data from May 2015 to September 2016; provisional data from October – December 2016). This is unlikely to place a constraint on the assessment since the difference between ratified and provisional data, after initial assurance is rarely significant in the annual context.

8.3 Legislation, Policy and Guidance

8.3.1 The following section outlines the regulations, policies and guidance relevant to this assessment.

Air Quality Strategy and Regulations

- Air Quality Strategy for England, Wales, Scotland and Northern Ireland⁶⁵;
- The Air Quality (England) Regulations 2000⁶⁶;
- The Air Quality (England) (Amendment) Regulations 2002⁶⁷;
- The Air Quality Standards Regulations 2010⁶⁸; and
- The Air Quality Standards (Amendment) Regulations 2016⁶⁹.

Planning Policies and Guidance

- National Planning Policy Framework, 2012;
- National Policy Statement for Networks, 2014; and
- Guidance on land-use planning and development control: Planning for air quality⁷⁰.

⁶⁵ Defra (2007) Air Quality Strategy for England, Wales, Scotland and Northern Ireland

⁶⁶ The Air Quality (England) Regulations, Statutory Instrument 2000/928, Environmental Protection, England

⁶⁷ The Air Quality (England) (Amendment) Statutory Instrument 2002/3043, Environmental Protection, England

⁶⁸ The Air Quality Standards Regulations, Statutory Instrument 2010/1001, Environmental Protection

⁶⁹ The Air Quality Standards (Amendment) Regulations, Statutory Instrument 2016/1184, Environmental Protection

⁷⁰ Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management (2017), London

Assessment Methodology Guidance

- Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance LAQM.TG(16)⁷¹;
- Guidance on the assessment of dust from demolition and construction⁷²;
- Design Manual for Roads and Bridges (DMRB), Volume 3, Section 11, Air Quality⁷³; and
- Guidance on air quality monitoring in the vicinity of demolition and construction sites⁷⁴.

Legislation

8.3.2 Under the requirements of the Environment Act 1995, the UK government published an Air Quality Strategy (Defra, 1997, revised in 2000 and 2007⁶⁵). The strategy sets out the UK's national standards and objectives for ambient air quality, and measures to help achieve the objectives. The overall aim of the strategy is to achieve steady improvement in air quality into the long term.

8.3.3 The Environment Act 1995 also sets out the principles for Local Air Quality Management (LAQM) under which Local Authorities are required to review current and future air quality within their area against the air quality objectives. Where it is anticipated that an air quality objective will not be met, the Local Authority is required to declare an Air Quality Management Area (AQMA) and to produce an Action Plan in pursuit of the achievement of the air quality objectives.

8.3.4 The air quality standards set out in the strategy are purely health based and reflect the levels of pollution thought to ensure the avoidance or minimisation of risks to health. The associated air quality objectives are policy targets, expressed as maximum ambient (outdoor) concentrations

⁷¹ Defra (2016), Part IV of the Environment Act 1995, Local Air Quality Management (LAQM), Technical Guidance LAQM TG(16)

⁷² Guidance on the Assessment of Dust from Demolition and Construction v1.1, Institute of Air Quality Management (2016), London

⁷³ Highways Agency (2007) Design Manual for Roads and Bridges, Volume 3, Section 11, Air Quality (HA207/07), London

⁷⁴ Institute of Air Quality Management (2012) Guidance on Air Quality Monitoring in the vicinity of Demolition and Construction Sites

not to be exceeded, either without exception or with a permitted number of exceedances within a specified timescale.

8.3.5 The European Union Ambient Air Quality Directive⁷⁵ sets similar limit values for the concentration of pollutants in air for the protection of health and ecosystems. The requirements of the Directive are transposed into UK law by the Air Quality Standards Regulations^{68,69}. These Regulations place the Secretary of State under a duty to ensure that air quality limit values are not exceeded within specified zones by relevant dates. Where there is a risk of limit values being exceeded (taking into account any time extensions granted by the European Commission, the Secretary of State is required to form and implement air quality plans to ensure that compliance is achieved as soon as possible.

8.3.6 The air quality limit values relevant to the assessment of the Project are set out in Table 8.1.

Table 8.1 Ambient air quality limit values relevant to the Project

Pollutant	AQS Limit Value	Measured as
NO₂	200 µg/m ³	1 hr mean; not to be exceeded more than 18 times per year
	40 µg/m ³	Annual mean
PM₁₀	50 µg/m ³	24hr mean not to be exceeded more than 35 times per year
	40 µg/m ³	Annual mean
PM_{2.5}	25 µg/m ³	Annual mean (potential reduction to 20 µg/m ³ by 2020)
Set for the protection of vegetation		
NO_x	30 µg/m ³	Annual mean

Planning Policies

8.3.7 In relation to local air quality, the NPPF states (para 109) that:

⁷⁵ Directive 2008/50/EC of the European Parliament and of the Council, 21 May 2008, on ambient air quality and cleaner air for Europe

“The planning system should contribute to and enhance the natural and local environment by: ...

Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability;...”

8.3.8 Additionally, the NPPF also states (para 124) that:

“Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan.”

8.3.9 For the Project, these statements imply that its construction and operation should not result in a significant deterioration in local air quality and should not interfere with the actions in any Air Quality Action Plans developed by Local Authorities through which EWR2 passes, namely:

- Aylesbury Air Quality Action Plan^{76,77};
- Bedford Air Quality Action Plan⁷⁸;
- Central Bedfordshire Air Quality Action Plan⁷⁹;
- Cherwell Air Quality Action Plan⁸⁰;
- Milton Keynes Air Quality Action Plan^{81,82}; and
- Wycombe District Council, Air Quality Action Plan⁸³.

8.3.10 Furthermore, the NPPF states (para. 120) that:

⁷⁶ Air Quality Action Plan, 2010, Aylesbury Vale District Council

⁷⁷ Updating and Screening Assessment, 2015, Aylesbury Vale District Council

⁷⁸ Air Quality Action Plan, 2008, Bedford Borough Council

⁷⁹ Air Quality Action Plan, 2006, Central Bedfordshire Council

⁸⁰ Air Quality Action Plan, 2016, Cherwell District Council (Consultation Document)

⁸¹ Air Quality Action Plan, 2006, Milton Keynes Council

⁸² Olney Air Quality Action Plan, 2012, Milton Keynes Council

⁸³ Air Quality Action Plan, 2002, Wycombe District Council

“To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account.”

- 8.3.11 In this context, pollution is taken to include both local air pollutants, covered by the UK’s air quality strategy and EU directives (e.g. particulate matter, nitrogen dioxide) and dust. In relation to the Project and air quality, this statement implies that particulate matter and dust emissions during construction should not result in adverse impacts on human health or any loss of general amenity, nor should the operation of EWR2 result in exposure to poor air quality.
- 8.3.12 The NPPF is supported by Planning Practice Guidance (PPG). The UK Government carries out an annual national assessment of air quality to determine compliance with European Union Limit Values. The PPG for Air Quality states (para 001) that:
- “It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit”.*
- 8.3.13 This PPG also sets out the information that may be required to support planning applications, making clear that assessments should be proportional to the nature and scale of development proposed.
- 8.3.14 There are no air quality specific policies in any of the Core Strategies or Local Plans set out by Local Authorities through which EWR2 passes, with the exception of Bedford Borough Council. There are, however, high level policies favouring sustainable development and the protection of the environment.
- 8.3.15 Policy CP26 of Bedford Council’s Core Strategy requires developers to have regard to cumulative impacts of development proposals on air

quality, in particular in relation to air quality management areas. This is compatible with the principles within the NPPF.

8.4 Approach and Methodology

8.4.1 The methodology for the air quality assessment followed a risk based approach based on an initial screening of potential impacts.

8.4.2 Impacts from dust and particulate matter during construction works were assessed using a qualitative approach, based on IAQM Construction Dust Guidance (2016)⁷². The guidance specifically states that the significance of effects prior to mitigation should not be assessed; rather the approach followed is to assess the risk of dust impacts prior to mitigation and to use the level of risk to specify appropriate mitigation. The guidance states that with the implementation of effective site-specific mitigation measures the environmental effect of construction works on dust and particulate matter will not be significant.

8.4.3 Impacts from exhaust emissions from construction vehicles on the public highway were screened for potential significance using criteria set out in IAQM guidance⁷⁰.

8.4.4 Further details of the construction dust assessment methodology are provided below and in Appendix 8.2.

8.4.5 Impacts from the operation of EWR2 were assessed using a semi-quantitative approach. Total emissions from rail transport (diesel engines⁸⁴) on the Project were estimated, for the Project as a whole and by Project sub-sections using the Core and Growth timetables. These were compared with total UK emissions from rail transport for consideration of regional air quality impacts. The potential impacts from exposure to these emissions in the immediate vicinity⁸⁵ of the Project were screened for their potential significance using the LAQM.TG(16) guidance.

⁸⁴ Rolling stock used was specified in the Core and Growth timetables.

⁸⁵ Relevant exposure within 30m of the relevant tracks, Section 7.18, LAQM TG(16)

8.4.6 The assessment of the impact of operational traffic and modal shift is currently being undertaken and a subsequent assessment of the air quality effects will be presented in the final draft of this ES.

Data Collection

8.4.7 Existing air quality data were collected for the desk study using the following sources:

- Local Authority LAQM Monitoring and Reporting:
 - Cherwell District Council 2016 Annual Status Report;
 - Aylesbury Vale District Council 2015 Updating and Screening Report;
 - Wycombe District Council 2016 Annual Status Report;
 - Milton Keynes Council 2016 Annual Status Report;
 - Central Bedfordshire Council 2016 Annual Status Report; and
 - Bedford Borough Council 2016 Annual Status Report.
- National Pollution Climate Model Output⁸⁶ (mapped on 1kmx1km grid over UK);
- National Atmospheric Emissions Inventory⁸⁷; and
- Multi-Agency Geographic Information for the Countryside⁸⁸.

8.4.8 The Local Authority LAQM reports were used to identify the locations of AQMAs, temporal trends in air pollution and the presence of notable pollution sources other than road transport.

8.4.9 Monitoring undertaken by the Local Authorities for the purpose of LAQM is intended to identify locations of exposure to poor air quality. As such, it is focussed on monitoring in urban areas alongside busy roads for nitrogen dioxide. Given the extent and location of EWR2, the Local Authority monitoring data were, therefore, supplemented by a yearlong Project-wide

⁸⁶ Defra, 2016, UK Ambient Air Quality Interactive Map. [online] available at <https://uk-air.defra.gov.uk/data/gis-mapping>, accessed 13/01/2017

⁸⁷ Defra, 2016, UK emissions data selector. [online] available at <http://naei.defra.gov.uk/data/data-selector>, accessed 13/01/2017

⁸⁸ Defra, 2016, Interactive Mapping. [online] available at <http://www.magic.gov.uk/MagicMap.aspx>, accessed 9/12/2016

nitrogen dioxide and nitrogen oxides diffusion tube monitoring survey coupled with shorter duration particulate matter monitoring.

Spatial study area

8.4.10 The study area for the assessment was defined as the Project Area plus the following buffers:

- 350m from any construction activities, including the Project Area itself and any associated worksites; and
- 100m from potential haulage routes out to a distance of 500m from construction activities.

8.4.11 The former buffer is determined with reference to IAQM Construction Dust Guidance (2016)⁶²; the latter with reference to the track-out of material on haul roads. The IAQM guidance states that outside of these buffers impacts from construction will be negligible.

8.4.12 Operational impacts are considered for rail transport along the Project Area as a result of proposed EWR2 services, with potential exposure to emissions within a distance of 200m from the track (and hence within the area defined above). There is no formal guidance available on the distance from the track beyond which exposure to emissions from moving diesel locations needs to be considered. As such, a 200m buffer has been defined on the basis of the DMRB guidance⁵⁹ on the assessment of the impacts of road transport (including trunk roads and motorways). This is considered conservative since likely emissions from diesel locomotives from the operation of EWR2 are lower than those from a busy trunk road⁸⁹.

8.4.13 For this Draft ES impacts from construction traffic (and operational traffic) were scoped out of the quantitative assessment in a screening exercise, based on traffic generation at the point of origin within the EWR2 Project Area. As such, no formal study area was defined for these impacts beyond that identified for the construction dust assessment (which includes consideration of onsite vehicle movements). Notwithstanding

⁸⁹ Emissions from Defra's Emission Factors Toolkit (v7.0) for road transport (<https://iaqm.defra.gov.uk>), and Transport Appraisal Guidance (WebTAG) for rail transport (<https://www.gov.uk/guidance/transport-analysis-guidance-webtag>).

this, professional judgement was used to identify locations where construction traffic could potentially impact on air quality sensitive locations such as AQMAs and sites designated for nature conservation (outside the construction dust assessment study area but within 200m of identified haulage routes) prior to dispersion on the road network (variable distances from traffic origin, based on potential route choices).

- 8.4.14 The methods used to define the study area are impact-specific rather than receptor-specific and, therefore, are applicable to all sub-sections of the Project. The study area is shown in Figures 8.1 to 8.8, for each reporting sub-section.

Temporal scope

- 8.4.15 The baseline assessment years are 2015/2016. Data for 2016 from local authorities or from national modelling were not published at the time of the draft assessment and these data are, therefore, taken from 2015. Project specific monitoring is available for 2016.

- 8.4.16 The construction period is assumed to cover 2019 to 2024.

- 8.4.17 The opening year for operational effects is assumed to be 2025, with growth in rail transport to 2035.

Consultation

- 8.4.18 Environmental Health Officers in all Local Authorities (Cherwell DC, Aylesbury Vale DC, Milton Keynes Council, Central Bedfordshire Council and Bedford BC) were consulted by email in 17 November 2016 with regards to location of sensitive receptors for air quality impacts and any potential concerns regarding cumulative impacts and/or the methodology to be used for the assessment.

- 8.4.19 A response from Bedford BC was received in December 2016. Table 8.2 below summarises the main points raised and how they have been addressed in the assessment. No other Local Authorities have responded.

Table 8.2 Local Authority Consultation

Local Authority	Consultation Comment	Response
Bedford Borough Council	Need to address future growth of rail traffic not just core scenario	A LAQM.TG(16) screening assessment of operational impacts under both Core and Growth scenarios has been undertaken, and no requirement for detailed assessment of exposure to pollution during operation was identified
	Unclear as to how the construction methodology will consider import of material	Construction traffic impacts from vehicle exhaust emissions have been screened against the criteria in IAQM Planning Guidance (2017) ⁷⁰ and no requirement for detailed assessment of impacts was identified due to the low numbers of vehicles on an annual average basis involved. Impacts from the movement of construction vehicles on dust from the trackout of mud onto the public highway have been considered using the IAQM Construction Dust Guidance (2016) ⁷² . Further information on construction traffic volumes will be provided in the final version of Chapter 14 (Traffic and Transport).

8.4.20 The responses to consultation during scoping, received in August 2015 are shown in Table 8.3. Further consultation will be undertaken where necessary.

Table 8.3 Scoping Opinion

Organisation	Scoping Opinion Comment	Response
Department for Transport	Check with individual local authorities on availability of particle analysers to assist with background data gathering	To ensure a consistent methodology and quality control, only project-specific monitoring equipment was used.
	Local Authorities should be consulted on the location of sensitive receptors	Local Authorities have been consulted. No specific responses in relation to sensitive receptors have been received. Sensitive receptors were therefore identified with reference to OS mapping, baseline monitoring and local authority LAQM reports.
	Use latest 2015 guidance	IAQM Planning Guidance (2017) ⁷⁰ is used in the assessment, together with Defra's 2016 Local Air Quality Management Guidance LAQM.TG(16) ⁷¹ .
Natural England	Assess air quality impacts on biodiversity	Impacts on sensitive ecological receptors within the Study Area have been assessed
East West Rail (EWR) Consortium	Check with individual local authorities on availability of particle analysers to assist with background data gathering	To ensure a consistent methodology and quality control, only project-specific monitoring equipment was used.
	Contact EH dept. in each LA to discuss selection or location of sensitive receptors.	Local Authorities (Environmental Health, EH) have been consulted. No specific responses in relation to sensitive receptors have been received. Sensitive receptors were therefore identified with reference to OS mapping, baseline monitoring and local authority LAQM reports.
	Make sure using the 2015 EPUK/IAQM guidance	The assessment will be undertaken in accordance with IAQM 2017 Planning Guidance ⁷⁰

Methods

8.4.21 The potential impacts of the Project are considered at 'receptors'. Exposure to air pollution can lead to adverse impacts on human health

and/or loss of amenity. A 'human receptor' for impacts therefore refers to any location where a member of the public may experience changes in air quality or amenity as a result of a proposed development.

8.4.22 Ecological receptors are any sites designated for nature conservation (statutory designation) with habitats potentially affected by dust soiling during construction and exposure to nitrogen oxides and/or nitrogen deposition. For information on other effects on ecological receptors, please refer to Chapter 9 (Ecology).

Baseline Monitoring

8.4.23 The requirements for the baseline monitoring survey were assessed with reference to:

- Locations of existing and long term air quality monitoring undertaken as part of local authorities' LAQM duties;
- The Project Boundary; and
- Potentially sensitive receptors (human and ecological) within 350m of the Project Boundary and any potential access routes.

8.4.24 Local Authority monitoring has largely focussed on urban areas and, as such, a Project-specific monitoring programme has been undertaken to supplement the available baseline data. The monitoring has covered the extent of the Project Area (as available in April 2015) including proposed access routes and compounds locations. For more detailed information on the proposed access routes, refer to Chapter 14 (Traffic and Transport). Locations of the proposed compounds can be found in Figure 2.1.

8.4.25 The monitoring has consisted of an extensive, 12 month diffusion tube survey and periodic local particulate matter monitoring using continuous analysers. 133 locations were monitored using diffusion tubes (127 NO₂ alone, and six sites with combined NO/NO₂ monitoring) between June 2015 and May 2016. Locations were selected to be representative of exposure at receptors including residential properties and schools (typically roadside locations), ecological receptors and at background locations. They are shown in Figures 8.1 to 8.8, and the results presented in Tables 8.1.1 to 8.1.8 of Appendix 8.1.

8.4.26 Particulate matter (as PM₁₀ and PM_{2.5}) monitoring was undertaken at three locations across EWR2, in Bedford (August 2015 to October 2015), Bletchley (October 2015 to November 2016) and Winslow (March 2016 to November 2016). The locations are shown in Figures 8.7, 8.5 and 8.3 respectively.

8.4.27 The monitoring locations were selected to be representative of locations of potential exposure to impacts, but were constrained by the requirements to find secure sites with access to power.

Construction Dust

8.4.28 IAQM Construction Dust Guidance (2016)⁷² provides criteria for qualitatively assessing the risk of dust/particulate matter impacts from construction activities. The assessment criteria consider the scale and nature of the works to determine a potential dust emissions magnitude, classed as small, medium or large. The sensitivity of the area to impacts is assessed using criteria based on the proximity and number of potential receptors and, in the case of health impacts, the background PM₁₀ concentration.

8.4.29 The dust emissions magnitude and the area sensitivity are then used, in combination, to determine the level of risk of impact (classed as low, medium or high) and the subsequent requirement for site-specific mitigation.

8.4.30 The guidance specifically states that the significance of any effects should not be assessed prior to mitigation, and that any effects can be reduced to 'not significant' in most cases with the application of effective mitigation. The rationale for the approach is that generic good site practice for the control of dust on construction sites is appropriate for low risk sites and should be applied everywhere during works. Site-specific mitigation is only required where a medium or high risk of impacts has been identified.

8.4.31 The IAQM guidance distinguishes between four different types/phases of activities on construction sites i.e. demolition, earthworks, construction and track-out.

- 8.4.32 Given the nature of EWR2 (i.e. a linear project nearly 100 km in length, with rail-specific works that vary from location to location depending on the existing infrastructure and track condition), the IAQM criteria and classification of activities do not readily apply to the works required. In particular, they will not fully reflect the spatial variations in the risk of dust and particulate matter impacts along the Project.
- 8.4.33 As such, the IAQM assessment methodology was modified for application to the assessment of the Project. In particular, the assessment was made rail specific rather than construction phase specific to reflect the linear nature of the scheme as opposed to a construction site based operation.
- 8.4.34 The assessment process involved:
- Step 1: Assigning a potential dust emission magnitude to the different categories of construction activities associated with the Project (Table 8.4);
 - Step 2: Determining the sensitivity of an area to dust and particulate matter impacts required to generate a high or medium risk of impacts, based on IAQM guidance for earthworks, construction and trackout⁹⁰ (Table 8.5);
 - Step 3: Use IAQM criteria to define the sensitivity of areas to dust, health and ecological impacts based on numbers and proximity of properties to activities (Table 8.6); and
 - Step 4: Identifying locations along the Project satisfying the criteria for high or medium risk and specifying site-specific mitigation.
- 8.4.35 Further details of the derivation of the dust emissions magnitude criteria are provided in Appendix 8.2.
- 8.4.36 The categories of activities considered in Step 1 of the assessment and their potential dust emissions magnitude are provided in Table 8.4. The sensitivity of the area required to generate a high or medium risk of impacts for Step 2 is provided in Table 8.5.

⁹⁰ Tables 7 – 9 of IAQM guidance on the assessment of dust from demolition and construction⁷⁰

Table 8.4 Construction activities considered in the assessment and their potential dust emission magnitude

Construction Category	Specific Construction Activity	Potential Dust Emission Magnitude
Use of Construction Compounds	Strategic compounds	Large (construction compound area of >10,00m ²)
	Satellite compounds	Large (construction compound area of >10,000m ²); or Medium (construction compound area of equal to or less than 10,000m ²);
	Logistics compounds	Negligible
Earthworks and Track Construction	Embankment construction	Large
	Cutting construction	Medium
	Formation strip and renewal	Large (at or above grade); Medium (below grade)
	Track construction	Medium
	Use of haul roads	Large
Station Works	Construction of new station	Large
	New platform build	Medium
	Platform extension	Small
Structures and Crossings	Construction compounds	Medium
	Bridge – New structure	Medium
	Bridge – Full reconstruction	Medium
	Bridge – Deck reconstruction	Small
	Footbridge – New structure	Small
General and Ancillary Civils	Removal of existing infrastructure (Strip Out)	Small
	Works for drainage and culverts	Small
	Other works (Troughing/Signal Foundation/Access/Fencing)	Small

Table 8.5 Sensitivity of area required to generate high or medium risk of impacts (N/A implies that risk level cannot be reached irrespective of sensitivity of the area)

Construction Category	Specific Construction Activity	Sensitivity of Area for High Risk of Impact	Sensitivity of Area of Medium Risk of Impact
Use of Construction Compounds	Strategic compounds	High	Medium
	Satellite compounds	High (construction compound area >10,000m ²); N/A otherwise	High or Medium
	Logistics compounds	N/A	N/A
Earthworks and Track Construction	Embankment construction	High	Medium
	Cutting construction	N/A	High or Medium
	Formation strip and renewal	High (if at or above grade), N/A otherwise	Medium (if at or above grade), High or Medium otherwise
	Track construction	N/A	High or Medium
	Use of haul roads	High	Medium
Station Works	Construction of new station	High	Medium
	New platform build	N/A	High or Medium
	Platform extension	N/A	N/A
Structures and Crossings	Construction compounds	N/A	High or Medium
	Bridge – New structure	N/A	High or Medium
	Bridge – Full reconstruction	N/A	High or Medium
	Bridge – Deck reconstruction	N/A	N/A
	Footbridge – New structure	N/A	N/A

Construction Category	Specific Construction Activity	Sensitivity of Area for High Risk of Impact	Sensitivity of Area of Medium Risk of Impact
General and Ancillary Civils	Removal of existing infrastructure (Strip Out)	N/A	N/A
	Works for drainage and culverts	N/A	N/A
	Other works (Troughing/Signal Foundation/Access/Fencing)	N/A	N/A

8.4.37 Table 8.6 provides the definition of area sensitivity, based on IAQM guidance. The criteria are based on the distance between properties and the dust generating activity. For the purpose of this assessment dust generating activities are assumed to potentially occur anywhere within the Project Area (and for dust trackout 500m of the point of egress onto the public highway).

Table 8.6 Criteria for area sensitivity, based on the number of properties affected and distance from the dust generating activity

Sensitivity of Area	Loss of Amenity due to Dust	Impacts on Health	Ecological Impacts
High	>10 properties within 20m and/or >50 properties within 50 m	>1 property within 350m and PM ₁₀ concentrations <32 µg/m ³	Internationally designated site with dust sensitive features within 20 m
Medium	Does not meet High Sensitivity criteria and >1 property within 20m and/or 10 properties within 50m and/or >100 properties within 100 m	>1 property within 350m and PM ₁₀ concentrations <28 µg/m ³	Does not meet High Sensitivity criteria and there is an International ⁹¹ or National ⁹² designated site with dust sensitive features within 50 m
Low	Not High or Medium and 1 or more properties within 350 m	>1 property within 350m and PM ₁₀ concentrations <24 µg/m ³	Not High or Medium and locally designated site with dust sensitive

⁹¹ International sites include SACs, SPAs and RAMSAR site

⁹² National designated sites include SSSI and ancient woodland.

			features within 50m
Negligible	No properties within 350 m	No properties within 350m	No ecological receptors within 50m

8.4.38 The overall aim of the construction dust assessment is to determine the level of risk of impacts and to define appropriate mitigation measures. The aim of the mitigation is to prevent significant effects through effective mitigation. IAQM guidance states that “*Experience shows that this is normally possible. Hence the residual effect will normally be ‘not significant’*”. Notwithstanding this, professional judgement is used to assess whether there are any locations within the Project Area where specific constraints could reduce the effectiveness of the mitigation.

Construction Traffic

8.4.39 The assessment of impacts from construction traffic has been undertaken semi-quantitatively. It considers the impacts of emissions from vehicle exhausts from construction traffic on the public highway. The use of haul roads internal to the Project Boundary is considered in the construction dust assessment as is the potential for the trackout of dust onto the public highway.

8.4.40 IAQM planning guidance (2017)⁷⁰ states that a change of HDV (Heavy Duty Vehicles) flows of more than 25 AADT (Annual Average Daily Traffic) within or adjacent to an AQMA or more than 100 AADT elsewhere are appropriate criteria for screening the need to proceed to an air quality assessment for a development. It is important to note that these flows are not maximum daily flows but annual average flows since the critical metrics in relation to roadside air quality and vehicle exhaust emissions are annual average pollutant concentrations rather than short term peak concentrations.

8.4.41 Detailed information on the routing of construction traffic on the road network is in the process of being agreed with LHA stakeholders and therefore does not form part of this draft assessment. Therefore, in this draft assessment, the potential for impacts, and significant effects, from

construction traffic has been considered in a qualitative screening exercise considering:

- The total number of HDVs likely to be generated by construction compounds within the Project, and the duration over which those activities will occur;
- The principal haulage routes for those vehicles;
- Whether the haulage routes pass through AQMA or areas where NO₂ concentrations are at risk of exceeding the objective;
- The potential for significant effects based on the IAQM indicative screening criteria (i.e. >25 HDV AADT); and
- The requirement and potential effectiveness of mitigation via construction logistics planning.

Operation Emissions (Exposure alongside Project)

8.4.42 Defra technical guidance, LAQM.TG(16)⁷¹, states that emissions from railways should be considered in relation to stationary emissions from idling locomotives in stations and depots (risks related to high short-term SO₂), and mobile emissions on busy lines with a high numbers of diesel locomotives (risks related to elevated short-term NO₂).

8.4.43 LAQM.TG(16) provides screening criteria for locations where local authorities may need to assess air quality, namely:

- Stationary diesel locomotives - Locations where locomotives are regularly stationary for periods of 15 minutes or more; and
- Moving diesel locomotives - Tracks with heavy traffic of diesel passenger trains and background annual mean NO₂ concentrations above 25µg/m³.

8.4.44 Given the nature of EWR2 it is considered unlikely that any of the stations within the Project Boundary would require assessment under the criterion for stationary diesel locomotives and therefore, in line with this guidance, impacts from exposure to SO₂ are scoped out of the assessment.

8.4.45 LAQM.TG(16) is not explicit about the definition of tracks with heavy traffic of diesel trains, but lists existing lines considered to meet the criteria. Since the trains on EWR2 will be diesel powered, a precautionary approach is adopted and it is assumed that the Project will qualify for assessment as a busy line. For each reporting sub-section, a qualitative

assessment of potential impacts from exposure to NO₂ alongside the track was undertaken, based on screening for background NO₂ concentrations >25 µg/m³. Where impacts can be screened out, no significant effects are expected.

Operation Emissions (Emissions)

8.4.46 The increase in emissions from rail transport in the UK due to EWR2 was calculated using the emission factors and assumptions provided in the Department for Transport's (DfT) Transport Analysis Guidance (known as WebTAG)⁹³. These emissions, detailed in the following, are compared to total UK emissions:

- Passenger DMU (Diesel Multiple Unit) (assumed 2 power cars/train on average) 40 g/km; and
- Freight (1 power unit per train) 170 g/km.

8.4.47 In reality, much, if not all, of these emissions will be offset by modal shift. Detailed information on modal shift, in a suitable format, such as details of the number of passenger or freight road vehicle-km transferred to rail were not available to inform this draft assessment. Therefore, the change in emissions with the operation of EWR2 is a conservative assessment i.e. tending to overestimate the increase in emissions.

8.4.48 Emissions are calculated for a core (opening year) scenario and a growth (future year) scenario⁹⁴.

Air Quality Descriptions

8.4.49 When describing the level of pollutants in air, reference is made throughout the chapter to the concentrations in relation to the relevant air quality objective (Table 8.1) (also known as air quality limits). At the most basic level, this relates simply to whether the concentration exceeds the standard or is within the standard.

⁹³ Department for Transport (2015) WebTAG: TAG unit A3 environmental impact appraisal [online] <https://www.gov.uk/government/publications/webtag-tag-unit-a3-environmental-impact-appraisal-december-2015>, accessed 07/01/2017

⁹⁴ Data provided as spread sheet "Core and Growth Train Service Specification table 181116.xlsx"

8.4.50 This does not, however, allow for uncertainty (whether in modelled or monitored data), and does not convey information on the level of risk that a standard is exceeded. Therefore, the terminology in Table 8.7 is used.

Table 8.7 Concentration descriptors

Descriptor	% of Objective	Concentration for annual mean NO₂ or PM₁₀ (rounded to 1 decimal place)
Well Above	>125%	>50.0µg/m ³
Above	>110% - 125%	44.1 – 50µg/m ³
Just above	>100% - 110%	40.1 – 44.0µg/m ³
At or Just below	90% – 100%	36.0 – 40.0µg/m ³
Below	75% - <90%	30.0 – 35.9µg/m ³
Well Below	<75%	<30.0µg/m ³

8.4.51 Concentrations within the ‘Just below’ category are at high risk of exceeding the objective. Concentrations ‘below’ the objective are at moderate risk of exceeding the objective. Concentrations ‘well below’ the objective are unlikely to exceed the objective and, as such, can be considered indicative of good air quality.

8.5 Baseline

Overview

8.5.1 The review of available literature and data, including the reports prepared for LAQM by Local Authorities (generally 2016 Annual Status Reports) and the national mapped data⁸⁸ has shown that air quality across the entire Project study area is generally good, particularly in rural areas, with the background (mapped) pollutant concentrations and monitored concentrations well within the air quality objectives.

8.5.2 However, there are some localised areas of poor air quality, associated with busy roads that have been declared as AQMAs. These are listed by reporting sub-sections below.

- 8.5.3 Within the AQMAs, the local authorities have identified that road transport is the major source of pollution and, as a result, the pollutant of greatest concern in relation to compliance with air quality standards is nitrogen dioxide (NO₂). Specifically, it is the annual mean NO₂ concentrations which exceed or are at greatest risk of exceeding the UK air quality objectives (40 µg/m³).
- 8.5.4 Particulate matter (less than 10 micron in diameter, PM₁₀ and less than 2.5 microns in diameter, PM_{2.5}) is also of concern due to the human health effects associated with this pollutant and the fact that there is no known threshold concentrations below which health effects do not occur. Whilst it is unlikely that breaches of the air quality objectives for particulate matter are occurring (as evidenced by local council monitoring in Central Bedfordshire and Milton Keynes), there is little existing PM₁₀ baseline data available across the entire study area. The national mapped data show concentrations well below the air quality objective for annual mean PM₁₀.
- 8.5.5 Over the medium term (since 2000), air quality has improved. However, in recent years, the improvement with time has been less clear.
- 8.5.6 Within the study area⁹⁵, the principal receptors for air quality impacts associated with construction dust and/or emissions from mobile sources (road/rail) are residential properties and schools.
- 8.5.7 In relation to impacts on ecological receptors, there are only two sites designated for nature conservation within the study area - Salden Wood (ancient woodland) and Sheephouse Wood (ancient woodland and SSSI). Construction effects in relation to Sheephouse Wood have been assessed as part of the HS2 ES and are therefore not considered further in this Draft ES. The Final ES will include further assessment of cumulative impacts where necessary.
- 8.5.8 National emissions data published by Defra⁸⁷ demonstrates that there has been a long term decrease in the emission of air pollutants covered by the National Emissions Ceiling Directive (NECD)⁹⁶, (data available for 1992 –

⁹⁵ That is, 350m buffer from the Project Boundary and potential traffic routes

⁹⁶ namely NO_x, SO₂, ammonia (NH₃), non-methane volatile organic compounds (NMVOCs) and PM

2015). Total emissions of PM₁₀ and PM_{2.5} decreased to around 2008 but have since stabilised; total emissions of NO_x show reductions year-on-year. The data show good progress has been made towards meeting the NECD emission reduction commitments for 2020 (Table 8.8).

8.5.9 However, in 2016 new emission reduction targets (for emissions to 2030) were set out in a revision to NECD⁹⁷. Future emissions of NO_x and PM_{2.5} are currently projected to exceed the 2030 targets (Table 8.8).

Table 8.8 UK Emissions of Pollutants and future emissions ceiling targets (kilotonnes)

Metric	NO _x	PM _{2.5}
UK Emissions Inventory		
2014 Total Emissions for UK	957	104
2014 UK Emissions from Rail Sector	39.1	1.2
UK Emissions Projections		
2020	726	96
2025	606	94
2030	565	94
UK Emissions Targets under National Emissions Ceiling Directive		
2020	728	76
2030	437	58

Cherwell District Council (CDC) Sub-Section

8.5.10 CDC declared an AQMA in the centre of Bicester in October 2015 as a result of monitored exceedances of the annual mean NO₂ objectives. The AQMA extends from Field Street in the north to Kings End in the south. This AQMA is neither within nor adjacent to the Study Area.

⁹⁷ European Parliament and Council of the European Union, 2016. Directive 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emission of certain atmospheric pollutants. [\[online\]](#) Accessed 20/01/2017

- 8.5.11 CDC does not undertake air quality monitoring within the Study Area. However, their long term monitoring stations indicate that air quality is improving over time⁹⁸.
- 8.5.12 Project-specific monitoring was undertaken at 16 locations within the district. The locations are shown in Figure 8.1 to 8.8 with results shown in Appendix 8.1.
- 8.5.13 Monitored concentrations are generally well below the annual mean objective for NO₂, indicating that air quality is good overall, with no exceedances of the annual mean objective for nitrogen dioxide of 40 µg/m³ were monitored. The maximum recorded concentration was 33.2 µg/m³ recorded on the A4421 (Location ID 2A-1.), which acts as a bypass around the eastern and south-eastern fringes of Bicester.
- 8.5.14 Within the Study Area in this sub-section, mapped background concentrations from national modelling⁸⁶ are well within the air quality objectives for NO₂ and PM₁₀ in 2015, as follows, and expected to decrease or hold steady in the future:
- NO₂ 6 - 14µg/m³; and
 - PM₁₀ 11-16µg/m³.

Aylesbury Vale: Claydon/Quinton Sub-Section

- 8.5.15 There are no AQMAs within or adjacent to the Study Area in this subsection. No existing Local Authority (Aylesbury Vale District Council (AVDC)) monitoring data were available in the Aylesbury Vale: Claydon/Quinton sub-section, but with the Study Area being predominantly rural with no major roads, air quality is likely to be good with no exceedances of the air quality objectives likely. AVDC only undertakes NO₂ diffusion tube monitoring at one background site⁹⁹. The urban background location (Long Meadow) is distant from main roads in Aylesbury in 2014 (1.6 km distant from the Project). In 2014 the annual mean NO₂ concentration was 13 µg/m³, which is well below the objective of 40 µg/m³. Concentrations in the Study Area are of a similar order of

⁹⁸ Cherwell District Council, 2016, 2016 Annual Status Report

⁹⁹ Aylesbury Vale District Council (2016), 2015 Updating and Screening Assessment Aylesbury Vale District Council

magnitude away from main roads in a more rural setting (as evidenced by the project specific monitoring).

8.5.16 Concentrations at Long Meadow between 2011 and 2014 remained largely stable with concentrations ranging from 13.1 $\mu\text{g}/\text{m}^3$ to 15.5 $\mu\text{g}/\text{m}^3$.

8.5.17 Project-specific monitoring was undertaken at 20 locations for NO_2 and two locations for NO_x within the sub-section. The locations are shown in Figure 8.2 and results shown in Appendix 8.1. Generally the air quality is very good within the district, with monitored annual mean concentrations all well below the objective for NO_2 .

8.5.18 The maximum monitored concentration was 16.9 $\mu\text{g}/\text{m}^3$, recorded at Werner Terrace in Calvert (Location 2E-19). This concentration is consistent with the AVDC background site monitoring at Long Meadow.

8.5.19 The NO_x tubes were located at the sensitive habitats (ancient woodland) in Finemere Wood and Lee Wood. Concentrations of NO_x were just below the objective of 30 $\mu\text{g}/\text{m}^3$, set for the protection of habitats.

8.5.20 Within the Study Area in this sub-section, mapped background concentrations from national modelling⁸⁶ are well within the air quality objectives for NO_2 and PM_{10} in 2015, as follows, and expected to decrease or hold steady in the future:

- NO_2 6 - 11 $\mu\text{g}/\text{m}^3$; and
- PM_{10} 12 - 14 $\mu\text{g}/\text{m}^3$.

Aylesbury Vale: Winslow/Swanbourne Sub-Section

8.5.21 There are no AQMAs within or adjacent to the Study Area in this subsection. AVDC monitor air quality within the settlement boundary of Winslow⁹⁹. Monitoring in recent years shows no exceedances of the objective for annual mean NO_2 but concentrations on the High Street, 400m from Project are only just below the objective and, therefore at risk of exceeding the objective. Monitored concentrations in 2014 were 37 $\mu\text{g}/\text{m}^3$ at 109 High Street compared to the objective of 40 $\mu\text{g}/\text{m}^3$.

- 8.5.22 Project specific monitoring was undertaken at 11 locations for NO₂ and one location for NO_x within the subsection. The locations are shown in Figure 8.3 and results shown in Appendix 8.1.
- 8.5.23 Monitored concentrations outside of the Winslow settlement are all well below the annual mean objective for nitrogen dioxide and below the objective for nitrogen oxides (<17 µg/m³).
- 8.5.24 Within Winslow, the maximum monitored annual mean concentration was 25.2µg/m³ recorded on Buckingham Road (A413) (Location ID: 2B-22), which is the main road through Winslow.
- 8.5.25 Within the Study Area in this sub-section, mapped background concentrations from national modelling⁸⁶ are well within the air quality objectives for NO₂ and PM₁₀ in 2015, as follows, and expected to decrease or hold steady in the future:
- NO₂ 7 - 13µg/m³; and
 - PM₁₀ 11 - 14µg/m³.

Aylesbury Vale: Aylesbury Sub-Section

- 8.5.26 AVDC has declared three AQMAs in Aylesbury as a result of monitored exceedances of the annual mean NO₂ objective. Of these, the Friarage Road and Stoke Road AQMAs are closest to the Project, within 100m and 200m of the Project respectively⁹⁹.
- 8.5.27 AVDC diffusion tube monitoring in the Friarage Road AQMA shows NO₂ concentrations consistently above the objective in recent years (2012 – 2014), up to 47 µg/m³ in 2014. AVDC continuous and diffusion tube monitoring in and around the Stoke Road AQMA in the period (2012 – 2014) indicate that concentrations in the AQMA are well above the annual mean objective – up to 56 µg/m³.
- 8.5.28 No significant trend is evident in the monitoring data.
- 8.5.29 Project specific monitoring was undertaken at 15 locations for NO₂ within the subsection, both within and outside the AQMAs. The locations are shown in Figure 8.4 and results shown in Appendix 8.1.

- 8.5.30 Monitored annual mean concentrations within the AQMAs exceed the annual mean objective for nitrogen dioxide (2E-1 to 2E-4). The maximum monitored annual mean concentration was 66.1 $\mu\text{g}/\text{m}^3$ on Walton Street within the Stoke Road AQMA (Location 2E-2).
- 8.5.31 Outside of the AQMA concentrations are generally well below the annual mean objective for NO_2 . As such, the air quality is generally good outside of the air quality management areas (AQMA).
- 8.5.32 Within the Study Area in this sub-section, mapped background concentrations from national modelling⁸⁶ are well within the air quality objectives for NO_2 and PM_{10} in 2015, as follows, and expected to decrease or hold steady in the future:
- NO_2 6 - 15 $\mu\text{g}/\text{m}^3$; and
 - PM_{10} 11 - 15 $\mu\text{g}/\text{m}^3$.

Milton Keynes Council (MKC) Sub-Section

- 8.5.33 There are no AQMAs within or adjacent to the Study area in this sub-section. MKC declared an AQMA in Olney in 2008, but this is too distant (>10 km) from the Project to be relevant to the assessment.
- 8.5.34 MKC do not monitor pollution levels in Bletchley at present, although monitoring was previously undertaken at an urban background location on Selbourne Avenue. NO_2 concentrations were consistently well below the objective and monitoring was discontinued in 2005.
- 8.5.35 NO_2 concentrations are monitored in Milton Keynes itself, at both roadside and urban background locations¹⁰⁰. Air quality in the town is currently good with no monitored exceedances or risk of exceedances of the air quality objectives. At the Civic Offices, 2015 annual mean concentrations were 18.8 $\mu\text{g}/\text{m}^3$ monitored using a continuous analyser. This is well within the objective of 40 $\mu\text{g}/\text{m}^3$. No exceedances of the hourly mean standard (200 $\mu\text{g}/\text{m}^3$) were recorded. Concentrations at this location show a slightly decreasing temporal trend from 2000 onwards. Pollutant concentrations at roadside locations in the centre of the town were similarly low.

¹⁰⁰ Milton Keynes Council, 2016, 2016 Annual Status Report

- 8.5.36 Monitored concentrations of PM₁₀ at the Civic Offices were well below the daily and annual mean objectives in 2015 (and in previous years): 14.8 µg/m³ as an annual mean, with one exceedance of the daily mean standard (50 µg/m³) when 35 are permitted under the objective.
- 8.5.37 Project specific monitoring was undertaken at 23 locations for NO₂ and one location for NO_x within the sub-section. The locations are shown in Figure 8.5 and results shown in Appendix 8.1.
- 8.5.38 Monitored concentrations were well below the annual mean objective for NO₂. The maximum monitored annual mean concentration was 29.3 µg/m³, monitored at Saxon Street, B4034 (Location ID: 2B-3). More typically, annual mean concentrations were of the order of 23 µg/m³.
- 8.5.39 Overall, therefore, the air quality in the Study Area in this sub-section is good.
- 8.5.40 Within the Study Area in this sub-section, mapped background concentrations from national modelling⁸⁶ are well within the air quality objectives for NO₂ and PM₁₀ in 2015, as follows, and expected to decrease or hold steady in the future:
- NO₂ 12 - 18µg/m³; and
 - PM₁₀ 12 - 15µg/m³.

Central Bedfordshire Council (CBC) Sub-Section

- 8.5.41 There are no AQMAs declared within CBC within or adjacent to the Study Area. The closest monitoring in the CBC sub-section to the Project is undertaken in Brogborough at a kerbside site (Highfield Crescent)¹⁰¹. This site is approximately 1 km to the north-east of Junction 13 on the M1, which is a road identified to be used by construction traffic for the Project. In 2015, the concentration of annual mean nitrogen dioxide was 33.6 µg/m³. This is within the air quality objective. Concentrations closer to the M1 are likely to be higher although there are few receptors in this area.
- 8.5.42 There is no significant trend in the data over recent years.

¹⁰¹ Highfield Crescent, Brogborough

8.5.43 Project specific monitoring was undertaken at 16 locations for NO₂ within the sub-section. The locations are shown in Figure 8.6 and results shown in Appendix 8.1.

8.5.44 Monitored annual mean concentrations are well below the annual mean objective for NO₂. As such, the air quality in the Study Area in this sub-section is good.

8.5.45 The maximum recorded concentration was 27.6 µg/m³ recorded at 2D-23 to the north of Lidlington on Sheep Tick End.

8.5.46 Within the Study Area in this sub-section, mapped background concentrations from national modelling⁸⁶ are well within the air quality objectives for NO₂ and PM₁₀ in 2015, as follows, and expected to decrease or hold steady in the future:

- NO₂ 9 - 11µg/m³; and
- PM₁₀ 12 - 17µg/m³.

Bedford Borough Council (BBC) Sub-Section

8.5.47 BBC has declared an AQMA in Bedford Town Centre. In 2015, concentrations of NO₂ up to 48 µg/m³ were monitored within the AQMA, although concentrations had decreased from previous years. The AQMA is within the Study Area. Outside of the AQMA, concentrations are below the objective although a mixed use development on Ampthill Road has the potential to increase concentrations in an area where concentrations in 2015 were below the objective.

8.5.48 Project specific monitoring was undertaken at 23 locations for NO₂ and one location for NO_x within the sub-section. The locations are shown in Figure 8.7 and results shown in Appendix 8.1.

8.5.49 Monitored concentrations within Bedford AQMA were, in places, above the annual mean objective for NO₂. The maximum recorded concentration was 58.8 µg/m³ recorded at 2D-2 within the Bedford Town Centre AQMA on Kempston Rd. Monitored concentrations outside of Bedford and the AQMA are below the annual mean objective for nitrogen dioxide.

8.5.50 Within the Study Area in this sub-section, mapped background concentrations from national modelling⁸⁶ are well within the air quality objectives for NO₂ and PM₁₀ in 2015, as follows, and expected to decrease or hold steady in the future:

- NO₂ 10 - 18µg/m³; and
- PM₁₀ 14 - 17µg/m³.

Wycombe District Council (WDC) Sub-Section

8.5.51 No monitoring data is available in the WDC sub-section, but with the Study Area being predominantly rural with no major roads, air quality is likely to be good.

8.5.52 WDC has not declared an AQMA within the Study Area or adjacent to the Study Area.

8.5.53 Project specific monitoring was undertaken at 16 locations for NO₂ within the sub-section. The locations are shown in Figure 8.8 and results shown in Appendix 8.1.

8.5.54 Generally air quality is good within the district with the majority of monitored annual mean concentrations well below the annual mean objective for NO₂. The maximum recorded annual mean concentration was 35.1µg/m³ recorded at 2F-14 at the Terrick crossroads on the A4010.

8.6 Effects

Overview

8.6.1 The potential impacts of the Project were identified as:

- During construction:
 - Impacts from emissions arising from construction activities and construction traffic; and
- During operation:
 - Impacts from changes to emissions to air from road and rail transport.

- 8.6.2 During construction, emissions from construction activities can give rise to impacts due to loss of amenity (dust), on human health (from increased particulate matter), and on ecological receptors (from dust deposition).
- 8.6.3 Of these, impacts on human health during construction can be immediately screened out of the assessment, as background particulate matter concentrations are below $24\mu\text{g}/\text{m}^3$, which, in combination with the low numbers of receptors within 20m of the Project gives a low sensitivity to the study area⁶².
- 8.6.4 Using Table 8.5, for risks of impacts from construction works to be medium or high risk and therefore warranting site specific mitigation, the sensitivity of the area to effects must be medium or high, irrespective of the magnitude of the potential dust emissions. In the Study area, the maximum background concentrations of PM_{10} identified in the baseline section (from national mapped concentrations) were $17\mu\text{g}/\text{m}^3$; the maximum period mean concentrations in the project-specific monitoring were $9.6\mu\text{g}/\text{m}^3$. Using Table 8.6, the sensitivity of the Project wide Study Area to impacts on health is, therefore, low. As such, with standard and best practice mitigation measures (as set out in Appendix 8.5) any effects of emissions will be not significant.
- 8.6.5 Impacts from mobile emissions from rail locomotives during operation of the Project can also be screened out of the assessment. The LAQM.TG(16) criteria for requiring an assessment of impacts included a requirement that the background concentrations of NO_2 were over $25\mu\text{g}/\text{m}^3$. Background NO_2 in the 2015 mapped data were a maximum of $18\mu\text{g}/\text{m}^3$, well below the trigger for an assessment. As such, effects of emissions from diesel trains will be not significant.
- 8.6.6 The operation of the Project will result in emissions of approximately 270 tonnes NO_x /year from diesel trains in the Core scenario and 306 tonnes NO_x /year in the Growth scenario. These represent 0.7% and 0.8% of total emissions from rail in the UK in 2015.
- 8.6.7 At the local scale, no significant effects are likely to result from these emissions (due to the low background concentrations of NO_2). However,

current projections indicate that the UK will not meet its NECD NOx emissions target for 2030 and the Project will increase national emissions from rail by just under 1%. A corresponding reduction in emissions from road transport as a result of modal shift may offset this to some degree.

8.6.8 The following sections set out the assessment of significant effects resulting from:

- Loss of amenity or harm to sensitive habitats due to dust deposition during construction; and
- Increased exposure to air pollution due to construction traffic.

Cherwell District Council (CDC) Sub-Section

Dust Deposition

8.6.9 The detailed assessment of all construction activities occurring within the CDC sub-section is provided in Appendix 8.3. Table 8.9 sets out a summary of activities potentially giving rise to a high or medium risk of dust impacts prior to mitigation.

Table 8.9 Activities in the CDC sub-section with medium to high risk of dust impacts

Construction Category	Specific Construction Activity	Comment
Structures and Crossings	OXD 36 and Manor Farm (Launton) crossings are assessed as having a medium risk of impact	Risk is medium since there are more than 10 but fewer than 50 properties in proximity to the works, to the south of Launton
General and Ancillary Civils	Use of onsite haul roads near Launton village	Medium risk

Construction Traffic

8.6.10 The construction traffic routes through the CDC sub-section and the average daily traffic movements on the routes across the construction period are shown in Appendix 8.6, Table 8.6.1. All movements are well below the IAQM planning guidance criteria (as explained in paragraph 8.4.2) of 25 HDVs per day and no significant effects are anticipated. For

more information about proposed traffic movements, refer to Chapter 14 (Traffic and Transport).

Operation Emissions - Rail

8.6.11 The operation of the Project will result in increased emissions of NO_x/year from diesel trains in both scenarios. Emissions from the CDC sub-section account for 0.048% and 0.054% of 2015 UK emissions from rail in the Core and Growth scenarios respectively.

8.6.12 At the local scale, no significant effects are likely to result from these emissions (due to the low background concentrations of NO₂).

Aylesbury Vale: Claydon/Quainton Sub-section

Dust Deposition

8.6.13 The detailed assessment of all construction activities occurring within the Aylesbury Vale: Claydon/Quainton sub-section is provided in Appendix 8.3. Table 8.10 sets out a summary of activities potentially giving rise to a high or medium risk of dust impacts prior to mitigation.

Table 8.10 Activities in the Aylesbury Vale: Claydon/Quainton sub-section with medium to high risk of dust impacts

Construction Category	Specific Construction Activity	Comment
Earthworks and Track Construction	These Works in this sub-section have medium dust risk	This sub-section requires significant volume of materials moved to bring track up to current standards. However, area is sparsely populated. Areas with a medium risk are: <ul style="list-style-type: none"> • B1 – Railway Cottages adjacent to Steeple Claydon compound • B2 – Properties in Verney Junction adjacent to the works.

Construction Category	Specific Construction Activity	Comment
Structures and Crossings	Crossings OXD 32 (Station Road Poundon, and Claydon/Queen Catherine Road, Steeple Claydon) have medium risk	Risk is medium since there are more than 10 but fewer than 50 properties in proximity to the works
General and Ancillary Civils	Use of onsite haul roads close to Compound B1 – Steeple Claydon and B2 - Verney Junction	Medium risk at: <ul style="list-style-type: none"> • Compound B1 – Railway Cottages adjacent to Steeple Claydon compound • Compound B2 – Properties in Verney Junction adjacent to the compound.

Construction Traffic

8.6.14 The construction traffic routes through the Aylesbury Vale: Claydon/Quainton sub-section and the average daily traffic movements on the route across the construction period are shown in Appendix 8.6, Table 8.6.2. All movements are well below the criteria of 25 HDVs per day and no significant effects are anticipated.

Operation Emissions - Rail

8.6.15 The operation of the Project will result in increased emissions of NO_x/year from diesel trains in both the Core and Growth scenarios. Emissions from the Aylesbury Vale: Claydon/Quainton sub-section account for 0.25% and 0.28% of 2015 UK emissions from rail in the Core and Growth scenarios respectively. At the local scale, no significant effects are likely to result from these emissions (due to the low background concentrations of NO₂).

Aylesbury Vale: Winslow/Swanbourne Sub-Section

Dust Deposition

8.6.16 The detailed assessment of all construction activities occurring within the Aylesbury Vale: Winslow/Swanbourne sub-section is provided in Appendix 8.3. Table 8.11 sets out a summary of activities potentially giving rise to a high or medium risk of dust impacts prior to mitigation.

Table 8.11 Activities in Aylesbury Vale: Winslow/Swanbourne sub-section with medium to high risk of dust impacts

Construction Category	Specific Construction Activity	Comment
Use of Construction Compounds	Use of Strategic Compound B6 (Compounds B3.1, B4, B5 low risk)	Properties to the west of B6 (Bletchley) compound are at a high risk of trackout (122 - 132 Bletchley Road)
Earthworks and Track Construction	Work in this sub-section has high dust risk	This sub-section requires significant volume of materials moved to bring track up to current standards. However, area is sparsely populated. Area with a medium risk are: <ul style="list-style-type: none"> • Compound B3 (Furze Lane)– properties to the south of the line in Winslow between Furze Lane and Clare Farm
Station Works	Construction of Winslow Station has medium dust risk	The risk of dust impacts is downgraded to low as the platforms and associated access will be built below grade in a cutting, whereas the main station building will be built at grade but further away from the residential properties
Structures and Crossings	Crossings OXD 20 (Furze Lane, Winslow), OXD 16 (Horwood Road Winslow), OXD 14 (Moco Farm, Winslow), and OXD 10 (Salden Wood) have medium risk	Risk is medium since there are more than 10 but fewer than 50 properties in proximity to the works; Ancient woodland within 20m
General and Ancillary Civils	Use of onsite haul roads between Furze Lane and Clare Farm is medium risk, and access roads next to Salden Wood	Properties affected are to the south of the track in Winslow between Furze Lane and Clare Farm Access road passes within 20m of Salden Wood.

Construction Traffic

8.6.17 The construction traffic routes through the Aylesbury Vale: Winslow/Swanbourne sub-section and the average daily traffic movements on the route across the construction period are shown in

Appendix 8.6, Table 8.6.3. All movements are well below the criteria of 25 HDVs per day and no significant effects are anticipated.

Operation Emissions - Rail

8.6.18 The operation of the Project will result in increased emissions of NO_x/year from diesel trains in both scenarios. Emissions from the Aylesbury Vale: Winslow/Swanbourne sub-section account for 0.17% and 0.20% of 2015 UK emissions from rail in the Core and Growth scenarios respectively. At the local scale, no significant effects are likely to result from these emissions (due to the low background concentrations of NO₂).

Aylesbury Vale: Aylesbury Sub-Section

Dust Deposition

8.6.19 The detailed assessment of all construction activities occurring within Aylesbury Vale: Aylesbury is provided in Appendix 8.3. Table 8.12 sets out a summary of activities potentially giving rise to a high or medium risk of dust impacts prior to mitigation.

Table 8.12 Activities in the Aylesbury Vale: Aylesbury sub-section with medium to high risk of dust impacts

Construction Category	Specific Construction Activity	Comment
Earthworks and Track Construction	Work in this sub-section has a high dust risk	Compound E5 - properties to the south of Pershore way, properties to the north of the track in the Haydon Hill area (up to Rabans Lane), properties to the south of the track between Rabans Lane and Oxford Road and, properties on Friarscroft Way north of the track
Station Works	No medium/high risk activities	N/A
Structures and Crossings	Crossings at Lower Blackgrove Farm No.1 and MCJ161 (California Brook Culvert)	Risk is medium since there are more than 10 but fewer than 50 properties in proximity to the works

Construction Category	Specific Construction Activity	Comment
General and Ancillary Civils	Use of haul roads between AVP and Aylesbury Central Station is medium risk (Section E5)	Properties at risk include: Properties to the south of Pershore way, properties to the north of the track in the Haydon Hill area (up to Rabans Lane), properties to the south of the track between Rabans Lane and Oxford Road and, properties on Friarscroft Way north of the track.

Construction Traffic

- 8.6.20 The construction traffic routes through the Aylesbury Vale: Aylesbury sub-section and the average daily traffic movements on the route across the construction period are shown in Appendix 8.6, Table 8.6.4. All movements are well below the criteria of 25 HDVs per day and no significant effects are anticipated whether or not HDVs travel through the AQMA.

Operation Emissions - Rail

- 8.6.21 The operation of the Project will result in increased emissions of NO_x/year from diesel trains in both scenarios. Emissions from the Aylesbury Vale: Aylesbury sub-section account for 0.044% and 0.045% of 2015 UK emissions from rail in the Core and Growth scenarios respectively. At the local scale, no significant effects are likely to result from these emissions (due to the low background concentrations of NO₂).

Milton Keynes Council (MKC) Sub-Section

Dust Deposition

- 8.6.22 The detailed assessment of all construction activities occurring within the MKC sub-section is provided in Appendix 8.3. Table 8.13 sets out a summary of activities potentially giving rise to a high or medium risk of dust impacts prior to mitigation.

Table 8.13 Activities in the MKC sub-section with medium to high risk of dust impacts

Construction Category	Specific Construction Activity	Comment
Use of Construction Compounds	Use of Strategic Compound B6 (Compounds C1,C2,C3 low risk)	Medium risk since <50 properties within 50m of the compound. However there is a densely populated area on the other side of the Project Boundary to the compound
Earthworks and Track Construction	Work in this sub-section has a high dust risk	B6 - properties in Bletchley to the North of the track, from the Bletchley Road bridge to the Water Eaton Road bridge.
Structures and Crossings	Woodleys Farm overbridge and Newton Road bridge has medium risk	Risk is medium since there are more than 10 but fewer than 50 properties in proximity to the works
General and Ancillary Civils	Use on haul roads between Bletchley compound and Water Eaton Road has medium risk	Affected properties include properties in Bletchley to the North of the track, from the Bletchley Road bridge to the Water Eaton Road bridge

Construction Traffic

- 8.6.23 The construction traffic routes through the MKC sub-section and the average daily traffic movements on the route across the construction period are shown in Appendix 8.6, Table 8.6.5. All movements are well below the criteria of 25 HDVs per day and no significant effects are anticipated.

Operation Emissions - Rail

- 8.6.24 The operation of the Project will result in increased emissions of NO_x/year from diesel trains in both scenarios. Emissions from the MKC sub-section account for 0.14% and 0.17% of 2015 UK emissions from rail in the Core and Growth scenarios respectively. At the local scale, no significant effects are likely to result from these emissions (due to the low background concentrations of NO₂).

Central Bedfordshire Council (CBC) Sub-Section

Dust Deposition

8.6.25 The detailed assessment of all construction activities occurring within the CBC sub-section is provided in Appendix 8.3. Table 8.14 sets out a summary of activities potentially giving rise to a high or medium risk of dust impacts prior to mitigation.

Table 8.14 Activities in the CBC sub-section with medium to high risk of dust impacts

Construction Category	Specific Construction Activity	Comment
Use of Construction Compounds	No medium/high risk activities	N/A
Earthworks and Track Construction	No medium/high risk activities	N/A
Station Works	No medium/high risk activities	N/A
Structures and Crossings	No medium/high risk activities	N/A
General and Ancillary Civils	No medium/high risk activities	N/A

Construction Traffic

8.6.26 The construction traffic routes through the CBC sub-section and the average daily traffic movements on the route across the construction period are shown in Appendix 8.6, Table 8.6.6. All movements are well below the criteria of 25 HDVs per day and no significant effects are anticipated.

Operation Emissions - Rail

8.6.27 The operation of the Project will result in increased emissions of NO_x/year from diesel trains in both scenarios. Emissions from the CBC sub-section account for 0.019% and 0.020% of 2015 UK emissions from rail in the Core and Growth scenarios respectively. At the local scale, no significant

effects are likely to result from these emissions (due to the low background concentrations of NO₂).

Bedford Borough Council (BBC) Sub-Section

Dust Deposition

8.6.28 The detailed assessment of all construction activities occurring within the BBC sub-section is provided in Appendix 8.3. Table 8.15 sets out a summary of activities potentially giving rise to a high or medium risk of dust impacts prior to mitigation.

Table 8.15 Activities in the BBC sub-section with medium to high risk of dust impacts

Construction Category	Specific Construction Activity	Comment
Structures and Crossings	Manor Road overbridge (Kempston Hardwick)	Risk is medium since there are more than 10 but fewer than 50 properties in proximity to the works
General and Ancillary Civils	Haul roads around Kempston Hardwick crossing	Haul roads may impact on the Eastwood Cottages to the south of the Project Boundary

Construction Traffic

8.6.29 The construction traffic routes through the BBC sub-section and the average daily traffic movements on the route across the construction period are shown in Appendix 8.6, Table 8.6.7. All movements are well below the criteria of 25 HDVs per day and no significant effects are anticipated.

Operation Emissions - Rail

8.6.30 The operation of the Project will result in increased emissions of NO_x/year from diesel trains in both scenarios. Emissions from the BBC sub-section account for 0.016% and 0.016% of 2015 UK emissions from rail in the Core and Growth scenarios respectively. At the local scale, no significant effects are likely to result from these emissions (due to the low background concentrations of NO₂).

Wycombe District Council (WDC) Sub-Section

- 8.6.31 The only works associated with the Project for the WDC sub-section are the platform extension at Princes Risborough. These are assessed as not having significant effects.

8.7 Mitigation

Dust Deposition

- 8.7.1 The following section, Tables 8.16 to 8.21, summarises the site-specific mitigation required for the areas highlighted in Section 8.6 as being of medium or high risk of dust impacts. No mitigation is required for the CBC sub-section except for that which is embedded into the Project design and construction strategy.
- 8.7.2 It is assumed that the site specific mitigation applied in this section will be in addition to the mitigation already outlined in Appendix 8.5, which will be put in place as part of the Code of Construction Practice (CoCP). These include wheel washing facilities or sufficient length of surfaced haul road to ensure vehicles exiting site are free of mud / loose debris at every access point to the public highway to reduce trackout to a minimum, as well as provision of a road sweep to damp down and wash access points and approach roads.
- 8.7.3 Should standard best practice, as detailed in the CoCP, be assessed not be sufficient or practicable and a sensitive receptor is within 20m of the dust generating activity, localised protection between the Project Boundary and sensitive receptors will be considered. The use of this protection will be applied based upon site specific risk assessment during construction. Protection could take the form of boundary hoarding if existing screening of vegetation or structures does not form a sufficient barrier.

Table 8.16 Proposed Mitigation within the CDC sub-section

Construction Category	Specific Location	Mitigation
Track Building (including Haul Roads)	Construction Sub-section: A1 Location around OXD36 and Manor Farm Crossing including properties to the south in Launton village	<ul style="list-style-type: none"> Regular monitoring of construction site. Use of hard surfaces haul routes to minimise risk of trackout Damp down surfaces when needed.

Table 8.17 Proposed Mitigation within the Aylesbury Vale: Claydon/Quinton sub-section

Construction Category	Specific Location	Proposed Mitigation
Earthworks and Track Construction including Haul Roads	Construction Sub-section: B1/B2 Railway Cottages adjacent to Steeple Claydon Compound Properties adjacent to the track at Verney Junction	<ul style="list-style-type: none"> Regular monitoring of construction site Use of hard surfaces haul routes to minimise risk of trackout Localised hoarding where necessary, Seed long-term soil stockpiles.
Structures and crossings	Construction Sub-section: B1/B2 OXD32 Claydon/Queen Catherine Rd	<ul style="list-style-type: none"> Regular monitoring of construction site Use of hard surfaces haul routes to minimise risk of trackout

Table 8.18 Proposed Mitigation within the Aylesbury Vale: Winslow/Swanbourne sub-section

Construction Category	Specific Location	Mitigation
Use of Construction Compounds	Construction Sub-section: B6 Bletchley 122 to 132 Bletchley Road	<ul style="list-style-type: none"> Regular monitoring of construction site Localised hoarding where necessary,
Earthworks and Track	Construction Sub-section: B5 Salden Wood	<ul style="list-style-type: none"> Regular monitoring of construction site

Construction Category	Specific Location	Mitigation
Construction (including Haul Roads)	Sub-section: B6 Haul roads adjacent to 122 to 132 Bletchley Road	<ul style="list-style-type: none"> • Use of hard surfaces haul routes to minimise risk of trackout • Damp down surfaces when needed. • Localised hoarding where necessary,
Structures and crossings	Construction Sub-section: B2 Winslow OXD 20 Furze Lane, OXD 16 Horwood Rd OXD 14 Moco Farm	<ul style="list-style-type: none"> • Regular monitoring of construction site • Use of hard surfaces haul routes to minimise risk of trackout • Damp down surfaces when needed.
	Construction Sub-section: B5 OXD10 Salden Wood	<ul style="list-style-type: none"> • Regular monitoring of construction site • Use of hard surfaces haul routes to minimise risk of trackout • Damp down surfaces when needed. • Localised hoarding where necessary

Table 8.19 Proposed Mitigation within Aylesbury Vale: Aylesbury sub-section

Construction Category	Specific Location	Mitigation
Earthworks and Track Construction (including Haul roads)	Construction Sub-section: E5 properties to the south of Pershore way, properties to the north of the track in the Haydon Hill area (up to Rabans Lane), properties to the south of the track between Rabans Lane and Oxford Road, and properties on Friarscroft Way north of this track	<ul style="list-style-type: none"> • Regular monitoring of construction site • Use of hard surfaces haul routes to minimise risk of trackout • Localised hoarding where necessary,
Structures and crossings	Construction Sub-section: E5 MCJ161 (California Brook Culvert)	<ul style="list-style-type: none"> • Regular monitoring of construction site • Use of hard surfaces haul routes to minimise risk of trackout

Table 8.20 Proposed Mitigation within the MKC sub-section

Construction Category	Specific Location	Mitigation
Earthworks and Track Construction (including Haul roads)	Construction Sub-section: B5/C1 Properties to the north of the track in Bletchley including Holne Chase Primary School up to compound C1	<ul style="list-style-type: none"> Regular monitoring of construction site Use of hard surfaces haul routes to minimise risk of trackout Localised hoarding where necessary
Structures and crossings	Construction Sub-section: E5 MCJ161 (California Brook Culvert)	<ul style="list-style-type: none"> Regular monitoring of construction site Use of hard surfaces haul routes to minimise risk of trackout

Table 8.21 Proposed Mitigation within the BBC sub-section

Construction Category	Specific Location	Mitigation
Earthworks and Track Construction (including Haul roads)	Construction Sub-section: D2 Properties to the south of the Project on Manor Road, Kempston Hardwick	<ul style="list-style-type: none"> Regular monitoring of construction site Monitoring of area and boundary, with records kept of inspections and any actions.
Structures and crossings		<ul style="list-style-type: none"> Use of hard surfaces haul routes to minimise risk of trackout Regularly damp down surfaces when needed.

Construction Traffic

8.7.4 No significant effects are expected from construction traffic based on the relatively low numbers of HDVs expected on the individual haulage routes. This will be confirmed in the Final ES, which will consider the construction routes in combination, including LDV flows. Traffic will be managed as part of a Construction Traffic Management Plan, in line with measures set out in the overarching CoCP.

Operation Emissions

- 8.7.5 The Project will increase national emissions from diesel rail locomotives, particularly when all phases of the EWR Programme are taken into account. However, these impacts will be partially, if not wholly, offset by a decrease in emissions from road transport from both passenger cars and freight due to modal shift. This draft assessment has not undertaken a formal quantification of this offset for air pollutants, though the final ES will provide a quantification of this offset.

8.8 Residual Effects

Dust Deposition

- 8.8.1 With the effective implementation of both standard and site-specific dust management measures, no significant residual effects are likely. The Final ES will confirm the mitigation required.

Construction Traffic

- 8.8.2 Based on the traffic information considered for this draft assessment, no significant effects are expected as a result of construction. This will be confirmed in the Final ES, which will consider construction routes in combination, including LDV flows.

Operation Emissions

- 8.8.3 With the expected offset of emissions from rail through modal shift, no significant residual effects are likely.