

The West Midlands Rail Freight Interchange Order 201X ES - Vol 1 -
Chapter 7: Air Quality
Regulation 5(2)(a)
Ramboll - July 2018

7 Air Quality

Introduction

- 7.1 This chapter of the ES assesses the likely significant environmental effects of the Proposed Development in respect of air quality. In particular, this chapter describes the relevant legislation and air quality policy context; the methods used for assessment and details of the criteria used to determine significance; and the baseline air quality conditions at and surrounding the Site.
- 7.2 This chapter has been written by Ramboll.

Legislation and Policy Context

International Legislation & Agreements

- 7.3 Local air quality is monitored and managed under a range of national and international legislation which sets out procedures, guidelines and standard limits for specific commonly occurring air pollutants. Legislation is based upon the effects of air pollutants to human health and safety, the environment, ecosystems, and effects to buildings and structures.

The European Air Quality Directives 2008/50/EC and 2004/107/EC

- 7.4 The European Air Quality Directive 2008/50/EC¹ on ambient air quality and cleaner air for Europe (CAFE) establishes a strategic framework for setting European-wide limit and/or target values for seven pollutants (nitrogen oxides, particulate matter, sulphur dioxide, ozone, carbon monoxide, lead and benzene). Limit values for heavy metals and polycyclic aromatic hydrocarbons are established by the Fourth-Daughter Directive 2004/107/EC² and are based on recommendations made by the World Health Organisation (WHO).
- 7.5 These directives have been transposed into UK legislation and implemented in England by the Air Quality Standards Regulations 2016³. Overall responsibility for achieving the limits lies with the Secretary of State; however, local authorities have a role through their duties to work towards meeting the national air quality objectives which are similar, or in some cases, more stringent than the EU limit values.

National Legislation and Policy

National Policy Statement for National Networks, 2014

- 7.6 This document⁴ requires that an assessment of air quality impacts is undertaken where impacts of the project are likely to have significant air quality effects and/or affect the UK's ability to comply with the Air Quality Directive.
- 7.7 The NPS requires that the assessment should describe the existing situation, forecast air quality and any significant effects including residual effects, taking into account the impact of traffic generated by the project (paragraph 5.7).

- 7.8 Paragraph 5.8 of the NPS indicates that an applicant's assessment may include more detailed air quality modelling.
- 7.9 Consideration of the effects on air quality will be particularly relevant where changes as a result of a project are sufficient to identify the need for a new air quality management area (AQMA) or affect the size of an existing AQMA (paragraph 5.11).
- 7.10 Paragraph 5.12 states that the Secretary of State must give air quality considerations substantial weight where, after taking into account mitigation, a project would lead to a significant air quality impact in relation to EIA and/or where they lead to a deterioration in air quality in a zone/agglomeration⁵. It requires (paragraphs 5.14 and 5.15) that the proposed mitigation measures should ensure that the net impact of a project does not delay the point at which a zone will meet compliance objectives. Measures could include, but are not limited to, changes to the proximity of vehicles to local receptors, physical means including barriers to trap or better disperse emissions, and speed control.
- 7.11 Paragraph 5.13 states that the Secretary of State should refuse consent where a scheme would result in a zone/agglomeration which is compliant with the limits set by the Air Quality Directive becoming non-compliant or where a scheme would affect the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the European Commission.

National Planning Policy Framework, 2012

- 7.12 The following paragraphs/policies⁶ are considered relevant to the Air Quality assessment:
- "109: 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";
- "110: In preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment. Plans should allocate land with the least environmental or amenity value, where consistent with other policies in this Framework";
- "120: 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"; and
- "124: 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."

¹ European Commission. European Air Quality Directive 2008/50/EC. 2008.

² European Commission. Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. 2004.

³ Air Quality Regulations 2016 – Statutory Instrument 2016 No. 1184.

⁴ National Policy Statement for National Networks, DfT 2014

⁵ The nearest zone/agglomeration to the site is UK0002 – West Midlands Urban Area, which includes Wolverhampton. The site is not within this area.

⁶ Department for Communities and Local Government. National Planning Policy Framework. National Planning Policy Framework. S.I. : Department for Communities and Local Government, 2012

National Planning Practice Guidance, 2014

- 7.13 This provides⁷ guiding principles on how planning can take account of the impact of new development on air quality.
- 7.14 The guidance states that when deciding whether air quality is relevant to a planning application, considerations could include whether the development would:
- Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads;
 - Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations; and
 - Affect biodiversity. In particular, is it likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site, and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites.

Air Quality Strategy for England, Scotland, Wales and Northern Ireland

- 7.15 The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)⁸ most recently updated in July 2007. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that the European Union and International agreements are met in the UK.
- 7.16 The AQS covers ten air pollutants. These are ammonia (NH₃), benzene (C₆H₆), 1,3 butadiene (C₄H₆), carbon monoxide (CO), lead (Pb), oxides of nitrogen (NO_x) (including nitrogen dioxide NO₂), particulate matter (PM₁₀ and PM_{2.5}), sulphur dioxide (SO₂), ozone (O₃), and polycyclic aromatic hydrocarbons (PAHs).
- 7.17 The AQS sets standards and objectives for the ten listed pollutants. Standards are the concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects on human health (including sensitive sub-groups) or ecosystems. In general these are concentration limits above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects. Objectives are policy targets often expressed as maximum concentrations not to be exceeded either without exception or with a limited number of exceedances within a specified timescale.
- 7.18 For some pollutants, there is both a long-term (e.g. annual mean) standard and a short-term (e.g. one hour mean) standard, to reflect the varying impacts on health of differing exposures to pollutants. Long-term standards are generally lower than short-term standards owing to the chronic health effects associated with exposure to low concentrations of pollutants for longer periods of time.
- 7.19 In July 2017 the Government published its Air Quality Plan for nitrogen dioxide in the UK⁹. The aim of the plan is to achieve the statutory limit values for NO₂ for the whole of the UK within the shortest time. The plan therefore sets out the measures the government will take to tackle traffic related emissions and assist local authorities to reduce local NO₂ emissions.

⁷ National Planning Practice Guidance, 2014

⁸ DEFRA. Air Quality Strategy. Air Quality Strategy for England, Scotland, Wales and Northern Ireland. London. S.I.: The Stationery Office, 2007.

⁹ DEFRA and DfT, UK Plan for tackling roadside nitrogen dioxide concentrations, Detailed Plan, July 2017.

¹⁰ UK Government. Air Quality (England) Regulations 2000. Air Quality (England) Regulations 2000, Statutory Instrument 2000 No 928. S.I.: UK Government, 2000.

Air Quality (England) Regulations

- 7.20 Many of the objectives in the AQS were made statutory in England with the Air Quality (England) Regulations 2000¹⁰ and the Air Quality (England) (Amendment) Regulations 2002¹¹ for the purpose of Local Air Quality Management (LAQM). The air quality regulations have subsequently been amended and the objectives are now included within the Air Quality Standards (Amendment) Regulations 2016. The objectives for NO₂, PM₁₀, which are relevant to this assessment are shown below in Table 7.1.
- 7.21 The DEFRA Local Air Quality Management Policy Guidance (LAQM.PG(16))¹² sets out new guidance on the role and responsibilities of local authorities with regard to the pollutant PM_{2.5}. There is no regulatory standard applied to PM_{2.5} concentrations for local authorities in England, however, local authorities are expected to work towards reducing emissions and concentrations of PM_{2.5} in their area. The policy guidance recommends that local authorities in England use the EU Ambient Air Quality Directive¹³ standards for PM_{2.5} including an exposure reduction obligation, a target value and a limit value as a guide. Air quality guidance by EPUK and IAQM also recommends assessing impacts on local PM_{2.5} instead of PM₁₀ providing a more conservative approach to an assessment. The national air quality objective (NAQO) for PM_{2.5} is also included in Table 7.1.

Table 7.1: Relevant Objectives set out in the Air Quality Strategy

Pollutant	Concentrations	Measured As	Date to be Achieved by
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times per year	1-hour mean	31 December 2005
	40 µg/m ³	Annual mean	31 December 2005
Particulate Matter (PM ₁₀)	50 µg/m ³ not to be exceeded more than 35 times per year	24-hour mean	31 December 2004
	40 µg/m ³	Annual mean	31 December 2004
PM _{2.5}	25 µg/m ³	Annual mean	-

- 7.22 Objectives included in the Air Quality (England) Regulations are generally more stringent than those included within EU legislation and other English regulations. Throughout this chapter, reference to statutory standards or objectives means those included within the Air Quality Standards (Amendment) Regulations 2016.
- 7.23 Whilst the objectives and EU limits values for NO₂ and PM₁₀ are identical in relation to the concentrations that apply, they are different and it is important to understand how they are interpreted and therefore assessed. Local authorities are required to demonstrate best efforts to achieve the AQS objectives whereas the UK government is legally required to achieve the EU Limit Values.
- 7.24 The objectives apply at locations where members of the public would be exposed over the relevant exposure period. For example, the annual mean objective applies at the building façades of residential properties and public buildings, but does not apply in gardens of

¹¹ Air Quality (England) (Amendment) Regulations 2002. Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 2002 No 3043. S.I.: UK Government, 2002.

¹² DEFRA (2016) Local Air Quality Management Policy Guidance (PG16) LAQM.PG(16)

¹³ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:152:0001:0044:EN:PDF>

residential properties, at the building façades of offices or other places of work or at kerbside locations where public exposure would be short term. The one hour mean objective would apply at any outdoor location where members of the public might reasonably be expected to spend an hour or longer.

- 7.25 In 2015 Draft Regulations¹⁴ were published that would revoke the 2000 and 2002 Regulations however these have not yet been introduced. These draft regulations propose to reduce the number of pollutants with air quality objective levels from seven to three (NO₂, PM₁₀ and SO₂).

Local Air Quality Management (LAQM)

- 7.26 Part IV of the Environment Act 1995¹⁵ requires local authorities to periodically review and assess the quality of air within their administrative area. The reviews have to consider the present and future air quality and whether any air quality objectives prescribed in regulations are being achieved or are likely to be achieved in the future.
- 7.27 Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate an AQMA.
- 7.28 For each AQMA the local authority has a duty to draw-up an air quality action plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.
- 7.29 DEFRA has published technical guidance for use by local authorities in their review and assessment work. This guidance, referred to in this report as LAQM.TG (16)¹⁶, has been reviewed and used, where appropriate, within the assessment.

General Nuisance Legislation

- 7.30 The local authority has powers and duties to address issues arising from dust through the statutory nuisance provisions of the Environmental Protection Act 1990¹⁷ (EPA). Regulation through the use of statutory nuisance provides a crucial level of protection in respect of problems that were not anticipated at the planning or permitting stage.
- 7.31 Section 79(1)(d) EPA sets out this statutory nuisance as: "Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance".
- 7.32 There are no statutory or universal standards that define what level of dust constitutes a nuisance. 'Acceptable levels' is a subjective term, in that what is deemed acceptable to one person may not be deemed acceptable to another. The issue is further complicated by the varied methods available to quantify the amount of dust present on a surface, for example, the mass of particles or the visual impact.

Regional Policy

- 7.33 There are no relevant, adopted regional policies that direct the assessment of air quality away from the approach outlined in the national and local policies set out here.

¹⁴ UK Government. Air Quality (England) Regulations 2015. Air Quality (England) Regulations 2015, Draft Statutory Instrument 2015 No 0000. S.I.: UK Government, 2015.

¹⁵ The Environment Act 1995 (Part IV). The Environment Act 1995 (Part IV). s.I.: UK Government, 1995

¹⁶ DEFRA. Local Air Quality Management Technical Guidance (TG16). DEFRA, 2016

Local Planning Policy and Air Quality Management

Local Air Quality Management (LAQM) in South Staffordshire District Council (SSDC)

- 7.34 SSDC has previously declared five Air Quality Management Areas in the district due to exceedances of the NO₂ annual mean objective, however AQMA 2 and AQMA 3 have been revoked as NO₂ concentrations have consistently met the objective in recent years. As detailed in the 2017 Air Quality Annual Status Report¹⁸, there are currently three AQMA's in the district:
- AQMA 1 – Woodbank;
 - AQMA 4 – Wedges Mills; and
 - AQMA 5 – Oak Farm.
- 7.35 The Status Report also states that SSDC plan to revoke AQMAs no, 1 and 4 "due to NO₂ concentrations continuing to be below the objective level". Woodbank is located close to the M6 between junctions 12 and 13 and Oak Farm is located on the A5 to the east of junction 12 of the M6, approximately 1km from the Site. The Oak Farm AQMA has been declared due to heavy duty vehicles (HDV) associated with the New Hollies truck stop on the A5.
- 7.36 The Wedges Mill AQMA encompasses properties on the western side of the A4601 from Woods Lane for 200 m north along Wolverhampton Road. The A4601 links the M6 and the A5.
- 7.37 The Site itself is not located within an AQMA.
- 7.38 Cannock Chase District Council to the east has also declared two AQMA on the A5, also due to elevated NO₂ concentrations; these are approximately 3km to the east of the Site.
- 7.39 Wolverhampton City Council has declared the whole of the City of Wolverhampton as an AQMA due to NO₂ and PM₁₀.
- 7.40 Walsall Metropolitan Borough Council has declared the whole of the Borough as an AQMA due to NO₂.
- 7.41 All these boroughs have developed Air Quality Action Plans setting out measures to improve air quality.

South Staffordshire Core Strategy DPD, 2012

- 7.42 Within South Staffordshire Core Strategy DPD, 2012¹⁹, the policies which relate to air quality are:
- Core Policy 2: Protecting and Enhancing the Natural and Historic Environment - "The Council will support development or other initiatives where they protect, conserve and enhance the District's natural and heritage assets including ecological networks internationally, nationally and locally important designations. Particular support will be given to initiatives to improve the natural environment where it is poor and increase the overall biodiversity of the District ... Development or initiatives will generally be supported which ... protect and improve water and air quality; provide mitigation or compensatory measures to address any potential harmful implications and supporting enhancement measures."; and
 - Core Policy 11: Sustainable Transport - "Development proposals will, either individually or collectively, have to make appropriate provisions for ... improving air quality and reducing the impact

¹⁷ UK Government. Environmental Protection Act 1990 (Section 79(1)(d)). Environmental Protection Act 1990 (Section 79(1)(d)). S.I.: UK Government, 1990.

¹⁸ South Staffordshire Council. 2017 Air Quality Annual Status Report. *South Staffordshire Council* [Online]. 2016. [Cited : June 2017].

<https://www.sstaffs.gov.uk/doc/176342/name/2017asr.pdf/>.

¹⁹ South Staffordshire Council. 2012. A Local Plan for South Staffordshire: Core Strategy Development Plan Document. *South Staffordshire Council* [Online]. 2012. [Cited May 2017]. <https://www.sstaffs.gov.uk/doc/171694/name/ADOPTED%20Core%20Strategy%20December%202012.pdf/>.

of travel upon the environment, in particular reducing carbon emissions that contribute to climate change".

7.43 There are no SSDC Supplementary Planning Documents relating to air quality.

Guidance and Industry Standards

Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1 (HA 207/07)

7.44 DMRB HA207/07²⁰ provides methodology to assess local air quality by comparing the Do Nothing scenario (without the scheme) to the Do Something scenario (with the scheme) for the opening year. Pollutant concentrations that may change as a result of the scheme (NO₂ and PM₁₀) at specific locations are compared with the air quality criteria set to protect human health or vegetation, as appropriate.

7.45 The spatial scope of the assessment has been determined using the criteria set out in DMRB for identifying affected roads.

Local Air Quality Management (LAQM) Technical Guidance

7.46 LAQM Technical Guidance²¹ provides local authorities with guidance, advice and methodologies to undertake their statutory duties under Part IV of the Environment Act 1995. As well as outlining the Review and Assessment Programme it provides a methodology for undertaking the verification process when using dispersion models which has been followed for this assessment.

Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction

7.47 The IAQM Guidance²² describes risk factors which affect the potential for dust to be created and released from the Site during construction activities and to migrate to, and be deposited on surfaces, cause nuisance and cause health effects.

7.48 The IAQM dust criteria and risk matrices have been used to determine dust impacts associated with the proposals during construction.

IAQM / EPUK Planning Guidance

7.49 The Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) have published guidance²³ for developers and air quality professionals to provide a consistent approach to air quality assessments for the UK. The assessment methodology applied in this chapter follows that guidance. Significance descriptors within this chapter have been applied where necessary to determine potential air quality impacts. The impact refers to the change that is predicted to take place to air quality with the Proposed Development in place compared to the predicted air quality without development.

Other

7.50 South Staffordshire and Cannock Chase Councils have implemented an ECO Stars Fleet Recognition Scheme. This scheme is voluntary and free for companies to join and it aims to improve fuel efficiency in HDV fleets^{24,25}.

Air Quality Standards for the Protection of Vegetation

7.51 Objectives for the protection of vegetation and ecosystems have been set by the UK Government and are the same as the EU limit values. The limit values and objectives only apply: (a) more than 20 km from an agglomeration (about 250,000 people) and; (b) more than 5 km from Part A industrial sources, motorways and built up areas of more than 5,000 people. Critical levels (CL) and critical loads (CLO) are the ambient concentrations and deposition fluxes below which significant harmful effects to sensitive ecosystems are unlikely to occur.

7.52 The critical levels relevant to this assessment are set out in Table 7.2, while the critical loads, taken from the APIS website²⁶, are provided in Table 7.3.

Table 7.2: Critical Levels for Protection of Vegetation and Ecosystems

Pollutant	Concentration (µg/m ³)	Averaging period
Oxides of Nitrogen (NO _x)	30	Annual mean
Oxides of Nitrogen (NO _x)	75	24 hour mean

Table 7.3: Critical Loads for Protection of Vegetation and Ecosystems

Habitat Type ¹ (and EUNIS code)	Nutrient Nitrogen Deposition (kgN/ha/yr) ²	Acid Nitrogen Deposition 'Nmax' (keq/ha/yr)
Doxey and Tillington Marshes SSSI	15-25	0.653
Belvide Reservoir SSSI	3-10	-
Burlington Wood AW	15-20	2.728
Keepers Wood AW	10-20	2.814
Essington Wood AW	10-20	2.814
Shoal Hill Common LNR	10-20	1.88
Mansty Wood AW	10-20	1.142
Rough Wood Chase AW	10-20	1.941

¹ SSSI – Site of Special Scientific Interest
AW – Ancient Woodland
LNR – Local Nature Reserve
² significance of any impacts has been calculated based on lowest CLO

Assessment Methodology

Scope of the Assessment

7.53 An EIA Scoping Report was submitted in September 2016. The method and scope of assessment follows that set out in the scoping report and includes amendments and additions as a result of the responses to the request as follows.

²⁰ Highways Agency. DMRB HA207/07 Volume 11, Section 3, Part 1. *Standards for Highways*. [Online] 2007. [Cited: 12 August 2016.] <http://www.standardsforhighways.co.uk/dmrb/vol11/section3/ha20707.pdf>.

²¹ DEFRA. Local Air Quality Management Technical Guidance. S.I. : DEFRA, 2016.

²² Institute of Air Quality Management. Guidance on the Assessment of dust from demolition and construction. 2016. v1.1.

²³ Institute of Air Quality Management and Environmental Protection UK. Land-Use Planning & Development Control: Planning For Air Quality v1.2. S.I.: Institute of Air Quality Management, 2017.

²⁴ <https://www.cannockchasedc.gov.uk/business/environmental-health/environmental-protection/eco-stars-fleet-recognition-scheme>

²⁵ <http://www.ecostars-uk.com/about-eco-stars/eco-stars-for-buses-vans-freight/freight/>

²⁶ <http://www.apis.ac.uk/>

Table 7.4: Comments in Scoping Opinion		
Consultee	Comments Raised	Response to Comments
SoS	Reference should be made to any significant climatic factors within the assessment.	Refer to Planning Statement (Document 7.1).
	The assessment to set out the model version and detailed modelling assumptions used to underpin it. The final baseline dataset adopted for the assessment should be agreed with the council.	All local authorities within the study area have been contacted to agree scope and baseline. Model version (Paragraph 7.71 and Appendix 7.2) and assumptions (paragraph 7.115 are set out in relevant sections of the chapter.
	An intermediate assessment scenario of construction vehicle activity and operational traffic is recommended.	The operational assessment has considered three phases, an initial year of 2021 with 25% of the development operational, 2028 with 50% and 2036 with 100% operational. An assessment of construction impacts has also been included based on an assessment year of 2021 as a worst-case.
	The modelling of impacts from rail movements should be undertaken, particularly in relation to the potential for short term exceedances of the air quality objectives due to idling trains.	An assessment of emissions from trains has been carried out in line with Defra guidance and included in this chapter.
	In the absence of detailed design data, a worst case quantitative air quality assessment must be undertaken for likely operational emissions from or generated by the built development.	Significant emissions during the operational phase are considered to be associated with traffic related emissions. Assessment of these emissions has been included.
	The air quality chapter should highlight any air quality mitigation measures for the proposed development clearly distinguishing between measures proposed for the construction and operational periods.	These have been included in the assessment.
SoS and Natural England	Assessment of depositional effects from the construction and operational vehicle emissions (and any other relevant sources) on relevant designated ecological sites (e.g. Cannock Extension Canal SAC and Cannock Chase SAC) is undertaken. The APIS	Relevant ecological sites have been identified based on changes in traffic data and the DMRB criteria. Those

Table 7.4: Comments in Scoping Opinion		
Consultee	Comments Raised	Response to Comments
	database should be consulted for relevant critical loads and levels. The assessment should link with the ecological assessment and the range of sites considered should be agreed with NE and the councils.	of relevance have been included in the assessment
Canal and River Trust	The following should be included as sensitive receptors: Boaters including leisure and residential users; Towpath users; Calf Heath Reservoir; and Residential Moorings.	Receptors have been selected to represent the Calf Heath Reservoir to assess impacts on users in this location.
Highways England (HE)	The assessment should be further discussed with Highways England once the parameters of the Proposed Development further emerge.	The project traffic consultant (WSP) has extensively liaised with HE to agree traffic modelling which has informed the air quality assessment.
Natural England	The relevant methodology for the screening and the need for any subsequent levels of assessment is set out in DMRB. APIS provides specific information on the air quality theme for each designated site and should be factored into the methodology when establishing the baseline.	This has been taken into account during the assessment.
	With regard to the construction phase the focus on NO ₂ , PM ₁₀ , PM _{2.5} set out in para 6.3.2 should be reviewed with regard to its suitability for ecological receptors including designated sites in the context of the APIS information.	There are no ecologically sensitive sites within 50 m of the Site. However, the construction impact assessment has considered the effect of traffic generated during construction on sites within 200 m of affected roads.
	Para 6.10.14 "Construction effects" includes only limited reference to transport routes. The chosen routes need to be factored into the assessment of air quality.	The impact of construction traffic on local air quality along the identified construction routes has been included within the assessment.
	We would welcome clarity regarding suitability of the assessment methodology for ecological receptors such as designated sites.	Detailed methodology on the assessment of impacts on ecological receptors has been included within the chapter.
	The Transport study area should be extended to cover the Belvide Reservoir SSSI.	The study area includes this location.

Table 7.4: Comments in Scoping Opinion		
Consultee	Comments Raised	Response to Comments
SSDC	The validity of use of the Penkrigde Automatic Monitoring site data for 2013 and 2014 was questioned.	This has been commented on within the baseline section of this chapter.
	The ES should cover local truck stop capacity as well as impact on air quality/residential amenity.	The assessment has assessed the impact of the scheme on air quality within the Oak Farm AQMA which incorporates the Truck Stop. Further details about traffic capacity are considered in chapter 15 of the ES.
SCC	The Cannock Extension Canal and Cannock Chase SAC should be included in the assessment. Cumulative impacts will need to be considered.	These have been reviewed in terms of location and changes in trips associated with the operational development. The change in trips on road links adjacent to these sites fall below the criteria set out in DMRB and therefore an assessment of impacts at these locations has been scoped out of the assessment.

Table 7.5: Comments received on assessment scope		
Consultee	Comments Raised	Response to Comments
	DMRB requires an assessment of the worst year in the first 15 years from opening as well.	The assessment has included this requirement.
	It is unclear why the IAQM criteria are not considered to be formal assessment criteria.	The IAQM criteria is set out in planning guidance. It is agreed standard practice to use this criteria but there is no formal legislation or policy requiring this criteria to be used.
Wolverhampton City Council	Requested the use of ADMS-Urban rather than ADMS-Roads.	ADMS-Urban is more appropriate for air shed modelling when considering a large number of different sources. As the main focus of this assessment is traffic related impacts the use of ADMS-Roads is considered appropriate.
	Requested that the assessment considered impacts on the M54, A41, A460 and A4124.	These roads have been included in the assessment.
Cannock Chase DC	Suggested use of the Defra 'Damage cost approach' to quantify the costs associated with traffic generated by the proposals.	The Proposed Development would generate additional vehicle movements on the local road network, however regionally it is envisaged that the scheme would reduce HDV trips by 50.6 million kilometres due to the increased rail freight. The use of the damage cost calculator is therefore not considered appropriate as this would not take account of the regional benefits.
South Staffordshire DC	Identified that "There is often standing traffic on the A5 east of the M6, AQ and congestion being better to the west of M6".	The modelling has included relatively slow speeds along these routes to account for congestion

7.54 Further consultation has been undertaken which has included agreeing the scope of the assessment with the relevant local authorities. Relevant comments received during this consultation are set out below in Table 7.5.

Table 7.5: Comments received on assessment scope		
Consultee	Comments Raised	Response to Comments
Secretary of State	Although carbon is considered within the Air Quality Assessment, there is a lack of discussion of the design in terms of its carbon footprint.	Discussion of regional impacts on air quality are discussed in paragraph 7.197 to 7.199 The impact of the scheme in terms of its carbon footprint has been discussed in the Planning Statement (Document 7.1).

- 7.55 The following potential impacts have been examined in the assessment.
- 7.56 The demolition and construction stage of the Proposed Development could generate potential significant direct and indirect air quality impacts, with temporary effects. The potential impacts could include:
- Dust and PM₁₀ arising during the demolition and construction phase with the potential to cause nuisance and affect local pollution concentrations and existing sensitive receptors; and
 - Exhaust emissions (NO₂, PM₁₀ and PM_{2.5}) from vehicles travelling to and from the Site during the demolition and construction, and the potential to affect local pollution concentrations and existing sensitive receptors.
- 7.57 The operational phase of the Proposed Development could generate a range of potential significant direct and indirect air quality impacts, with likely permanent effects. These could include:
- Exhaust emissions (NO₂, PM₁₀ and PM_{2.5}) from vehicles travelling to and from the Site during operation, and the potential to affect local pollution concentrations and existing sensitive receptors;
 - Emissions from plant proposed within the Proposed Development for example associated with heating, and the potential to affect local pollution concentrations. Given the Proposed Development comprises warehouse buildings significant point source emissions (such as industrial emission stacks) are not expected. Furthermore, exact layouts of warehouse buildings are unknown at this stage. Therefore, any boilers associated with the Proposed Development would be assessed to ensure compliance with appropriate standards. This assessment would be secured via DCO Requirement; and
 - Emissions from rail movements.

Baseline Characterisation

- 7.58 In order to establish the baseline air quality in the vicinity of the Site, relevant monitoring data were reviewed and assessed. Data were obtained from the following sources:
- SSDC monitoring data (Air Quality and Annual Status Reports (ASR))¹⁸ and Updating and Screening Assessment (USA) of Air Quality Reports²⁷;
 - Cannock Chase Council (CCC) monitoring data from the ASR 2016²⁸ and ASR 2017²⁹;
 - Wolverhampton City Council (WCC) monitoring data from 2015 USA³⁰ and supplied via email from WCC³¹;
 - Stafford Borough Council (SBC) monitoring data from ASR 2016³² and ASR 2017³³;
 - Telford and Wrekin Council (TWC) monitoring data from ASR 2016³⁴ and email communication with TWC³⁵; and
 - Walsall District Council (WDC) monitoring data from ASR 2016³⁶.
- 7.59 No project specific air quality monitoring was undertaken to inform this assessment, as it is considered that adequate data exists to characterise the baseline and inform the study.

- 7.60 Defra air quality background maps³⁷ were used to obtain current and future background concentrations for the study area.
- 7.61 Dispersion modelling has been undertaken to determine future baseline air quality at sensitive receptors.

Method of Assessment

Construction Traffic

- 7.62 Impacts on local air quality as a result of construction traffic has been modelled using the ADMS Roads dispersion model. The assessment has used the latest model version (Version 4.1, February 2017) and uses the approach used for modelling operational impacts as detailed later within this section and set out in Appendix 7.2.

Construction Dust

- 7.63 An assessment of the impacts of dust emissions during construction has been undertaken by considering relevant guidance²² and the availability and applicability of dust control measures.
- 7.64 Factors which affect the potential for dust to be created and released from the Site during construction activities and which migrate and deposit on surfaces and potentially cause nuisance and harm to human health include:
- The nature, scale and duration of activities;
 - Dust control measures employed;
 - The local climate and meteorology; and
 - The character and land use of the surrounding area.
- 7.65 Following IAQM Guidance, the assessment has been carried out in a number of steps:
- Step 1, the need for a construction assessment was screened, based on the proximity of receptors;
 - Step 2, the risk of dust impacts was assessed taking into account the level of activity and the proximity of sensitive receptors;
 - Step 3, Site specific mitigation integral to the development proposals was reviewed and supplemented where necessary; and
 - Step 4, the significance of the dust effects, after applying the site specific mitigation, was assessed.
- 7.66 The assessment criteria used within the construction impact assessment are set out in Appendix 7.1.
- 7.67 It should be noted that construction impacts are temporary in nature. As set out in Chapter 2 of the ES, the duration of a temporary effect is typically as described below:
- Short term: less than 1 year;
 - Medium term: 1 to 5 years; or
 - Long term: greater than 5 years.

²⁷ SSC. 2015 Updating and Screening Assessment for South Staffordshire Council. [Online]. 2015. [Cited May 2017]. <https://www.sstaffs.gov.uk/doc/172157/name/USA2015.pdf>.

²⁸ CCC, Air Quality Annual Status Report 2016

²⁹ CCC, Air Quality Annual Status Report 2017

³⁰ WCC, Air Quality Updating and Screening Assessment 2015

³¹ Email from Dean Gooch, 11.09.2017

³² SBC, Air Quality Annual Status Report 2016

³³ SBC, Air Quality Annual Status Report 2017

³⁴ TWC, Air Quality Annual Status Report 2017

³⁵ Email from Rebecca Percox 17.08.2017

³⁶ WDC, Air Quality Annual Status Report 2016

³⁷ DEFRA. Background Mapping Data for Local Authorities. [Online] June 2017. <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013>.

Vehicle Emissions

- 7.68 The assessment of operational vehicle emissions considers the impact of the Proposed Development against the relevant air quality objectives set out within the Air Quality Strategy (Table 7.1). This is undertaken to assess the impact of the Proposed Development on a local level and, in particular, where there may be a significant impact on an AQMA. The impact on local air quality has been carried out in accordance with the current EPUK/IAQM air quality planning guidance.
- 7.69 The predicted impacts have also been used to assess whether the Proposed Development represents a risk to compliance with the EU Directive on ambient air quality. The assessment utilises information published by DEFRA to determine whether compliance with the EU Limit Values will be affected by the scheme, which has been assessed in accordance with Highways Agency advice note IAN 175/13³⁸.
- 7.70 Reporting against compliance with the EU Limit Values is undertaken by DEFRA and reported at a zonal/agglomeration level. Zones/agglomerations only comply when everywhere in the zone is below the EU Limit Value. This is the basis of DEFRA's reporting, which is designed to determine what the maximum concentration is within the zone and determine what the date by which the zone will comply with the Limit Value. A compliance risk assessment has been undertaken to determine whether the Proposed Development will have an impact on compliance with the EU Air Quality Directive.

Local Air Quality Assessment

- 7.71 Pollutant concentrations have been predicted for the baseline and future year scenarios using the ADMS-Roads dispersion model (Version 4.1, released in February 2016) and following Defra guidance²¹. The model uses predicted traffic data derived from local traffic survey data and digitised meteorological observation data collected at a Met Office observation station representative of conditions at the Site. Full details of the methodology including the method used to derive current and future year background nitrogen dioxide concentrations is set out in Appendix 7.2.
- 7.72 The assessment has predicted air quality in 2015 for verification against local monitoring data. The model has also been used to predict concentrations in 2021, 2028 and 2036, the determined future assessment years. The emissions factors released by DEFRA in October 2017, provided in the emission factor toolkit (EFT) EFT2017_V8.0 have been used to predict existing and future year emissions.
- 7.73 Emission factors and background data used in the prediction of future air quality concentrations predict a gradual decline in pollution levels over time due to improved emissions from new vehicles and the gradual renewal of the vehicle fleet. However, recent monitoring carried out in urban areas throughout the UK has found that NO₂ concentrations are not declining as rapidly as previously thought and in some locations concentrations have increased. It is thought that this discrepancy is related to the on-road performance of modern diesel vehicles. The emission factors released in the latest EFT has addressed this disparity and are considered to show a good agreement with real world emissions and are therefore considered appropriate for this assessment.
- 7.74 At sites designated for sensitive ecology, concentrations of NO_x, and rates of deposition of nitrogen in terms of nutrient nitrogen and acidity have been determined. The approach used for this is set out in Appendix 7.2.
- 7.75 The NO_x to NO₂ Conversion Spreadsheet³⁹ was used to convert emissions of Road NO_x to Road NO₂.

- 7.76 The model does not provide a method for the conversion of annual mean NO₂ concentrations to one-hour mean NO₂ concentrations. However, research,^{40, 41} has concluded that exceedances of the one-hour mean objective are unlikely to occur where annual mean concentrations do not exceed 60µg/m³. This relationship has been used to assess whether exceedances of the hourly mean objective are likely.
- 7.77 Daily mean PM₁₀ concentrations have been calculated from annual mean PM₁₀ concentrations using the method described in LAQM.TG-16²¹.

Compliance with the EU Directive on ambient air quality (Compliance Risk Assessment)

- 7.78 DEFRA assesses and reports to the European Commission on the status of air quality in the UK, by reference to the Limit Values for each pollutant, in accordance with EU Directive (2008/50/EC). For the assessment purposes and reporting by DEFRA, the UK is divided in to 43 zones and agglomerations and the main pollutant of concern in respect to compliance is NO₂.
- 7.79 The air quality study area falls within the West Midlands (UK0035) and West Midlands Urban Area (UK0002) zones. The status of these zones, as declared by the UK government is as follows:
- “West Midlands (UK0035):*
- The assessment undertaken for the West Midlands non-agglomeration zone indicates that the annual limit value was exceeded in 2015 but is likely to be achieved by 2023 through the introduction of measures included in the baseline. When combined with the measures outlined in the overview document for the UK we expect this zone to be compliant by 2021.*
- West Midlands Urban Area (UK0002):*
- The assessment undertaken for the West Midlands Urban Area agglomeration zone indicates that the annual limit value was exceeded in 2015 but is likely to be achieved by 2025 through the introduction of measures included in the baseline. When combined with the measures outlined in the overview document for the UK we expect this zone to be compliant by 2020”.*
- 7.80 The assessment of compliance undertaken by DEFRA is carried out using both monitoring from the DEFRA AURN network and modelling from DEFRA's Pollution Climate Mapping (PCM) model. To determine the study area for the compliance risk assessment for the Proposed Development the road network considered for the local air quality assessment was compared with the DEFRA PCM model network. Where the two networks overlap, this is known as the compliance risk road network (CRRN) and forms the basis of the assessment of compliance risk.
- 7.81 The DEFRA PCM modelling is at a much larger scale than the Proposed Development network given that the roads are modelled nationally within it. The road network considered within the local air quality assessment is much more locally focused and is verified at a local level. Consequently, there are differences in the results. However, as the DEFRA PCM modelling is used to inform compliance, it has to be used as the basis to assess the Proposed Development's risk to compliance.
- 7.82 In accordance with IAN 175/13, the concentrations within the DEFRA PCM model for the assessment years 2021, 2028 and 2036 have been used to determine which roads within the CRRN exceed the EU Limit Values. The latest released PCM model, using the 2015 reference year, has been used.
- 7.83 The flow chart set out in Figure 7.1 has been used to determine the compliance risk of the operational phase of the Proposed Development.

³⁸ Highways Agency, Interim Advice Note 175/13, Risk assessment of compliance with the EU Directive on ambient air quality and production of Scheme Air Quality Action Plans

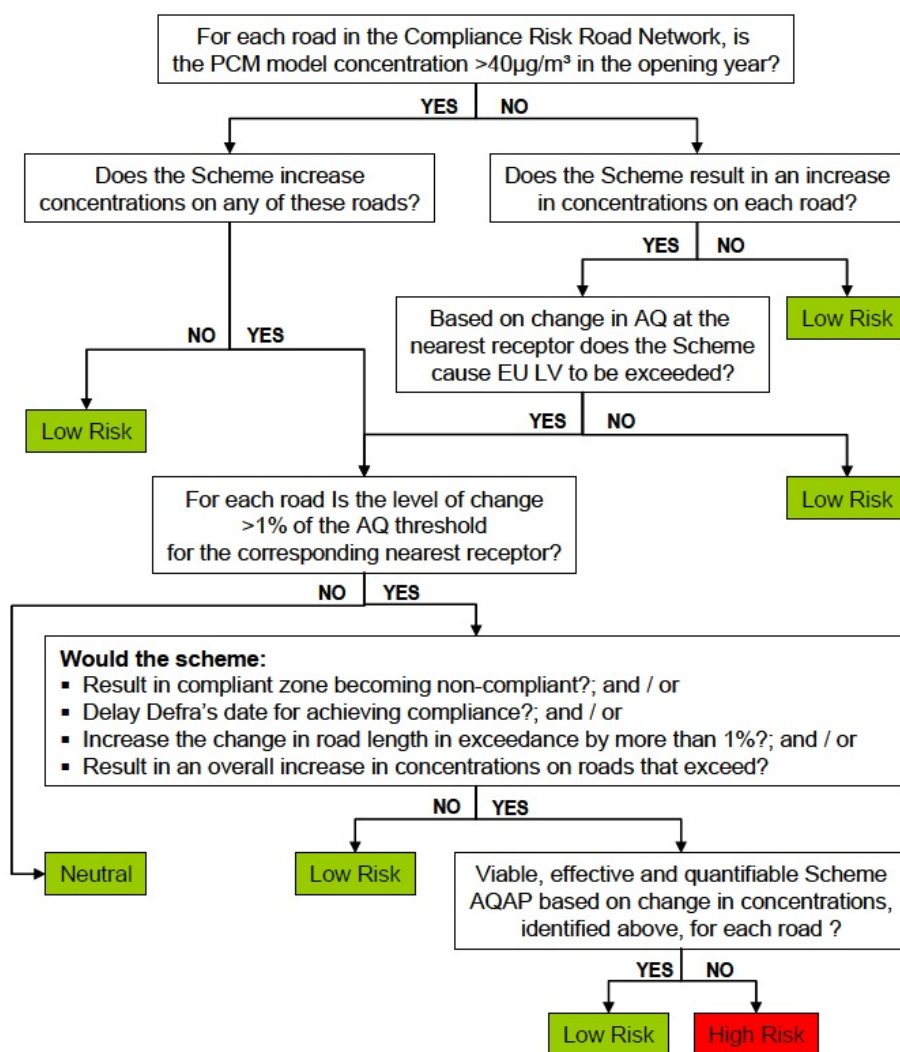
³⁹ Ricardo-AEA. NO_x to NO₂ conversion spreadsheet Version 6.1. *Local Air Quality Management*. [Online] 17 October 2017. [Cited: 01 February 2017.] <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>.

⁴⁰ A, Cook. *Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedances of the one-hour mean*. 2008.

⁴¹ Marner, D Laxen and B. *Analysis of the relationship between one-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites*. 2003.

- 7.84 A zone can only become compliant when locations throughout the zone meet the relevant EU Limit Values. However, the IAN175/13 and assessment of compliance only considers the impact of a scheme on the individual links in the PCM model within a zone. Mitigation is required where a scheme results in an overall worsening on links that exceed the EU limit values. In this instance mitigation is required in the form of a Scheme Air Quality Action Plan (SAQAP). Guidance on the production of an SAQAP is set out within IAN175/13, which should include mitigation impacts to reduce the risk of the scheme impacting on compliance.
- 7.85 An SAQAP is required where a scheme is assessed as having a high risk of non-compliance. The scheme falls within the PCM West Midlands zone and the roads considered within the assessment fall within Zone 35 West Midlands Plan and Zone 2 West Midlands Urban Area zone plan. The West Midlands zone has been identified as a non-compliance area i.e. NO₂ concentrations will not achieve the relevant objectives by 2025.

Figure 7.1: Compliance Risk Flow Chart



Rail Emissions

- 7.86 Stationary locomotives can give rise to high levels of nitrogen dioxide close to the tracks. DEFRA guidance²¹ outlines an approach to assess the potential for exceedance of the nitrogen dioxide objectives as a result of emissions from diesel locomotives. Residential properties within 30 m of railway lines where there are large numbers of diesel locomotive movements (these lines are identified in the Defra guidance), and where background nitrogen dioxide

concentrations are greater than 25 µg/m³, may be at risk of elevated nitrogen dioxide concentrations. Only locations which meet these criteria require further assessment. This approach has been used in the assessment.

Spatial Scope

Construction Dust

- 7.87 Construction dust impacts have the potential to extend up to 350m of the Site boundary or within 50 m of roads used by construction vehicles.
- 7.88 Sensitive receptors for construction dust have been identified based on the above criteria. These include residential properties, or other places where people might reasonably expect a certain level of amenity as well as commercial land uses that are sensitive to dust. Areas of sensitive vegetation or ecology that are very close to dust sources may also be susceptible to some negative effects. Where applicable, these have also been considered within the assessment.

Traffic Impacts

- 7.89 The traffic impacts study area has been determined by the likelihood of impacts to the existing road network and which roads would have a direct impact on local sensitive receptors.
- 7.90 In the first instance traffic data for the various assessment scenarios has been provided by the transport consultants WSP. The traffic data has been derived using the approach discussed in Appendix 7.2.
- 7.91 The road network considered in the assessment has subsequently been determined from the data set using guidance set out in DMRB as follows:
- The road alignment will change by 5m or more;
 - Daily traffic flows will change by 1000 annual average daily traffic (AADT) flow or more;
 - Heavy Duty Vehicles (HDV) flows will change by 200 AADT or more; or
 - Daily average speed will change by 10km/hr or more.
- 7.92 Existing residential properties and other sensitive land uses where members of the public would spend extended periods of time located close to roads that would experience a significant change in traffic due to the Proposed Development, including within AQMAs, have been considered as sensitive receptors. Details of these are set out in Appendix 7.2.
- 7.93 Receptors have been identified to represent worst-case exposure close to affected roads. When selecting these receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links. The receptors have been located on the façades of the properties closest to the sources.
- 7.94 Sensitive or designated ecology close to the Proposed Development or roads that will experience a significant change in traffic due to the Proposed Development have been considered in the assessment. To ascertain the extent of impacts across the sites impacts have been modelled across a transect up to 200 m from the roadside. Details of the transects and selected receptor locations within each transect are provided in Appendix 7.2. The sites included are as follows:
- Doxey and Tillington Marshes SSSI; and
 - The Belvide Reservoir SSSI.
- 7.95 Natural England and SoS requested that Cannock Chase SAC and Cannock Extension Canal SAC be considered as sensitive receptors within the assessment. The change in traffic along the roads in closest proximity to both sites fell below the DEFRA criteria therefore impacts as a result of vehicle emissions are unlikely to be significant and an assessment of impacts as these two locations have been scoped out of the assessment.

7.96 A summary of the sensitive ecological sites raised during consultation and identified during the screening assessment are set out in Table 7.6 below along with details on whether assessment of the site has been screened in or out.

Table 7.6: Details of Sensitive Ecological Sites Considered for the Assessment						
Site	Designation /Type	Distance from Road	LDV Change	HDV Change	Ecological Sensitivity/Description of habitats within 200 m of link*	Scoped in/out?
Cannock Extension Canal	SAC, SSSI	< 200m	16	113	Extensive inland waterway system. The high water quality, uneven canal bottom and low volume of boat traffic have allowed a diverse aquatic flora to develop.	Out – change in LDV and HDV fall below DMRB criteria
Mottey meadows	SAC, SSSI	>200m	-	-	An outstanding, floristically diverse mesotrophic grassland.	Out - over 200 m from nearest road
Cannock Chase	SAC, SSSI	<200m	65	44	Large, diverse area of seminatural vegetation comprising the most ecologically valuable parts of the former Royal Chase, one of a nationally important series of relict ancient forest/chase landscapes in the Midlands.	Out- change in LDV and HDV fall below DMRB criteria
Belvide Reservoir	SSSI	<200m	690	474	Belvide Reservoir provides secluded refuge for many species of water birds. It is particularly important as a wintering site for shoveler, and of regional importance for large numbers of moulting and wintering water-birds. It is also noted for its breeding birds and ability to attract a great variety of migrants and rare vagrants. Two small woodlands of pedunculate oak and ash and a well-developed boundary hedgerow provide shelter, food, and nest-sites. The reservoir is primarily designated for its bird interest and as such, would not expect any significant effect on the main qualifying feature for its designation. The small scale changes are likely to be dwarfed by changes due other factors such as management regime, fertiliser runoff and rainfall.	In – change in LDV and HDV fall above the DMRB criteria
Doxey and Tillington Marshes	SSSI	<200m	756	750	Lowland grazed marshy grassland dominated by Juncus sp. The site is buffered from the M6 by highways planting on an embankment (woodland and semi-improved grassland). A reed bed was noted and a wet ditch with typha.	In – change in LDV and HDV fall above the DMRB criteria
Stowe Pool and Walk Mill Clay Pit	SSSI	M6 not included (>200 from other roads)	-	-	Designated for white-clawed crayfish population. The habitats adjacent to the road comprise scrubby woodland. Species present include; goat willow, alder, oak, birch, ash and bramble. These are not considered to be sensitive to air quality impacts. The water body does not include any appreciable marginal vegetation. Two areas of emergent vegetation were noted (reeds) to the north and south.	Out – change in LDV and HDV fall below the DMRB criteria
Chasewater and the Southern Staffordshire	SSSI	<200m	16	113	A 'trotting track' is present adjacent the M6. This comprises acid grassland dense gorse within the track. Chasewater was considered to be of low value with no emergent vegetation. The	Out – change in LDV and HDV fall below the DMRB criteria

Table 7.6: Details of Sensitive Ecological Sites Considered for the Assessment						
Coalfield Heaths					waterbody is a very popular and heavily used amenity site. Signs warning of blue green algae suggest existing water quality is poor. The water body is not considered to be sensitive. An area in the east of the northern portion of the SSSI (at Anglesey Wharf) comprises areas of heath with a pond and birch scrub woodland. The area opposite this on the other side of the M6 and adjacent to the A5195 was not accessed but had the appearance of woodland with heathy open glade areas. Species noted included willow, oak, broom and gorse.	
Four Ashes Pit	SSSI	<200m	5748	1090	Geological Designation so not sensitive to traffic emissions.	Out – change in LDV and HDV fall below the DMRB criteria
*based on information gathered during site visits undertaken by ecologist during November 2017						

- 7.97 The Canal & River Trust scoping response requested that the following sensitive receptors should be included in the assessment: boaters, both residential users and leisure and towpath users and Calf Heath Reservoir. Receptors representing the Calf Heath Reservoir have been included within the assessment which are considered to include residential and leisure uses.
- 7.98 The Proposed Development is not expected to introduce any highly sensitive receptors for air quality which would normally include residential properties or areas where members of the public might spend significant periods of time. However, the Proposed Development include areas within the Site designated as community parks. These would represent short-term exposure to public health i.e. in terms of the 1-hour NO₂ objective, although long term exposure (i.e. annual mean and 24-hour) would not be considered relevant. The assessment has considered potential impacts on short term exposure within the proposed community parks.
- 7.99 The rail emissions study area includes consideration of residential properties within 30 m of railway lines where there are large numbers of diesel locomotive movements and where background nitrogen dioxide concentrations are greater than 25µg/m³ (if applicable).

Temporal Scope

- 7.100 Due to the length of time over which the Proposed Development would be built out a number of interim scenarios have been assessed as well as the completed development. The following scenarios have been considered for traffic impacts:
- Baseline year (2015) to verify the model and characterise the existing situation;
 - Future Baseline in the peak construction/interim year;
 - 2021 future baseline;
 - 2021 Future Year assuming 25% of the development is operational but without the on-site link road in operation;
 - 2028 Future Baseline;
 - 2028 future year assuming 50% of the development is operational, including on-site link road;
 - 2036 future baseline year; and
 - 2036 future year assuming 100% of the development is operational.
- 7.101 Rail impacts have been considered in the opening year, which is the year in which impacts are likely to be most significant due to general improvements in air quality with time.

Significance Criteria

Construction Phase

- 7.102 Published guidance from the IAQM²² determines the receptor sensitivity in relation to dust soiling effects, health effects of PM₁₀ and ecological effects due to construction activities.
- 7.103 Published guidance from the IAQM²² sets out criteria and general conditions which can be applied to construction sites to predict the magnitude of the dust emissions from activities such as demolition, earthworks, construction and trackout, prior to the implementation of mitigation. Dust Emission Magnitude is classified as Large, Medium or Small depending on certain criteria.
- 7.104 The IAQM guidance states that, with appropriate mitigation in place, the impacts of construction dust will be 'not significant'. The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that impacts would normally be 'not significant'.

⁴² D Laxen and B Marner, Analysis of the relationship between one-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites, July 2003

Operational Phase

- 7.105 Sensitivity of receptors in relation to vehicle emissions have been determined in relation to where the UK air quality objectives are applicable regarding NO₂ and PM₁₀ from vehicles. The annual mean objective would apply at residential properties, schools, hospitals and care homes and therefore, these are considered to be of high sensitivity. The daily and hourly mean objectives for PM₁₀ and NO₂ respectively would apply at all of the above locations and would also be considered to be of high sensitivity.
- 7.106 The annual mean objective should generally not apply at façades of office buildings and therefore these are considered to be of low sensitivity.
- 7.107 There are no official guidelines for establishing the magnitude or quantifying the degrees of significance associated with changes in local air quality arising from development proposals. EPUK and IAQM's Planning Guidance²³ sets out descriptors to allow a degree of quantification of the magnitude of change and provides levels of significance at individual receptor locations. The absolute concentration of the receptor is also taken into consideration i.e. if the receptor is close to or above the UK air quality objective level, marginal changes in magnitude may be determined to be moderate, however if the receptor is less than 75% of the UK air quality objective level marginal changes in magnitude may be determined to be negligible.
- 7.108 The impact descriptors from the IAQM guidance are in Table 7.7 below.

Long Term Average Concentration at Receptor with Development	Percentage Change in Concentration Relative to Annual Mean Air Quality Objective (AQO)			
	< 1	2 - 5	6 - 10	> 10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

- 7.109 The guidance states that overall significance of effects on air quality should be based on professional judgement taking into account the impact descriptors at the receptor locations and also taking into account such factors as:
- The existing and future air quality in the absence of the development;
 - The extent of current and future population exposure to the impacts; and
 - The influence and validity of any assumptions adopted when undertaking the prediction of impacts.
- 7.110 In terms of assessing significance for EIA effects, those which are determined to be moderate or substantial are deemed to be significant. Anything of slight or negligible impact would not be classed as a significant effect.
- 7.111 Measurements across the UK^{42,43} have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded where the annual mean concentration is below 60 µg/m³. Therefore, 1-hour nitrogen dioxide concentrations need only to be considered further if the annual mean concentration is above this level. The assessment of significance in respect of the 24-hour PM₁₀ objective has been assessed following the guidance set out within the EPUK/IAQM guidance, where an alternative annual mean, equivalent to an exceedance of the 50 µg/m³ limit for more than 35 days per year, has been derived based on the equation set out within

⁴³ Cook A, Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedances of the one-hour mean AQS, May 2008

LAQM.TG(16). An annual mean of 32 µg/m³ has been calculated as being equivalent to the short-term objective. Where an increase in the days exceeding the 50 µg/m³ objective has been predicted, the significance of this impact has been determined by assessing the predicted annual mean at the receptor against an air quality assessment level (AQAL) of 32 µg/m³ using the same percentage scale as set out in Table 7.7.

- 7.112 Impacts on sensitive ecology are considered insignificant, and have been screened out for further consideration where they are less than 1% of the long-term critical level or loads and less than 10% of the short-term critical level⁴⁴. Where such impacts cannot be screened out for further assessment, the significance of impacts has been determined by an ecologist.
- 7.113 This criterion is also used in guidance issued by the Environment Agency and Joint Nature Conservation Committee (JNCC)⁴⁵ on applying the Habitats Regulations in relation to air quality impacts. This states that:
- Where the concentration within the emission footprint in any part of the European Site is less than 1% of the relevant benchmark, the emission is unlikely to have a significant effect irrespective of the background levels.
- 7.114 The NPS requires that likely air quality effects that are both significant in relation to meeting EIA requirements and/or in terms of compliance with the EU Air Quality Directive are assessed. This assessment determines whether the likely significant effects require mitigation beyond that which is embedded in the design of the Proposed Development. It also guides the decision maker in relation to whether the scheme should be granted development consent. The key test is described in paragraphs 5.12 and 5.13 of the NPS, set out below:
- “the Secretary of State should refuse consent where, after taking into account mitigation, the air quality impacts of the Scheme will:*
- *Result in a zone/agglomeration which is currently reported as being compliant with the Air Quality Directive becoming non-compliant; or*
 - *Affect the ability of a non-compliant area to achieve compliance with the most recent timescales reported to the European Commission at the time of the decision”.*

Assumptions and Limitations

- 7.115 The following assumptions and limitations are relevant to this Chapter:
- Traffic data were supplied by WSP and include a number of assumptions for traffic growth, operational trip generation and trip distribution. Further details of the assumptions and approach to deriving the traffic data are provided in Appendix 7.2; and
 - Calculations used to provide vehicle emission factors and to convert NO_x to NO₂ use accepted methods and are published on behalf of the Department of Transport and DEFRA. The most up to date version of the calculators at the time of writing was used in the assessment.

Baseline Conditions

Current Baseline

- 7.116 This section summarises the characteristics of the existing air quality conditions within the study area. The section is focussed on concentrations of NO₂, PM₁₀ and PM_{2.5}.

- 7.117 The main source of existing air pollutants close to the Site is road traffic in particular associated with the main road network bordering the Site to the north, east and west. This includes the A5, M6 and A449.
- 7.118 There is an existing light industrial area immediately to the south of the Site, and other commercial uses at various locations surrounding the Site, including the Veolia Energy Recovery Facility and a Sludge Disposal Centre to the south.
- 7.119 The Environment Agency Website⁴⁶ identifies one industrial process within 500m of the Site with emissions to air. This is SI Group UK Ltd, Gravelly Way, Four Ashes, West Midlands, and the last entry is for 2012, and emissions to air are for carbon dioxide.

Air Quality Review and Assessment

- 7.120 The three AQMAs declared by SSDC fall within the study area and there is the potential for significant increases in traffic as a result of the operational development. Receptors have been selected within all three AQMAs as part of the assessment.
- 7.121 The A5 Watling Road also falls within the study area and therefore there is a risk of impacts associated with the development within the CCDC AQMA. Impacts within these AQMA have been considered within the assessment.
- 7.122 Both WCC and Walsall Metropolitan Borough Council (WMBC) have declared borough wide AQMA due to NO₂ and PM₁₀. The study area extends into both areas and therefore the assessment considers impacts within both AQMAs.
- 7.123 Shropshire Council (SC) has declared 4 AQMAs due to NO₂. However, all four fall outside the study area and therefore have not been considered any further within this assessment.
- 7.124 WC has previously declared an AQMA due to exceedances of the NO₂ objective however this was revoked in 2005. Currently pollutant levels within this district are meeting the air quality objectives.

Monitored data

- 7.125 SSDC undertakes air quality monitoring at a number of locations within the district. The other local authorities immediately adjacent to SSDC and which are included within the study area also undertake monitoring at a number of locations. Data from these authorities have been collected and those most relevant to the assessment for NO₂ are provided in Figures 7.3.1 to 7.3.4 and Table 7.3.1, Technical Appendix 7.3.
- 7.126 Monitoring by SSDC recorded exceedance of the annual mean NO₂ objective during 2011, 2012 and 2014 at site HA2, located at Hatherton Roadside close to the Truck Stop. Exceedance of the objective was also recorded at the Penkridge automatic site during 2013 and 2014, however data capture for this site was low during both of these years so comparison of data against the annual mean objective should be treated with caution. No exceedances have been recorded at the other monitoring locations within the district and the majority of sites recorded an overall decline in concentrations between 2011 and 2015. SSDC has attributed improvements in air quality at the Hatherton Roadside sites to alterations to the entrance and exit of the truck stop⁴⁷, although all the monitoring sites in the district recorded an increase in concentrations in 2016.
- 7.127 The monitoring data shows exceedance of the annual mean NO₂ objective at 2 locations within Cannock Chase, both within the A5 Watling Road AQMA and 3 locations within Wolverhampton, all within the Wolverhampton AQMA.

⁴⁴ The Institute of Air Quality Management, Position Statement: Use of a Criterion for the Determination of an Insignificant Effect of Air Quality Impacts on Sensitive Habitats, January 2016.

⁴⁵ OMAH (2005) Further Guidance on Applying the Habitats Regulations to Integrated Pollution Control (IPC), Pollution Prevention and Control (PPC) and Control of Major Accident Hazards (COMAH), comprising of Appendix 7A for IPC and PPC and Appendices 7B and 7C for COMAH

⁴⁶ <http://maps.environment-agency.gov.uk/wiyby> accessed 30/5/17

⁴⁷ SSC ASR 2016.

- 7.128 The annual mean objective was also exceeded at one of the Cannock Chase monitoring sites in 2011, however during all other monitoring years the objective was achieved. The data for this borough shows no significant trend in concentrations between 2011 and 2016.
- 7.129 The monitoring carried out by SBC showed exceedance of the annual mean objective at site 33 during 2011 but during all other years the objective was met. Again, the data shows no significant trend in concentrations over the monitoring period.
- 7.130 Monitoring within Wolverhampton shows general compliance with the annual mean objective at the majority of monitoring locations and although the data shows a general downward trend in concentrations between 2011 and 2015 there was again an increase in concentrations in 2016.
- 7.131 Overall the monitoring data shows compliance with the annual mean objective at locations outside all the AQMAs. As the Site is located some distance from the nearest AQMA it is expected that NO₂ concentrations at the Site would meet the annual mean objective.
- 7.132 All the monitoring shows annual mean NO₂ concentrations to be below 60 µg/m³, therefore it is expected that the 1-hour NO₂ objective is being met across the study area.
- 7.133 SSDC do not operate any PM₁₀ or PM_{2.5} monitoring stations. However, WCC, CCC and SC monitor PM₁₀ concentrations and CCC and SC monitor PM_{2.5} concentrations. Monitoring for both pollutants shows concentrations to be well below the relevant air quality standard in recent years. It is therefore concluded that concentrations of both pollutants are meeting the air quality objectives within the study area.

Modelled background concentrations

- 7.134 Background NO₂, PM₁₀ and PM_{2.5} concentrations have been obtained from the DEFRA maps⁴⁸ of predicted background pollutant concentrations, which have been produced to aid local authorities in carrying out their Review and Assessment duties.
- 7.135 Concentrations have been presented as a range, to cover the different backgrounds for the receptors used in the assessment.
- 7.136 The background concentrations are presented below in Table 7.8.
- 7.137 The data shows that for all locations background concentrations of all three pollutants are less than 75% of the annual mean objective limits.

Local Authority	Year	NO ₂	PM ₁₀	PM _{2.5}
CCC	2021	7.4-17.0	10.7-17.2	7.3-11.4
	2028	6.1-13.7	10.5-17.2	7.1-11.3
	2036	5.9-13.2	10.5-17.3	7.1-11.3
SBC	2021	7.6-14.9	10.8-15.2	7.5-10.0
	2028	6.2-10.6	10.6-15.0	7.3-9.7
	2036	5.9-10.0	10.6-15.0	7.3-9.7
SC	2021	6.3-6.5	12.9-13.2	8.2-8.4
	2028	5.1-5.2	12.7-13.1	8.0-8.2
	2036	4.9-5.0	12.7-13.0	8.0-8.2

Local Authority	Year	NO ₂	PM ₁₀	PM _{2.5}
SSDC	2021	6.3 – 19.2	11.0-17.9	7.5-10.5
	2028	5.1 – 14.7	10.8-18.0	7.3-10.0
	2036	4.9 – 14.2	10.8-18.1	7.2-10.0
TWC	2021	8.4-12.7	12.2-13.4	7.7-8.4
	2028	6.8-9.7	12.0-13.2	7.5-8.2
	2036	6.5-9.2	12.0-13.2	7.5-8.2
WDC	2021	17.4-21.2	15.8-17.4	10.2-11.3
	2028	13.7-16.6	15.7-17.4	10.0-11.1
	2036	13.1-15.9	15.7-17.4	10.0-11.1
WCC	2021	11.4-22.6	12.6-16.7	8.4-11.3
	2028	9.3-19.8	12.5-16.6	8.2-11.1
	2036	9.1-19.4	12.5-16.7	8.2-11.1

¹the DEFRA maps do not provide concentrations for 2036. Data for 2030 has therefore been used for this year

- 7.138 Background NO_x, nitrogen deposition and acid (n) deposition rates at the sensitive ecological sites have been taken from the APIS website⁴⁹, where they are reported as three-year averages (2009-2011). The data is presented below in Table 7.9.

Site	NO _x (µg/m ³)	N-Deposition (kgN/ha/yr)	Acid (N) Deposition (keq/ha/yr)
Doxey and Tillington Marshes	21.3	25.4	1.81
Belvide Reservoir	14.5	23.2	1.66

- 7.139 At both ecological sites NO_x concentrations currently meet the annual mean objective.
- 7.140 At both the designated sites N-deposition rates already exceed the relevant Critical Loads (CL) for N-deposition and Acid deposition as set out in Table 7.3.

Future Baseline

- 7.141 Future baseline concentrations of NO₂, PM₁₀ and PM_{2.5} have been modelled at each of the selected receptor locations in 2021, 2028 and 2036. The results are set out in Appendix 7.4.
- 7.142 The NO₂ data shows exceedance of the annual mean objective at a number of locations in 2021 using the EFT emissions data (Table 7.4.1) including one location within the borough of Cannock Chase, four locations in the South Staffordshire district and five locations within the Walsall area. With the exception of the site in Cannock Chase, all are located adjacent to the

⁴⁸ <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>

⁴⁹ <http://www.apis.ac.uk/>

M6. The site in Cannock Chase is located adjacent to the A5, within the AQMA. Concentrations are predicted to decline between 2021 and 2036 and at all ten locations concentrations are expected to meet the annual mean objective by 2028 with the exception of receptor 7a (on Darlaston Road within WDC), where NO₂ concentrations are still predicted to exceed the objective under the baseline scenario in 2036.

- 7.143 At all other locations NO₂ concentrations are predicted to meet the annual mean objective under all three assessment scenarios.
- 7.144 Annual mean concentrations of PM₁₀ and PM_{2.5} (Tables 7.4.2 and 7.4.4, respectively in Technical Appendix 7.4) are predicted to meet the relevant annual air quality objectives under the three future year base scenarios. The short-term PM₁₀ concentrations are also predicted to meet the 24-hour objective limit at all receptor locations with the exception of receptor 7a. The assessment has predicted an exceedance of the objective limit under all three assessment years for this pollutant at this receptor location.
- 7.145 The future year NO_x concentrations predicted at the designated ecological sites, at receptors closest to the nearest road are set out in Table 7.10. The data shows exceedance of the annual mean objective of 30 µg/m³ at all sites in 2021 and at three of the Doxey and Tillington Marsh locations in 2028, however concentrations decline sufficiently by 2036 that the CL is only exceeded at one location by this year.

Site	X	Y	2021	2028	2036	Distance Exceedance occurs across transect in 2021
Belvide Reservoir	386762	310735	33.6	24.6	23.4	Up to 5 m
Doxey and Tillington Marshes 1	390039	324986	41.8	31.1	29.8	Up to 50 m
Doxey and Tillington Marshes 2	389786	324687	53.5	36.7	34.7	Up to 150 m
Doxey and Tillington Marshes 3	389734	324539	40.7	30.6	29.4	Up to 100 m
Doxey and Tillington Marshes 4	389715	324408	35.9	28.3	27.4	Up to 70 m

Figures in bold represent exceedance of the Critical Level of 30 µg/m³

- 7.146 Future baseline nitrogen deposition and acid nitrogen deposition predicted at the designated ecological sites are set out in Table 7.12. Predicted concentrations are already above the relevant critical loads at all of the sites under all three assessment years.

Site	N-deposition			acid deposition		
	2021	2028	2036	2021	2028	2036
Belvide Reservoir	25.9	24.7	24.5	-	-	-
Doxey and Tillington Marshes 1	28.4	26.8	26.6	2.021	1.911	1.898
Doxey and Tillington Marshes 2	30.0	27.6	27.3	2.141	1.969	1.948
Doxey and Tillington Marshes 3	28.2	26.7	26.6	2.009	1.906	1.893
Doxey and Tillington Marshes 4	27.5	26.4	26.3	1.960	1.882	1.872

Figures in bold represent exceedance of the critical loads as set out in Table 7.3. It should be noted that for N-deposition the lowest deposition rate set out within the range has been used to ensure a conservative approach.

Sensitive receptors

Existing Sensitive Receptors

- 7.147 Details of the sensitive human receptors considered in the assessment are set out in Table 7.2.1 and Figures 7.2.1 to 7.2.3 in Appendix 7.2. Details of the receptors included within the transects across the ecological sites are set out in Table 7.2.2 and Figures 7.2.4 to 7.2.7, Technical Appendix 7.2.

New Sensitive Receptors

- 7.148 The Proposed Development is not expected to introduce any highly sensitive receptors for air quality, which would normally include residential properties or areas where members of the public might spend significant periods of time. However, the proposals include areas within the Site designated as community parks. These would represent short-term exposure to public health i.e. in terms of the 1-hour NO₂ objective, although long term exposure (i.e. annual mean and 24-hour) would not be considered relevant. The assessment has considered potential impacts on exposure within the proposed community parks.

Potential Impacts

Construction Impacts

Construction Traffic

- 7.149 During construction of the proposed development, HDVs will require access to the Site to deliver and remove materials; earthmoving plant and other mobile machinery will also work on-site including generators and cranes. These machines produce exhaust emissions; of particular concern are emissions of NO₂ and PM₁₀.
- 7.150 The dispersion model has predicted the impact of construction traffic in 2021 as this is considered to represent a worst-case. Results are presented in Appendix 7.5.

7.151 The modelling assessment has predicted a negligible impact on annual mean NO₂ concentrations at all receptor locations.

7.152 The impact of construction traffic on PM₁₀ and PM_{2.5} concentrations is also predicted to be negligible at all receptor locations (Tables 7.5.2 to 7.5.5).

Construction Dust

7.153 Construction phase impacts as a result of the Proposed Development have been assessed using the guidance provided by the IAQM.

7.154 The development will comprise the demolition of existing buildings, ground preparation and construction of new facilities within the existing Site. There are residential properties within 20 m of the Site to the north, west, south and east, therefore a detailed assessment of potential impacts is required.

7.155 Dust emissions from construction activities are unlikely to result in significant impacts on ecologically sensitive receptors beyond 50 m from the Site boundary. A review of data held on the DEFRA MAGIC website shows the Four Ashes Pit SSSI located to the south of the Site. However, it is over 100 m from the Site boundary and has been designated due to its important geological features. There are no species or habitats at this site that are sensitive to dust effects.

7.156 There are 13 Local Wildlife Sites (LWS) within 1 km of the Site. Two of these sites are located within 50m of the boundary of the Site:

- Gailey Reservoirs: This is an important area for water birds (located immediately to the north-east of the Site) for which there is no citation, this is awaiting review); and
- Calf Heath Bridge (east of): comprises of a section of the Staffordshire and Worcester Canal (10 m south of the Site).

7.157 Gailey reservoirs is designated for its bird interest, as such is not considered to be a sensitive receptor with respect to construction dust. No impacts are predicted from construction dust that would affect the integrity or function of the Calf Heath Bridge LWS.

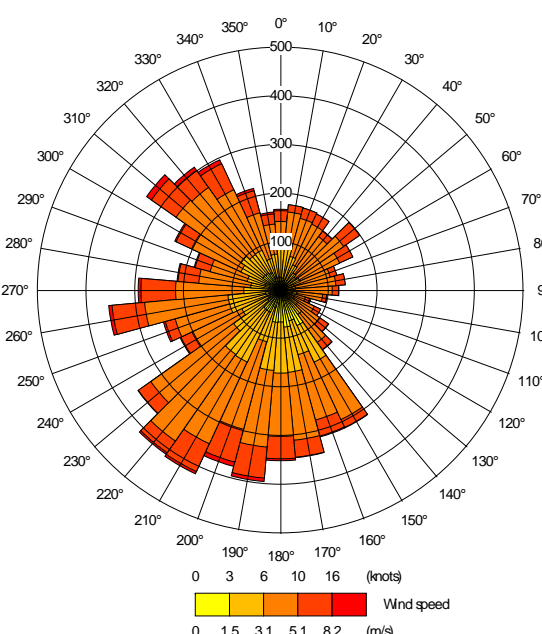
7.158 Impacts on ecological receptors have not been considered any further within the construction dust assessment but have been assessed further within the Chapter 10 Ecology and Nature Conservation.

7.159 The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited would depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

7.160 A windrose from the Cosford Meteorological Station is provided in Figure 7.2, which shows that prevailing winds are from the south, south-west and north-west.

7.161 Areas most consistently affected by dust are generally located downwind of the prevailing wind direction of an emission source. Therefore, the highest risk of impacts would occur to the north, north-east and south-east which includes a number of residential receptors around the Site.

Figure 7.2: 2016 Windrose from Cosford Meteorological Station



7.162 Using the evaluation criteria within the IAQM’s Guidance, the potential dust emission magnitude has been identified for each stage of the Proposed Development as shown in Table 7.12 below.

Activity	Dust Emission Magnitude	Justification
Demolition	Small	Total building volume < 20,000m ³ , potentially dusty construction material (e.g. concrete, brick) ¹
Earthworks	Large	Site area greater than 10,000 m ² (c.320,0000 m ²) >10 HDV on-site per day
Construction	Large	Total building volume >100,000 m ³ Main construction materials include brick and concrete.
Trackout	Large	Maximum HDV movements over the duration of the development would be > 50 per day.

¹ the majority of the Site is agricultural land and the majority of buildings have already been cleared/demolished.
HDV: Heavy Duty Vehicles greater than 3.5 tonnes.

7.163 The next stage of the assessment is to define the sensitivity of the Proposed Development area to dust soiling and human health impacts. Using the criteria set out in Tables 7.1.1 to 7.1.4 in Appendix 7.1, the sensitivity of the surrounding area to impacts from dust emissions has been determined and are set out in Table 7.13.

Sensitivity to Dust Soiling	Sensitivity to Human Health Impacts	Sensitivity to Ecological Receptors
High – number of residential houses within 20 m of the site is > 10.	Low – existing PM10 concentrations estimated to be less than 24 µg/m ³ , >10 residential properties within 20 m of the Proposed Development.	N/A – no ecological receptors sensitive to dust within 50 m of the Site.

7.164 The dust emission magnitude determined in Table 7.12 has been combined with the sensitivity assessment in Table 7.13 to define the risk of impacts for each phase of development in the absence of mitigation as shown in Table 7.14. The risk of impacts associated with each activity is provided in Table 7.14 below and has been used to identify site-specific mitigation measures, which are discussed and set out in Table 7.21.

		Dust Emission Magnitude			
		Demolition (Small)	Earthworks (Large)	Construction (Large)	Trackout Construction (Large)
Sensitivity of the surrounding Areas	Dust Soiling (High)	Negligible ¹	High Risk	High Risk	High Risk
	Human Health (Low)	Low Risk	Low Risk	Low Risk	Low Risk

¹ the buildings remaining on Site which require demolition are located over 300 m from the nearest sensitive receptors therefore the risk of impacts would be negligible

7.165 The overall risk of dust impacts in the absence of mitigation has been assessed as being High.

Operational Impacts

Railway Emissions

7.166 The operational development would lead to an increase in the number of trains using the western branch of the WCML between Rugby and Stafford. There are receptors located within 6 m of the line to the south of the Site and within 20 m of the line to the north. These are therefore within the criteria outlined within DEFRA’s guidance as potentially significant. However, the DEFRA guidance states that only locations with a large number of diesel locomotive movements in conjunction with background concentrations in excess of 25 µg/m³ need to be assessed.

7.167 Background NO₂ concentrations for 2021, as set out in Table 7.8 (the first year of operation), without a reduction in road traffic emissions, are predicted to be below 25 µg/m³ at all locations across the study area with the exception of a few locations within Wolverhampton. There is therefore a risk that background concentrations at some receptors within Wolverhampton could exceed 25 µg/m³; however, LAQM.TG(16) sets out a list of railway lines

which are currently considered to experience heavy traffic of diesel locomotives. The West Coast Mainline (WCML) between Stafford and Wolverhampton is not one of these lines. Furthermore, it is anticipated that the operational development would only generate an additional 10 movements per day, less than 1 per hour. Air quality impacts as a result of railway locomotive movements can therefore be screened out as being insignificant.

7.168 On the wider rail network, the additional train movements generated by the Proposed Development will be so small as to be considered insignificant therefore impacts on local air quality as a result of the operational development are deemed to be negligible.

Road Traffic Impacts

Existing Receptors

Human Health Receptors

7.169 Predicted annual mean NO₂ concentrations under the base and with scheme scenarios at each receptor location are set out in Table 7.6.1, Technical Appendix 7.6. The table provides an impact descriptor which takes into account the increase due to the scheme and the resulting concentration following the EPUK/IAQM guidance. The impact descriptor at each receptor is also presented in Figures 7.3(a, b, c and d) to 7.5(a, b, c and d) below.

7.170 Predicted PM₁₀ and PM_{2.5} concentrations at each receptor are set out in Tables 7.6.2 to 7.6.4, Appendix 7.6. At all locations impacts are predicted to be negligible in terms of annual mean concentrations for these two pollutants within the study area. However, the assessment has predicted an increase in the number of days exceeding the 24-hour PM₁₀ objective at a number of locations. The impact has been assessed as between moderate and substantial adverse at receptor 7a, but negligible to slight adverse at all other locations.

7.171 The 24 hour objective is already exceeded at receptor 7a without the Proposed Development in operation, therefore due to this high baseline concentration the impact, which is only between 1-2% of the AQAL, is classed as being either a moderate or substantial adverse impact. It should be noted that this impact is limited to 3-4 residential properties located immediately to the east of the M6. To the west of the motorway, represented by receptors 7b and 7c, the impact of the Proposed Development is predicted to be negligible, because the increase as a result of the Proposed Development is less than 1% of the objective even though concentrations are predicted to exceed the objective. At all other locations the objective would be met under all with and without development scenarios. The scheme does not therefore result in an exceedance of this objective at any location and overall the impacts are not considered to be significant.

7.172 A summary of the predicted impact descriptors for each assessment year and within each local authority area based on predicted NO₂ concentrations is set out in Tables 7.15 to 7.17, with a summary of the comparison of results against the annual mean objective presented in Table 7.18.

Local Authority	No. of receptors modelled	Impact Magnitude			
		Negligible	Slight Adverse	Moderate Adverse	Substantial Adverse
CCC	9	9	-	-	-
SBC	6	6	-	-	-
SC	2	2	-	-	-

Table 7.15: Impact Magnitude at receptors in 2021 within each local authority based on predicted NO₂ concentrations

SSDC	90	89	1	-	-
TWC	7	7	-	-	-
WDC	6	6	-	-	-
WCC	37	36	1	-	-

7.16: Impact Magnitude at receptors in 2028 within each local authority based on predicted NO₂ concentrations

Local Authority	No. of receptors modelled	Impact Magnitude			
		Negligible	Slight Adverse	Moderate Adverse	Substantial Adverse
CCC	9	9	-	-	-
SBC	6	6	-	-	-
SC	2	2	-	-	-
SSDC	90	90	-	-	-
TWC	7	7	-	-	-
WDC	6	6	-	-	-
WCC	37	37	-	-	-

7.17: Impact Magnitude at receptors in 2036 within each local authority based on predicted NO₂ concentrations

Local Authority	No. of receptors modelled	Impact Magnitude			
		Negligible	Slight Adverse	Moderate Adverse	Substantial Adverse
CCC	9	9	-	-	-
SBC	6	6	-	-	-
SC	2	2	-	-	-
SSDC	90	88	2	-	-
TWC	7	7	-	-	-
WDC	6	6	-	-	-
WCC	37	EFT	37	-	-

7.18: Summary of Comparison of Predicted NO₂ Concentrations Against Annual Mean Objective of 40 µg/m³

Scenario	Number of Receptors with Predicted Concentrations > 40 µg/m ³	Increase in Number of Receptors exceeding 40 µg/m ³ as a result of the Scheme	Maximum Predicted Increase as a result of the Scheme at receptors exceeding 40 µg/m ³	Impact Descriptors for Receptors exceeding 40 µg/m ³			
				Negligible	Slight Adverse	Moderate Adverse	Substantial Adverse
2021	10	1	0.3	10	1	0	0
2028	1	0	0.2	1	0	0	0
2036	1	0	0.2	1	0	0	0

2021

7.173 The results presented in Figures 7.3 (a, b, c and d) relating to 2021, with 25% of the Proposed Development complete, but without the on-site link road in operation, show a negligible to slight adverse impact with regard to annual mean NO₂ within the study area as a result of traffic changes during operation of the development.

2028

7.174 The results presented in Figure 7.4 (a, b, c and d) shows a negligible impact across the study area with regards NO₂ as a result of the operational scheme, assuming 50% of the Site is operational in 2028.

2036

7.175 Under the 2036 scenario with the Site fully operational (Figure 7.5 (a, b, c and d)) the assessment shows either a slight adverse or negligible impact at all locations within the study area c.

Figure 7.3a: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2021

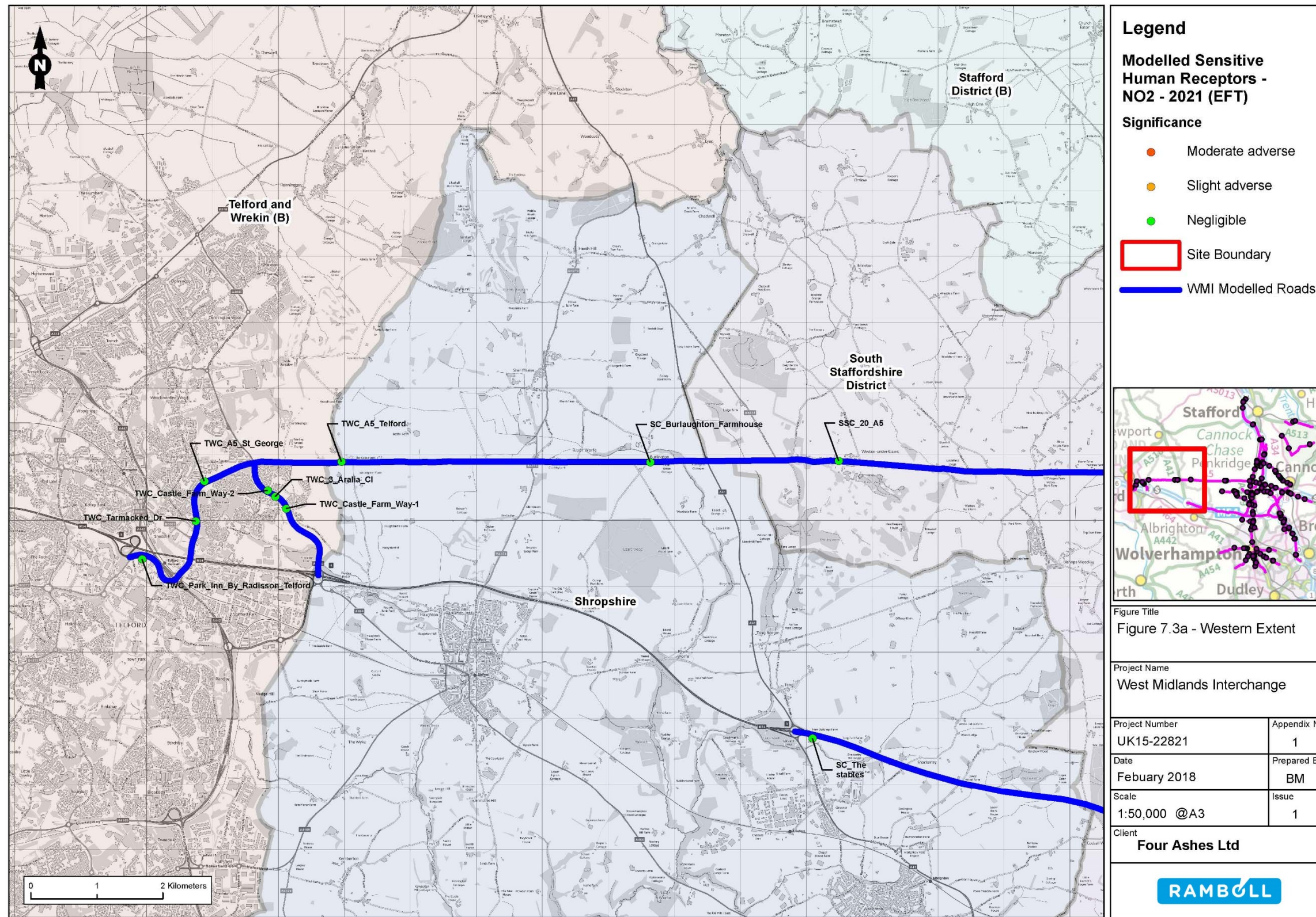


Figure 7.3b: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2021

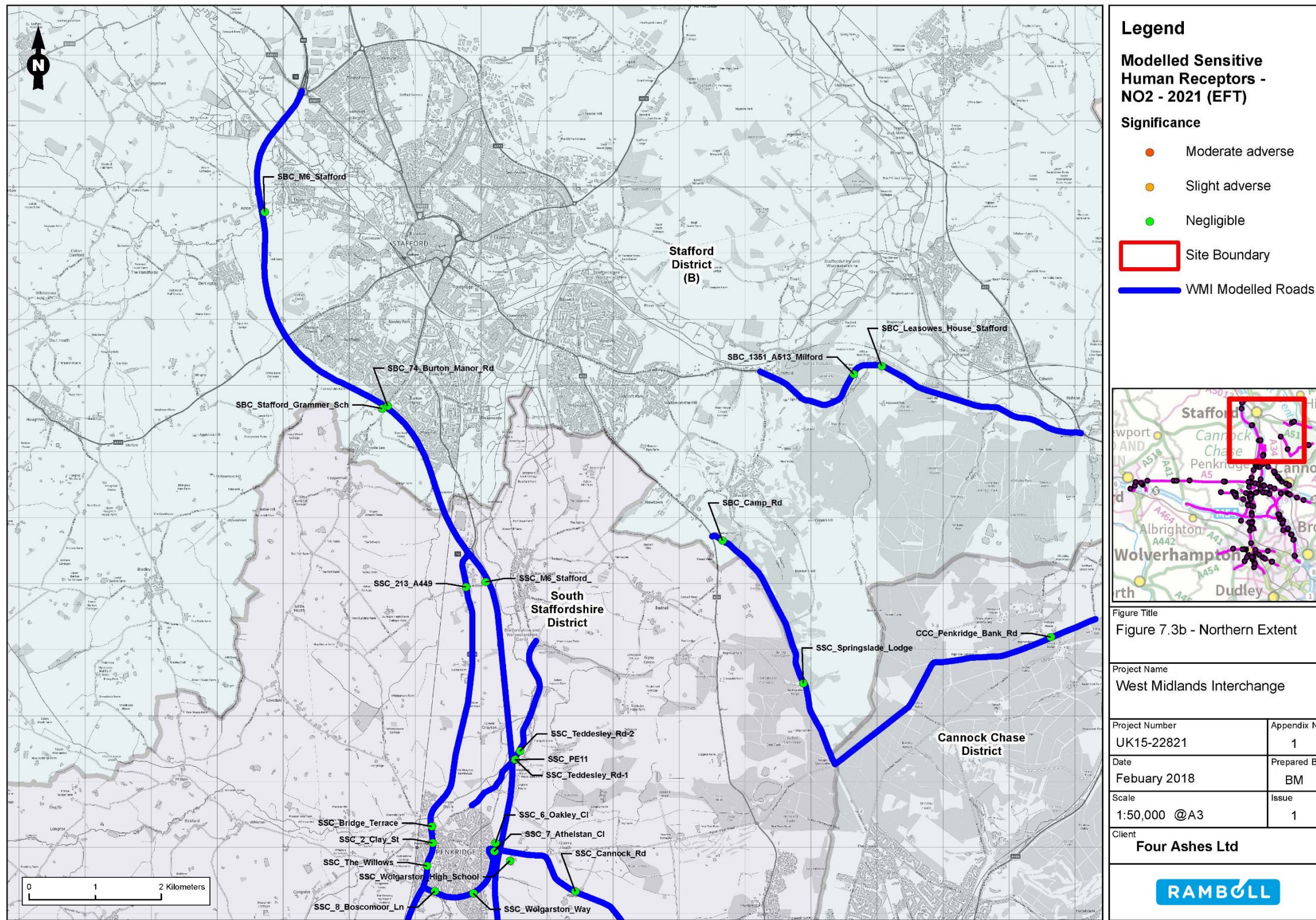


Figure 7.3c: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2021

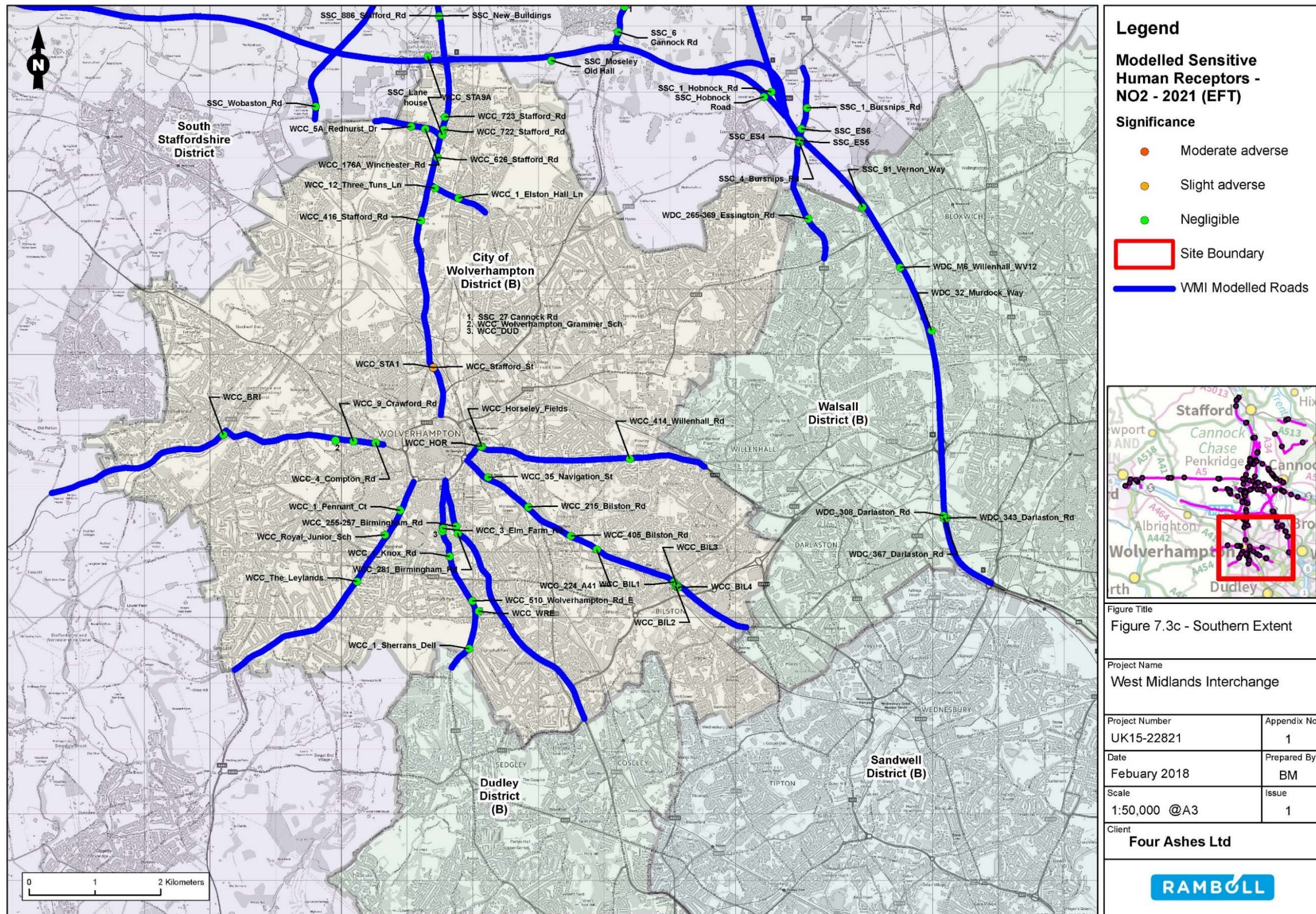


Figure 7.3d: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2021

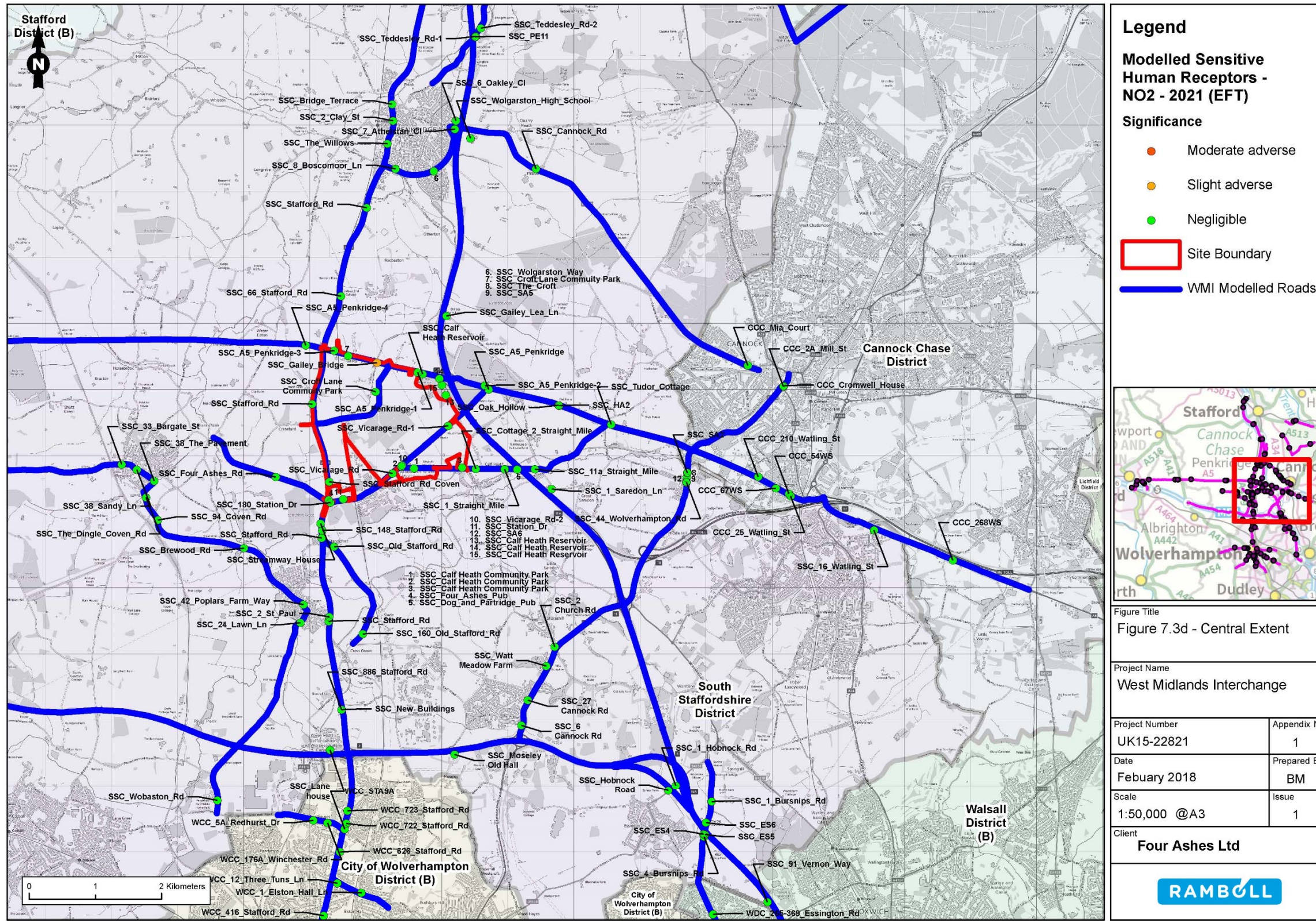


Figure 7.4a: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2028

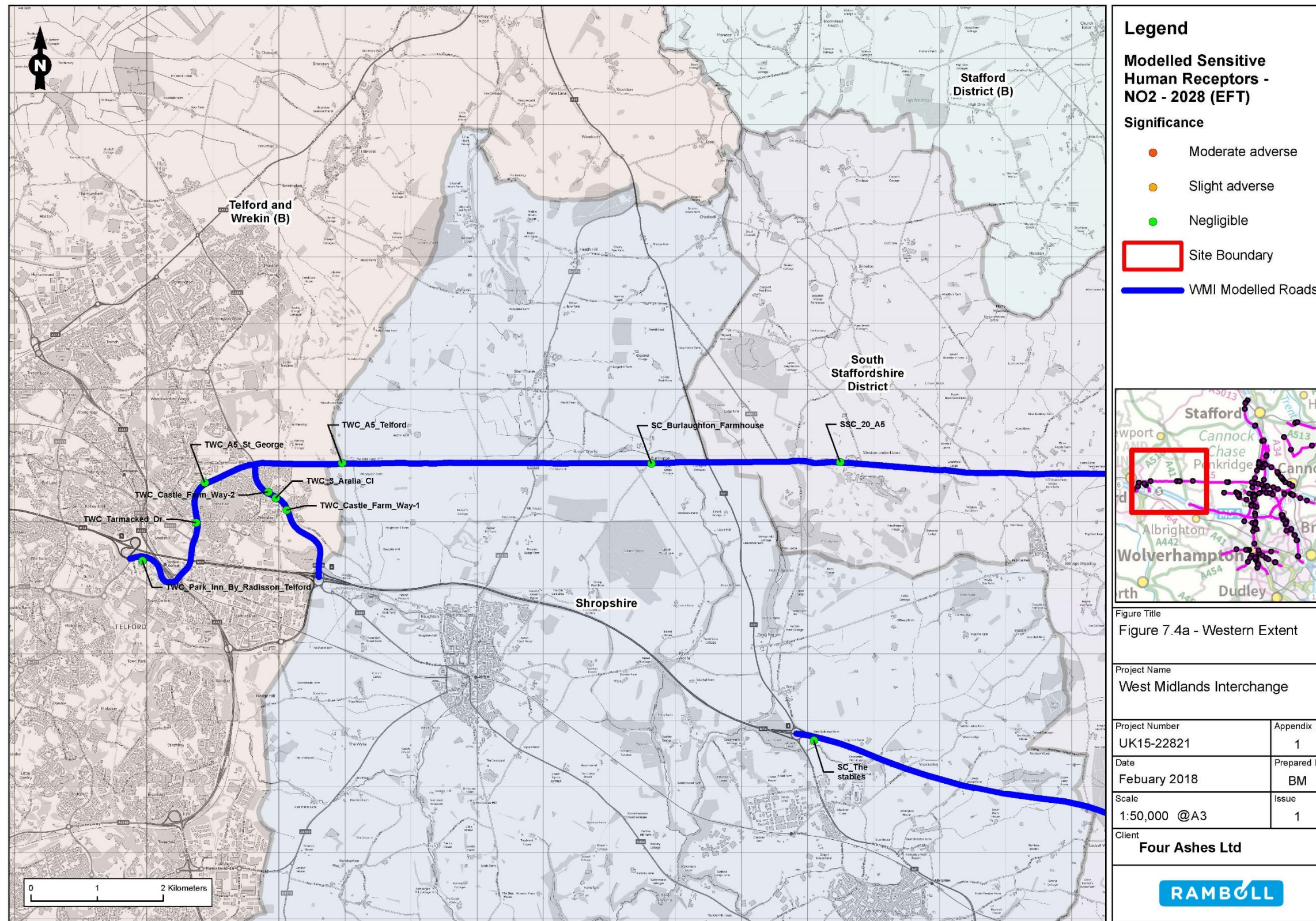
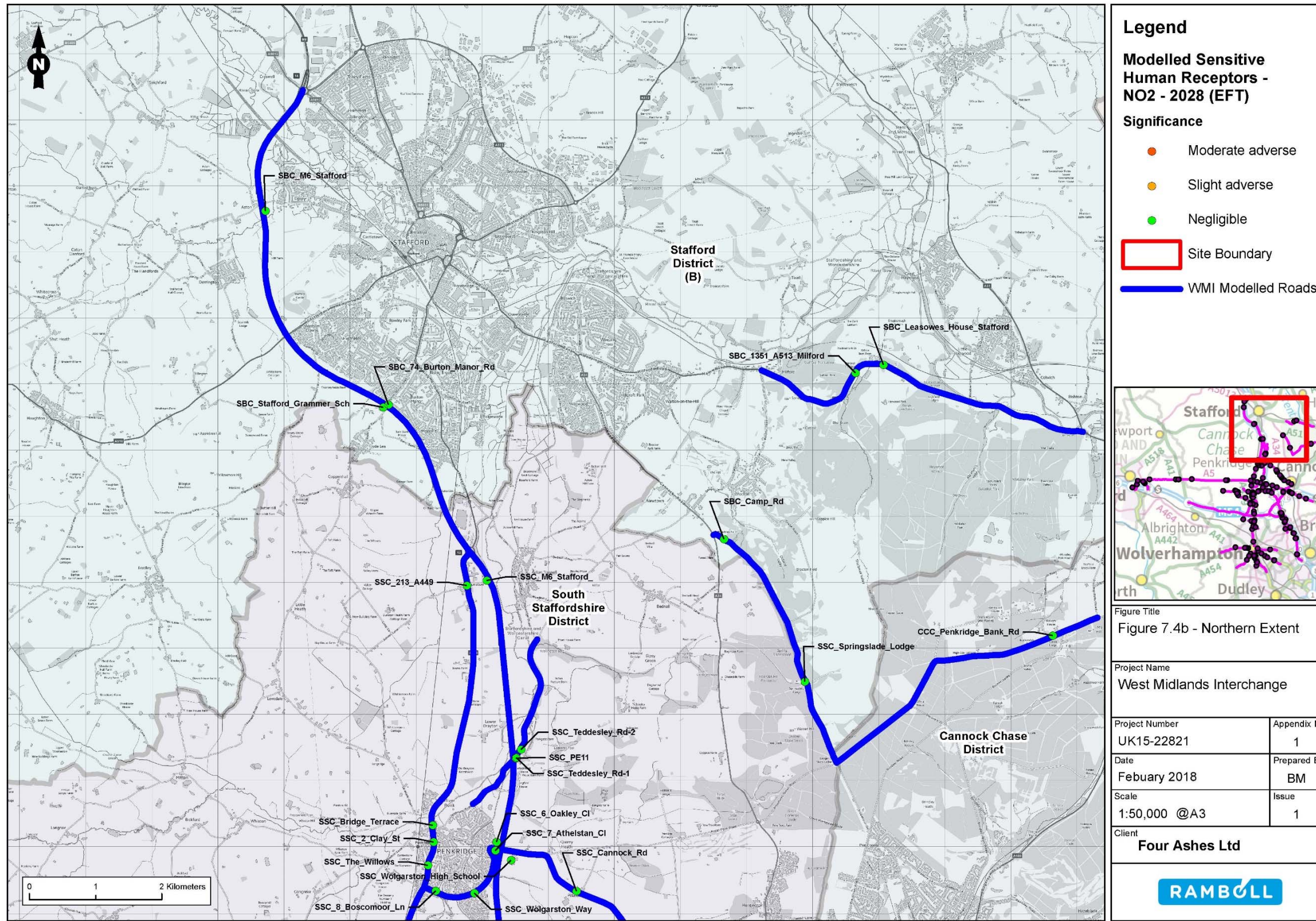


Figure 7.4b: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2028



Legend

Modelled Sensitive Human Receptors - NO₂ - 2028 (EFT)

Significance

- Moderate adverse
- Slight adverse
- Negligible

Site Boundary

WMI Modelled Roads

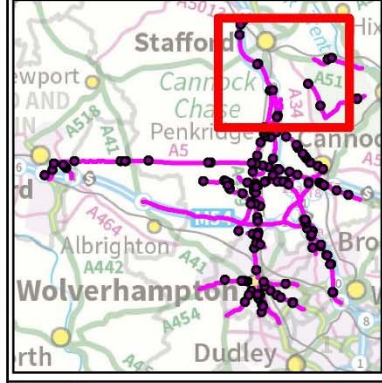


Figure Title
Figure 7.4b - Northern Extent

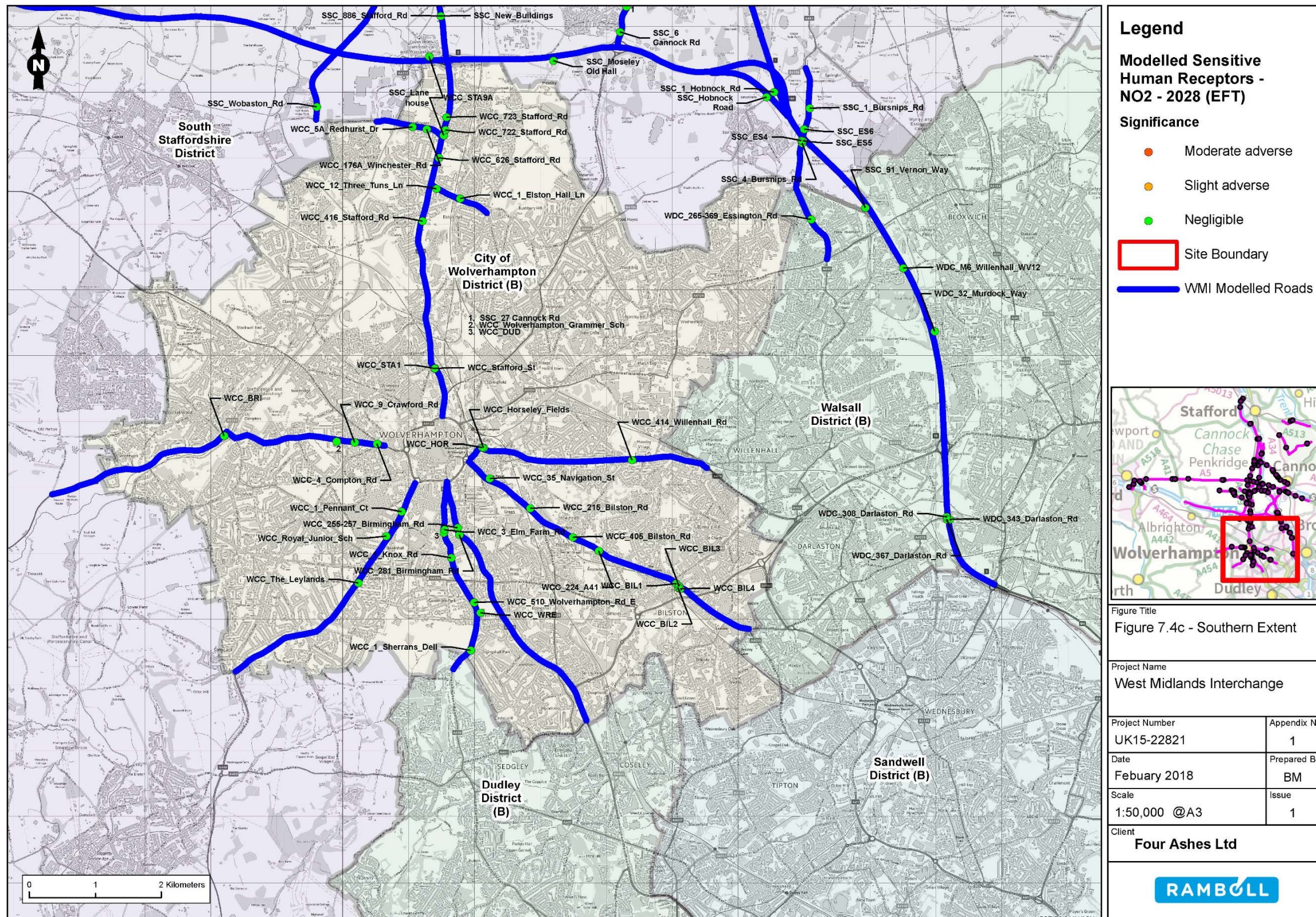
Project Name
West Midlands Interchange

Project Number UK15-22821	Appendix No. 1
Date February 2018	Prepared By BM
Scale 1:50,000 @A3	Issue 1

Client
Four Ashes Ltd

Reproduced from Ordnance Survey digital map data © Crown copyright 2017. All rights reserved. Licence number 100040631

Figure 7.4c: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2028



Reproduced from Ordnance Survey digital map data © Crown copyright 2017. All rights reserved. Licence number 100040631

Figure 7.4d: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2028

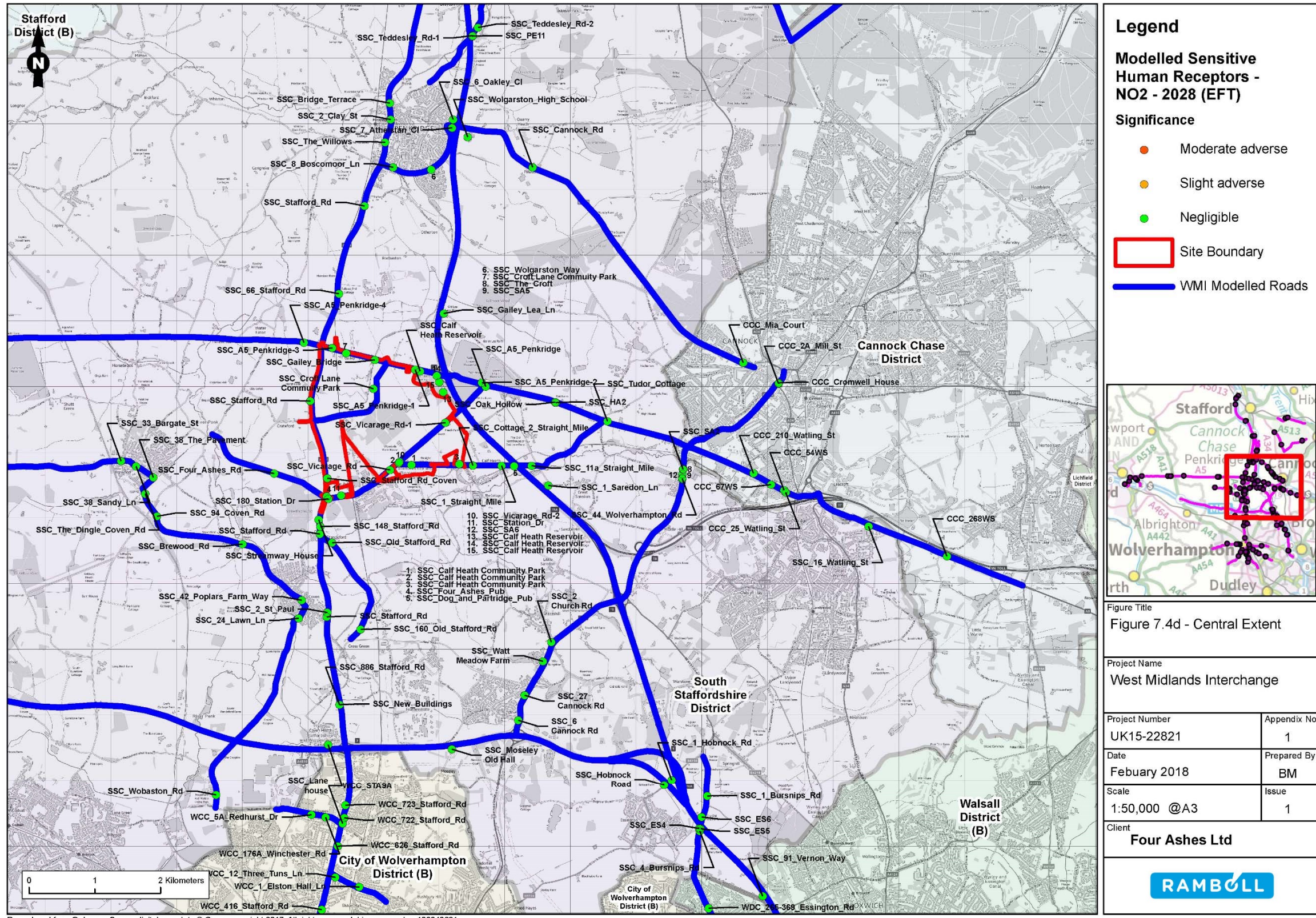


Figure 7.5a: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2036

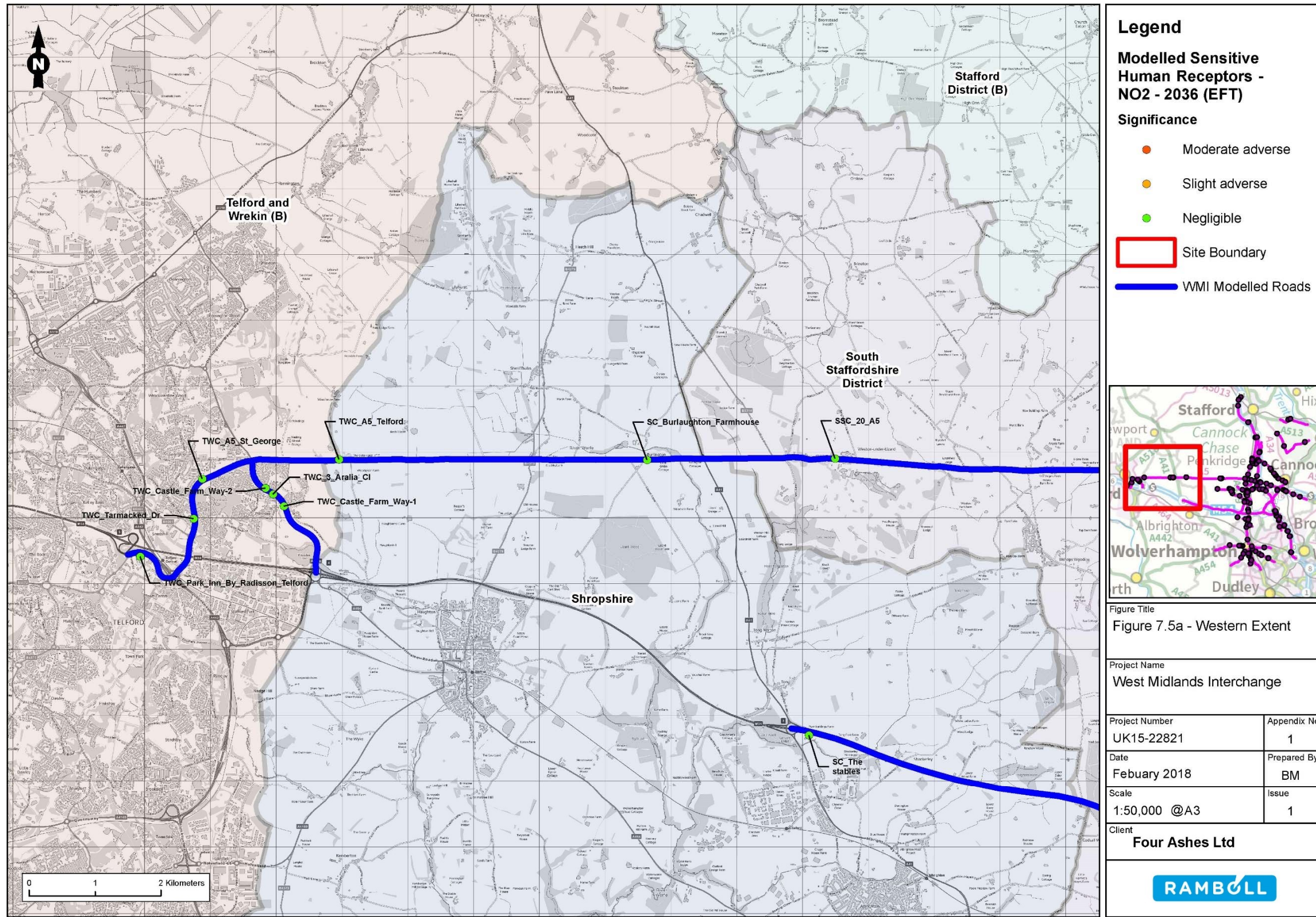


Figure 7.5b: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2036

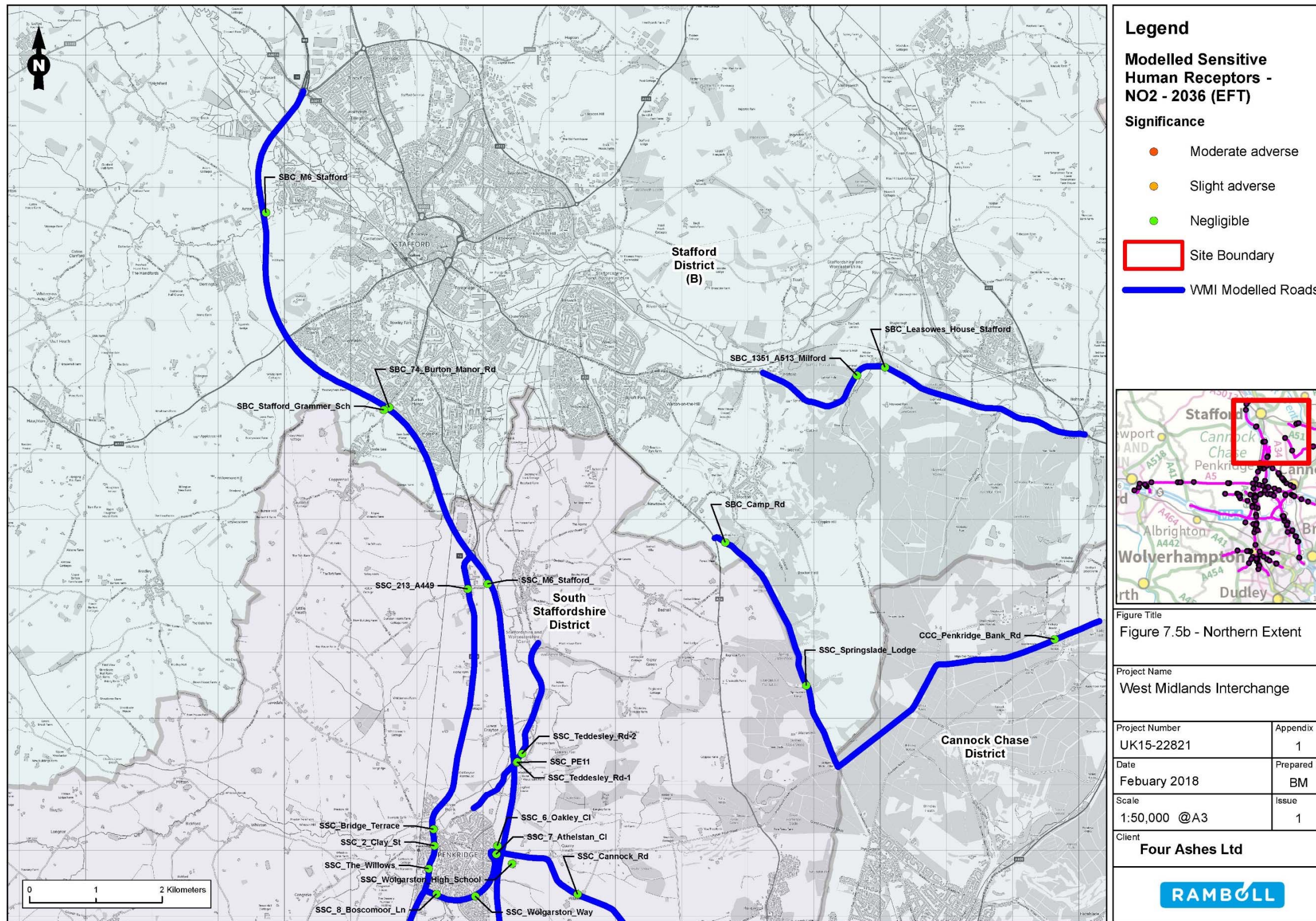


Figure 7.5c: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2036

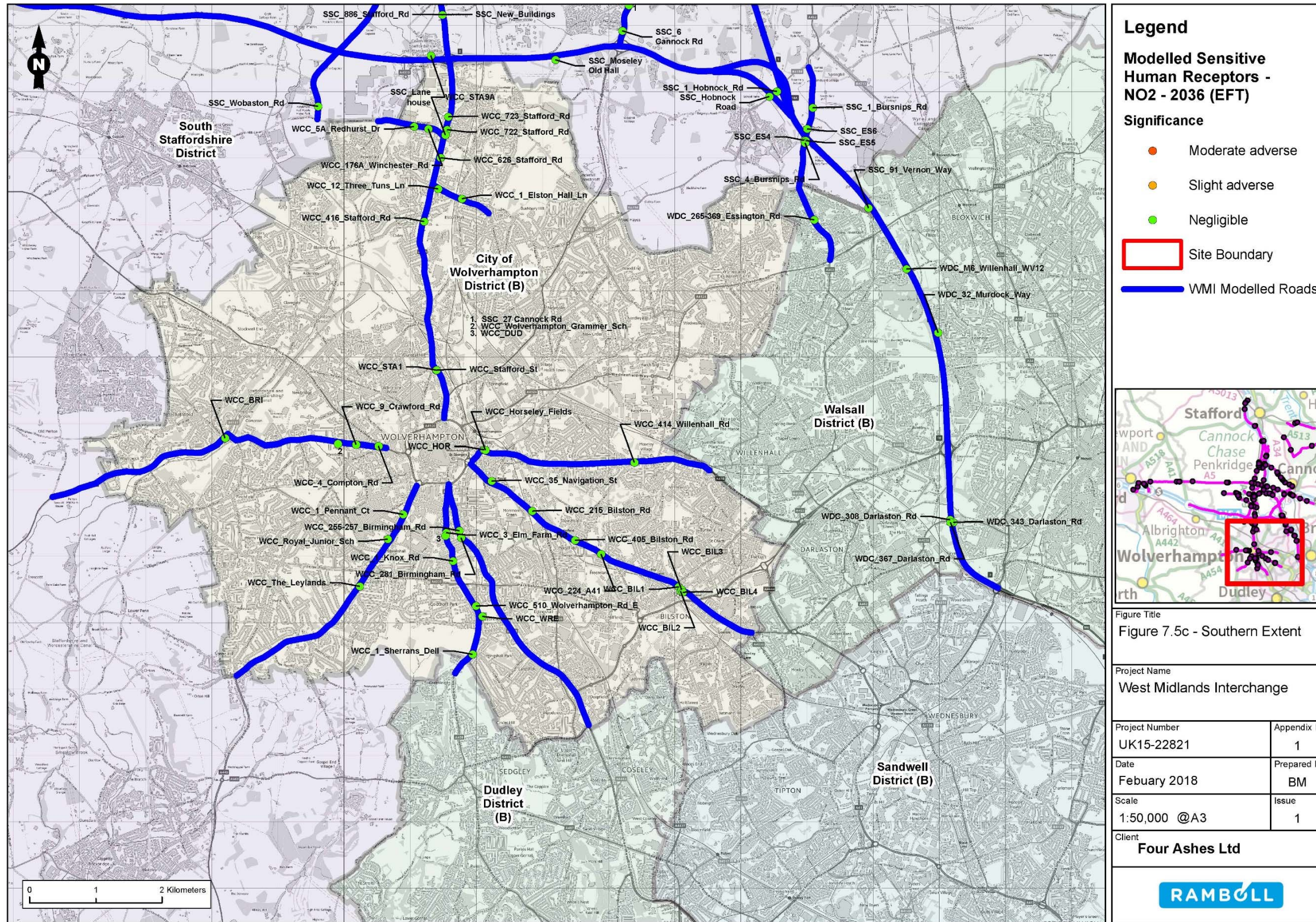
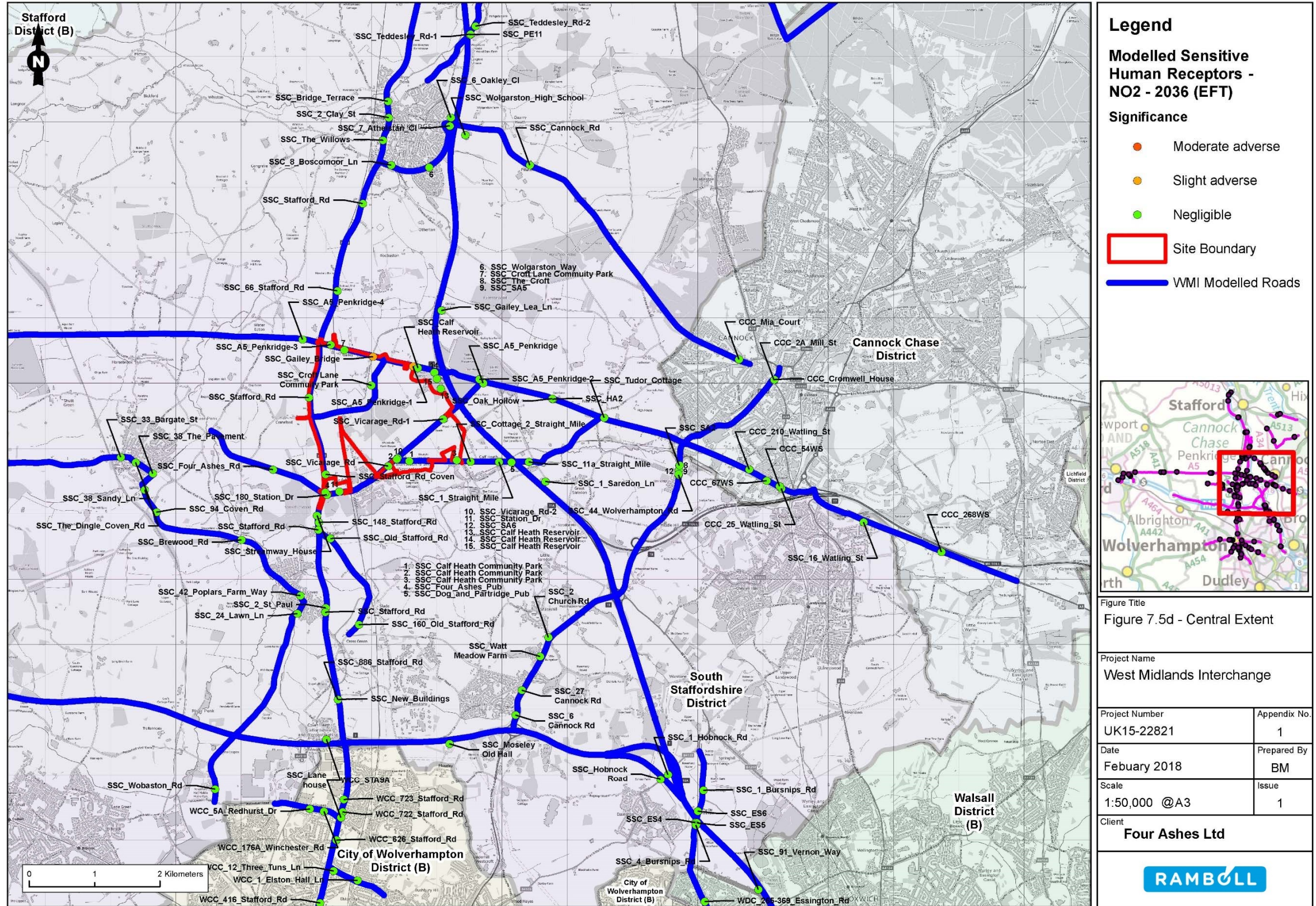


Figure 7.5d: Significance of Impact as a result of Scheme on NO₂ Concentrations in 2036



Reproduced from Ordnance Survey digital map data © Crown copyright 2017. All rights reserved. Licence number 100040631

New Receptors

- 7.176 As previously discussed the Proposed Development would provide a number of community parks within the Site. These represent sensitive receptors in terms of short-term exposure however given the transient nature of members of the public using these locations the annual mean and 24-hour objectives are not considered relevant in these locations.
- 7.177 The impact of the Proposed Development in terms of new exposure has therefore been assessed in relation to exposure to short-term NO₂ concentrations at these receptor locations.
- 7.178 The community parks are proposed in the south-east area of the Site (Calf Heath community park), to the south-east of Vicarage Road and within the northern part of the Site (Croft Lane community park) between the new link road and the A5.
- 7.179 As set out in Table 7.6.1 (Technical Appendix 7.6) the model has predicted annual mean NO₂ concentrations in the range of 13-24 µg/m³ at receptors CPAa to CPAe between 2021 and 2036 with the development operational This is significantly below 60 µg/m³ and therefore it is considered unlikely that the 1-hour mean objective would be exceeded within the community parks. The impact of the Proposed Development with regards new exposure would therefore be negligible.

Assessment of Likely Significant Effects on Human Health

- 7.180 The EPUK/IAQM guidance has been used to assess the likely significant effects on human health from air quality as a result of the Proposed Development. This uses the results of the quantitative assessment and professional judgment to determine the likelihood of significant effects.
- 7.181 Overall the Proposed Development would result in a negligible to slight adverse impact across the study area with regards to NO₂, PM_{2.5} and annual mean PM₁₀.
- 7.182 With regards to the 24 hour PM₁₀ objective, the assessment has predicted a moderate (2028) and substantial (2036) impact at one receptor location. At this location, which is representative of 3 to 4 houses adjacent to the M6, the Proposed Development contributes less than 2% of the AQAL. However due to the existing high baseline concentrations an increase of this amount is considered to result in a moderate or substantial impact.
- 7.183 The Proposed Development does not increase the number of receptors where air quality would be expected to exceed the air quality objectives and would therefore not increase the number of receptors which are exposed to poor air quality.
- 7.184 The Proposed Development does not introduce new receptors into a location of poor air quality.
- 7.185 Overall impacts on air quality as a result of the Proposed Development are not considered to give rise to a significant effect on human health.

Ecological Receptors

Annual Mean NO_x

- 7.186 Predicted annual mean and short-term NO_x concentrations predicted at the ecological receptors are set out in Appendix 7.6, Table 7.6.7 and 7.6.8. A summary of the impact of the Proposed Development at each location is set out in Table 7.19.

Table 7.19: Distance from road at which impacts on Annual Mean NO_x would become insignificant			
Site	2021	2028	2036
Belvide Reservoir	0	10m	10m
Doxey and Tillington	0	0	0

Table 7.19: Distance from road at which impacts on Annual Mean NO_x would become insignificant			
Site	2021	2028	2036
Marshes 1			
Doxey and Tillington Marshes 2	0	0	0
Doxey and Tillington Marshes 3	0	0	0
Doxey and Tillington Marshes 4	0	0	0

2021

- 7.187 For 2021 the modelling assessment has predicted a change in annual mean NO_x concentrations of less than 1% of the 30 µg/m³ critical level at all modelled locations at Belvide Reservoir and Doxy Tillington Marshes. The impact of the Proposed Development is therefore classed as insignificant at these designated sites during 2021.

2028

- 7.188 For the 2028 scenario the impact of the Proposed Development would be less than 1% of the CL at all locations within Doxey and Tillington Marshes and therefore the Proposed Development impact can be classed as insignificant. At Belvide Reservoir, the impact would be greater than 1% of the CL for 10 m across the assessed transect. The impact cannot therefore be classed as insignificant over this part of the site. Impacts at this location have been considered further within Chapter 10: Ecology and Nature Conservation.

2036

- 7.189 During 2036 the impact of the Proposed Development would remain at less than 1% of the CL at Doxey and Tillington Marshes.
- 7.190 At Belvide Reservoir the Proposed Development would exceed 1% of the CL over the first 10 m of the transect.
- 7.191 The assessment has shown that at Belvide Reservoir the impact of the Proposed Development cannot be classed as insignificant. Further assessment of the air quality impacts has therefore been carried out by the ecologist and the significance of the predicted impacts are discussed in detail within Chapter 10 of the ES.
- 7.192 However, for all receptors it should be noted that overall concentrations in NO_x are predicted to fall at all receptor locations between the base year and the completion of the scheme in 2036.

Nutrient Nitrogen Deposition

- 7.193 Predicted nutrient nitrogen deposition at the ecological receptors is presented in Technical Appendix 7.6, Table 7.6.6. A summary of the impacts is provided in Table 7.20.
- 7.194 Under all three assessment years the Proposed Development would result in a change in N-deposition of less than 1% of the CLO at the Doxey and Tillington Marshes site. The impact of the scheme on this location can therefore be classed as insignificant.
- 7.195 At Belvide Reservoir, the assessment has predicted a change in N-deposition of more than 1% of the CLO over a proportion of the transect. As the impact cannot be classed as insignificant at these locations the significance of the impacts has been discussed in more detailed within Chapter 10: of the ES.

Table 7.20: Distance from road at which impacts on N-Deposition would become insignificant

Site	EFT Emissions		
	2021	2028	2036
Belvide Reservoir	5m	15m	20m
Doxey and Tillington Marshes 1	0	0	0
Doxey and Tillington Marshes 2	0	0	0
Doxey and Tillington Marshes 3	0	0	0
Doxey and Tillington Marshes 4	0	0	0

Acid Nitrogen Deposition

- 7.196 Predicted acid nitrogen deposition at each ecological receptor are presented in Table 7.6.7, Appendix 7.6. A summary of the impacts are set out in Table 7.21 below. Belvide Reservoir has not been included as this receptor is not considered sensitive to acid deposition.
- 7.197 The predicted impacts are less than 1% of the CLO at the Doxey and Tillington Marshes site under all three assessment years. The impact of the scheme can therefore be classed as insignificant at this site.

Table 7.21: Distance from road at which impacts on Acid (N) Deposition would become insignificant

Site	EFT Emissions		
	2021	2028	2036
Doxey and Tillington Marshes 1	0	0	0
Doxey and Tillington Marshes 2	0	0	0
Doxey and Tillington Marshes 3	0	0	0
Doxey and Tillington Marshes 4	0	0	0

Compliance Risk Assessment

- 7.198 The compliance risk assessment, undertaken in accordance with IAN 175/13, provides an evaluation of whether the Scheme will affect the UK's ability to comply with the EU Directive.
- 7.199 As discussed previously, the change in concentrations at receptors close to the DEFRA PCM modelled road links are used to determine the risk of effecting compliance within the relevant zone/agglomeration. In this case the zones under consideration are the West Midlands and West Midlands Urban Area zones.
- 7.200 The impacts of the Proposed Development, set out in accordance with IAN 175/13, are provided in Tables 7.7.1 to 7.7.3 in Technical Appendix 7.7. The impacts have been assessed for each assessment year (2021, 2028 and 2036) using the 2015 released PCM modelled data for the 2017 base, 2017 Clean Air Zone and 2017 Clean Air Zone Plus models.
- 7.201 In all three assessment years and all three assessment scenarios the PCM predicts that the EU limit value for NO₂ will be met at all receptor locations.
- 7.202 Following the flow chart set out in Figure 7.1, the Proposed Development would not delay compliance with the EU Limit Value. The Proposed Development would not cause the EU limit

value of 40 µg/m³ to be exceeded as a result of the predicted change in concentrations and there would be no increase on road links predicted by the PCM model to exceed 40 µg/m³.

- 7.203 Furthermore, the Proposed Development would not result in the need to designate a new AQMA or require a change in the size of an existing AQMA, nor would it affect the ability of a non-compliant area to achieve compliance within the shortest period. The Proposed Development would not therefore change the compliance status of the West Midlands or West Midlands Urban Zones. Based on the IAN 175/13 flow chart the Scheme is deemed to be low risk.

Regional Impacts

- 7.204 As detailed in the technical note produced by Freight on Rail⁵⁰, rail freight produces 76% less CO₂ emission than the equivalent HDV journey. Furthermore, rail produces 90% less PM₁₀ and 15 times less NO₂ than an equivalent HDV journey.
- 7.205 It is anticipated that an average train from the Proposed Developments could remove 77 HDVs from the road network which would significantly reduce the number of HDV movements on the wider network.
- 7.206 A technical note has been produced by WSP which discusses the change of HDV movements along the arterial roads leading into Wolverhampton as a result of the WMI. It is anticipated that the number of HDV movements would increase significantly along the A449 leading into Wolverhampton as a result of WMI, however the number of HDV using the other arterial roads would decline. This is due to a greater proportion of freight entering Wolverhampton originating from WMI rather than entering from other locations. No change in the overall number of HDV entering Wolverhampton is anticipated as a result of the Proposed Development. This is set out in more detail in Appendix 7.9.
- 7.207 Figures generated by WSP indicate that the operational Proposed Development would reduce HDV movements on a regional scale by 50.6 million km per year. Using DEFRA's Emissions Factor Toolkit (EFT) tool and assuming an average speed of 82 kilometres per hour (kph) and emission factors for 2030, the proposals would reduce regional emissions of NO_x by 6,126 kg, PM₁₀ by 5,967 kg and PM_{2.5} by 3,117 kg per year indicating a clear beneficial impact from the Proposed Development.
- 7.208 The proposals are anticipated to reduce overall HDV movements across the wider road network resulting in significant reductions in regional NO_x, PM₁₀ and PM_{2.5} emissions therefore although there would be some localised adverse impacts the increase in movements of goods via freight would result in a beneficial impact on regional air quality.
- 7.209 The Proposed Development aims to reduce the overall number of HDV using the road network by using rail freight to transport goods. This is expected to result in a positive impact on regional air quality.

Mitigation

Construction Phase

- 7.210 The control of dust emissions from demolition and construction sites relies upon good site management and mitigation techniques to reduce emissions of dust and limit dispersion. A summary of the mitigation measures recommended in the IAQM guidance to reduce impacts from a high-risk sites is provided in section 8 of the Outline Demolition and Construction Environmental Management Plan (ODECMP) included as Technical Appendix 2.3. These measures would be included in the Phase-Specific Dust Management Plan which would form part of the Phase specific Demolition and Construction Environmental Management Plan (DCEMP). The principle requirements for the Dust Management Plan are outlined in the ODECMP.

⁵⁰ Freight on Rail, Response to West Midlands Rail Freight Interchange Consultation

Operational Phase

- 7.211 The assessment has predicted a substantial adverse impact on daily PM₁₀ concentrations at one receptor location but a negligible to slight adverse at all other locations. However, as previously discussed the significant impact is due to the high baseline concentrations in this location and is limited to 3-4 residential properties adjacent to the M6. Overall, impacts are not considered to be significant and no mitigation measures are therefore considered necessary.
- 7.212 Measures to reduce vehicle movements and potential congestion (and hence reduce potential air emissions) are outlined in detail within a Sustainable Transport Strategy included as an appendix to the Transport Assessment (Technical Appendix 15.1). In summary the measures comprise:
- Enhancement of public transport, including additional buses between Wolverhampton City Centre and the Site and introduction of a new shuttle bus service;
 - Raise awareness of bus services by promotional activity and provision of real-time bus service information;
 - Measures to encourage car sharing;
 - Improve pedestrian and cycle connections to the Site; and
 - Encouragement of staggered working hours / flexible working.
- 7.213 The sustainable transport proposals are anticipated to reduce overall HDV movements associated with the Proposed Development.

Conclusions

Construction Impacts

- 7.214 The modelling assessment has predicted negligible impacts at all receptor locations as a result of construction traffic movements.
- 7.215 An assessment of construction dust impacts arising from the Proposed Development has indicated the development proposals would have a high risk of causing impacts at adjacent receptors in the absence of suitable mitigation. On the assumption that best practice dust management techniques are employed, which is delivered through a Dust Management Plan (as part of each DCEMP) to be agreed with SSDC, potential impacts would be sufficiently reduced to ensure that no significant residual effects arise.

Operational Impacts

- 7.216 The operational development would lead to an increase in the number of trains using the WCML which runs between Rugby and Stafford and receptors have been identified within 30 m of the railway line to the north and south of the Site. However, the railway line has not been identified within LAQM.TG(16) as experiencing heavy traffic of diesel locomotives and the majority of locations along the railway line experience background concentrations of less than 25 µg/m³. It is anticipated that the operational development would generate an additional 10 movements per day, less than 1 per hour. Air quality impacts as a result of railway locomotive movements are therefore unlikely to result in significant impacts on local air quality.
- 7.217 On the wider rail network, the additional train movements generated by the Proposed Development will be so small as to be considered insignificant therefore impacts on local air quality from rail freight as a result of the operational development are deemed to be negligible.
- 7.218 The operational impacts of increased traffic emissions arising as a result of additional traffic movements on the surrounding road network have been assessed. Impacts have been predicted at sensitive receptors identified adjacent to the road links which would experience changes in traffic flows above the assessment criteria set out within the EPUK/IAQM air quality

planning guidance. The assessment has used the latest emissions data issued by DEFRA to predict potential impacts to consider the impact of the Proposed Development at three operational phases, assuming 25% complete in 2021 (with the on-site road not yet in operation), 50% in 2028 (including the on-site link road) and 100% operation in 2036.

- 7.219 At all locations impacts are predicted to be negligible in terms of annual mean concentrations for PM₁₀ and PM_{2.5} within the study area. However, the assessment has predicted an increase in the number of days exceeding the 24-hour PM₁₀ objective at a number of locations. The impact has been assessed as between moderate and substantial adverse at receptor 7a but not significant at all other locations. The objective is already being exceeded at receptor 7a without the Proposed Development in operation therefore the significant impact is as a result of the high baseline concentrations. The significant impact is limited to 3-4 residential properties immediately adjacent to the M6. Impacts at other receptors immediately adjacent to the M6 to the west have been assessed as being negligible. The Proposed Development does not therefore result in an exceedance of this objective at any location and overall impacts on human health are not considered to be significant.
- 7.220 With regards to NO₂, the assessment predicted a slight adverse impact at two receptor locations under the 2021 and 2036 scenarios. These impacts arise at receptors located within AQMA and at receptors where the objective limit is predicted to exceed the annual mean objective. However, a slight adverse impact is not considered to be significant. At the remaining 155 receptor locations and for the 2028 scenario the assessment has predicted a negligible impact at all receptors.
- 7.221 The assessment has shown there would be no increase in the number of receptor locations which exceed relevant human health air quality objectives as a result of the Proposed Development. The impact of the scheme is not therefore considered to be significant in terms of human health.
- 7.222 The assessment has considered the impact of the operational development on identified internationally, nationally, regionally and locally designated ecological sites. Those sites identified within 200 m of affected roads, as identified by the DMRB screening criteria, have been considered within the assessment.
- 7.223 The assessment has indicated that traffic generated by the operational scheme is predicted to result in changes in NO_x concentrations and nutrient nitrogen and acid deposition rates at the identified ecological receptors at a rate of more than 1% of the relevant critical levels and loads at just one of the ecological receptors, Belvide Reservoir. Further consideration of the predicted impacts at this site has been considered as part of the ecology assessment and the significance of effects set out in the ecology chapter (Chapter 10).
- 7.224 The impact of the Proposed Development has been considered in relation to the NPS. The Site falls within a non-compliant zone in terms of air quality, therefore the impact of traffic generated by the Proposed Development has been assessed for compliance with the EU Limit Values in accordance with the DEFRA guidance IAN 175/13.
- 7.225 Following the Compliance Risk Assessment flow chart set out within IAN 175/13 the Proposed Development would not prevent the UK's compliance with the EU Limit Value for NO₂.
- 7.226 The operational scheme would reduce HDV movements on a regional scale by 50.6 million km per year which would reduce regional emissions of NO_x by 6,126 kg per year when fully operational. PM₁₀ would reduce by 5,967 kg and PM_{2.5} by 3,117 kg. The operational development would therefore result in a beneficial impact on air quality on a regional scale.

Summary of Mitigation Measures

Potential Effects Identified	Proposed Mitigation/Control & Enhancement Measures
Construction	
Negligible effects from construction traffic	Best Practice, as set out in ODCEMP.
Moderate adverse effects from construction dust	Best Practice, as set out in ODCEMP
Completed Development	
Slight adverse effects from operational traffic	Impacts would be localised however the wider impacts of the Proposed Development would result in reduced regional air quality emissions due to reduced HDV movements regionally. In addition, measures to reduce vehicle movements and potential congestion (and hence reduce potential air emissions) are outlined in a Sustainable Transport Strategy included as an appendix to the Transport Assessment (Technical Appendix 15.1)

Canal moorings and canal towpath	Construction dust	Negligible to Slight	-	D	T	R	Lt
Completed Development							
Human receptors adjacent to road network	Operational traffic	Negligible to Slight	-	D	P	R	Lt
Ecological Receptors	Operational traffic	Not Insignificant***	-	D	P	R	Lt
Notes: * - = Adverse/ + = Beneficial; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St- Short term/ Mt -Medium term/ Lt -Long term. **Negligible/Minor/Moderate/Major *** the impacts could not be classed as insignificant and have been assessed further in the Ecology Chapter (Chapter 10)							

Summary of Residual Effects

7.227 Table 7.23 provides a tabulated summary of the outcomes on air quality arising from the Proposed Development.

Receptor	Description of Residual Effect	Nature of Residual Effect*					
		Significance**	+	D	P	R	St Mt Lt
Construction							
Residential receptors adjacent to road network	Construction traffic	Negligible	-	D	T	R	Lt
Residential receptors adjacent to Site	Construction dust	Negligible to Slight	-	D	T	R	Lt

Decommissioning

- 7.228 The Proposed Development is expected to be operational indefinitely, as long as it is viable and fit for purpose.
- 7.229 In the long term, it may likely to be re-developed or adapted on a piecemeal basis as operator requirements change and new occupiers move to the Site. Any such piecemeal redevelopments would be expected to be undertaken in accordance with current and future legislation and guidance in relation to air quality and would be subject to separate planning applications and planning requirements and conditions.
- 7.230 On this basis the potential effects on air quality for decommissioning are considered to be negligible.

Cumulative Effects

- 7.231 During the construction phase, cumulative effects of dust and particulate matter generated from on-site activities may be experienced in locations in close proximity to two or more development sites where the timing of the construction phases overlap. There may also be an effect due to the increased construction traffic on local roads if construction vehicles use the same routes to access the sites. During the operational phase, cumulative effects may be experienced due to the additional road vehicles generated by one or more schemes if the traffic is likely to affect the same local roads.

Construction

- 7.232 Guidance provided by the IAQM suggests that effects of dust and particulate matter generated from a construction site may be experienced up to 350m from the site. The Bericote Development is located within 350 m of the Site, as is the Calf Heath Quarry, which is potentially a significant source of dust emissions.

- 7.233 The Bericote Development is anticipated to be complete by the time the Proposed Development construction phase commences. Therefore, no cumulative effects are anticipated between the construction phases of both schemes.
- 7.234 Calf Heath Quarry is currently operational, however should DCO consent be granted, no further minerals will be excavated within the Site including the new minerals allocation. The existing minerals infrastructure will be removed. As the quarry is regulated under an Environmental Permit removal of the existing minerals infrastructure at Calf Heath Quarry would be expected to employ stringent mitigation measures similar to those that would be implemented during construction of the Proposed Development. It is anticipated that the current quarry workings would be left open, thereby minimising the need to rework materials during the earthworks stage of the Proposed Development. As such, it is not anticipated that there will be any cumulative effects.

Completed Development

- 7.235 The traffic data provided by WSP has taken into account the cumulative impact of a number of developments within the study area. The predicted impacts therefore take account of the cumulative impacts associated with these other schemes.