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WASTE RESOURCE MANAGEMENT



JONES HOMES (YORKSHIRE) LIMITED

BLOOMHOUSE LANE, DARTON, BARNSLEY

AIR QUALITY ASSESSMENT

JUNE 2017

your earth our world



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JONES HOMES (YORKSHIRE) LIMITED

BLOOMHOUSE LANE, DARTON, BARNSELY

AIR QUALITY ASSESSMENT

JUNE 2017

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LE13441-001: Existing and Proposed Sensitive Receptor Locations

1 INTRODUCTION

- 1.1.1 Wardell Armstrong LLP has been commissioned to undertake an air quality assessment for a proposed residential development off Bloomhouse Lane, Darton.
- 1.1.2 The proposed development site is located to the north of Darton. To the north, the site is bordered by Bloomhouse Lane, with open land and ancient woodland beyond. To the east, the site is bordered by existing residential properties; with Sackup Lane and further residential areas beyond. To the south, the site is bordered by existing residential properties and allotments; with railway line and Two Roses Brewery beyond. To the west, the site is bordered by open land. The development site currently comprises open land. The location of the site is shown on drawing LE13441-001.
- 1.1.3 The proposals subject of this full planning application relates to a residential development comprising up to 214 dwellings with access from the proposed roundabout onto Darton Road / Sackup Lane, to the south of the site including a spine road through the site with access onto Woolley Colliery Road. A second phase 2 application for 83 dwellings with access onto Woolley Colliery Road, from the spine road, will be submitted at a later stage, once this site, currently designated as Green Belt has been reallocated for housing in the emerging Local Plan, expected to be adopted in 2018.
- 1.1.4 This air quality assessment report has been undertaken in support of the full planning application for 214 dwellings (referred to as Phase 1 of the development). Potential cumulative impact from both Phase 1 and Phase 2 (83 dwellings) of the development in combination has also been considered within this report.
- 1.1.5 This report details the results of the air quality assessment undertaken in support of a planning application for the proposed residential development. The report discusses the potential dust and fine particulate matter impacts associated with the construction phase and an assessment of the potential air quality impacts of the additional road traffic generated by the proposed development. Air pollutant concentrations are considered at existing sensitive receptor locations in the vicinity of the proposed development, and also at a proposed receptor location within the residential development itself.

2 LEGISLATION AND POLICY CONTEXT

2.1 Air Quality Legislation and National Air Quality Strategy

- 2.1.1 The Environment Act 1995 requires the UK government to prepare a National Air Quality Strategy. The UK National Air Quality Strategy (NAQS) was therefore published in March 1997 setting out policies for the management of ambient air quality. The Strategy sets objectives for eight pollutants, which may potentially occur in the UK at levels that give cause for concern. These pollutants are: nitrogen dioxide (NO₂), sulphur dioxide, carbon monoxide, lead, fine particulate matter (PM₁₀), benzene, 1, 3–butadiene and ozone.
- 2.1.2 The Strategy was reviewed and a Review Report¹ and Consultation Document² were published by the Department of the Environment, Transport and the Regions in 1999. A revised version (The Air Quality Strategy (AQS) 2000), which supersedes the 1997 Strategy, was published in January 2000. The AQS 2000 strengthens the objectives for a number of pollutants with the exception of that for particulates, which was replaced with the less stringent EU limit value.
- 2.1.3 The objectives for the eight pollutants in the Strategy provide the basis of the implementation of Part IV of the Environment Act 1995. The Air Quality Strategy objectives for each pollutant, except ozone, were given statutory status in the Air Quality (England) Regulations, 2000³ and Air Quality (England) (Amendment) Regulations 2002⁴ ('the Regulations').
- 2.1.4 In 2007 the Air Quality Strategy was revised. This latest strategy⁵ does not remove any of the objectives set out in the previous strategy or its addendum, apart from replacing the provisional 2010 objective for PM₁₀ in England, Wales and Northern Ireland with the exposure reduction approach for PM_{2.5}. The UK Government and the Devolved

¹ Department of the Environment, Transport and the Regions, January 1999. Report on the Review of the National Air Quality Strategy, Proposals to amend the Strategy

² Department of the Environment, Transport and the Regions 1999, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. A consultation document

³ The Air Quality (England) Regulations 2000. SI No 928

⁴ The Air Quality (Amendment) Regulations 2002

⁵ Department of Environment, Food and Rural Affairs, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. July 2007

Administrations have now therefore set new national air quality objectives for particulate matter smaller than 2.5µm diameter (PM_{2.5}).

2.1.5 EU Directive 2008/50/EC⁶ came into force in June 2008 and was transposed into legislation in England on 11th June 2010 as 'The Air Quality Standards Regulations 2010'⁷. This EU Directive consolidates existing air quality legislation and makes achievement of the objectives a national objective rather than a local one. It also provides a new regulatory framework for PM_{2.5}.

2.1.6 The current Air Quality Standards and Objectives, as set out in the Air Quality Standards Regulations 2010, are detailed in Table 1.

Table 1: UK Air Quality Objectives and Pollutants			
Pollutant	Objective	Averaging Period	Obligation
Nitrogen Dioxide (NO ₂)	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	All local authorities
	40µg/m ³	Annual mean	All local authorities
Particulate Matter (PM ₁₀)	50µg/m ³ not to be exceeded more than 35 times a year	24-hour mean	All local authorities
	50µg/m ³ not to be exceeded more than 7 times a year	24-hour mean	Scotland only
	40µg/m ³	Annual mean	All local authorities
	18µg/m ³	Annual mean	Scotland only
Particulate Matter (PM _{2.5})	25µg/m ³	Annual mean	England only
	10µg/m ³	Annual mean	Scotland only
Sulphur Dioxide (SO ₂)	266µg/m ³ not to be exceeded more than 35 times a year	15-minute mean	All local authorities
	350µg/m ³ not to be exceeded more than 24 times a year	1-hour mean	All local authorities
	125µg/m ³ not to be exceeded more than 3 times a year	24-hour mean	All local authorities
Benzene (C ₆ H ₆)	16.25µg/m ³	Running annual mean	All local authorities
	5µg/m ³	Annual mean	England and Wales only

⁶ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe

⁷ Statutory Instruments 2010 No. 1001 The Air Quality Standards Regulations 2010

Table 1: UK Air Quality Objectives and Pollutants			
Pollutant	Objective	Averaging Period	Obligation
	3.25µg/m ³	Running annual mean	Scotland and Northern Ireland only
1,3-Butadiene (C ₄ H ₆)	2.25µg/m ³	Running annual mean	All local authorities
Carbon Monoxide (CO)	10mg/m ³	Maximum daily running 8-hour mean	England, Wales and Northern Ireland only
	10mg/m ³	Running 8-hour mean	Scotland only
Lead (Pb)	0.5µg/m ³	Annual mean	All local authorities
	0.25µg/m ³	Annual mean	All local authorities

2.2 Legislative Requirement for Local Air Quality Management Guidance

- 2.2.1 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, July 2007, establishes the framework for air quality improvements based on measures agreed at a national and international level. However, despite these measures, it is recognised that areas of poor air quality will remain and these should be dealt with through the Local Air Quality Management (LAQM) process using locally implemented measures.
- 2.2.2 LAQM legislation in the Environment Act 1995 requires local authorities to conduct periodic review and assessments of air quality. These aim to identify all those areas where the air quality objectives are being, or are likely to be, exceeded.
- 2.2.3 All authorities were required to undertake the first stage of review and assessment which concluded in September 2001. In those areas identified as having the potential to experience elevated levels of pollutants the authority was required to undertake a more detailed second stage review comprising two steps; Updating and Screening Assessments and Detailed Assessments. Where it was predicted that one or more of the air quality objectives would be unlikely to be met by the end of 2005, local authorities were required to proceed to a third stage and, if necessary, declare Air

Quality Management Areas (AQMA) and make action plans for improvements in air quality, in pursuit of the national air quality objectives.

- 2.2.4 An Evaluation Report, commissioned by the UK Government and Devolved Administrations in 2007, led to the publication of the LAQM Technical Guidance document LAQM.TG(09) in February 2009. This technical guidance was subsequently updated following a consultation process, and in January 2016 the LAQM Technical Guidance document LAQM.TG(16) was published by Defra.
- 2.2.5 LAQM.TG(16) presents the changes to the LAQM system across the UK. A new streamlined approach has been adopted in England and Scotland; however Wales and Northern Ireland are still considering changes to LAQM and therefore work according to the previous regimes.
- 2.2.6 The previous structure of Review and Assessment, comprising Updating and Screening Assessments and Detailed Assessments has been replaced by the introduction of an Annual Status Report (ASR) for England and an Annual Progress Report (APR) for Scotland.
- 2.2.7 The ASR replaces all other reports which previously had to be submitted as part of the LAQM system including Action Plans, Progress Reports, Updating and Screening Assessments and Detailed Assessments.
- 2.2.8 Local authorities now have the option of a fast track AQMA declaration. This allows more expert judgement to be used and removes the need for a detailed assessment where a local authority is confident of the outcome. Detailed assessments should still be used if there is any doubt.
- 2.2.9 Examples of where the Air Quality Objectives should/should not apply are also detailed in LAQM.TG(16) and are included in Table 2 below.

Table 2: Examples of Where the Air Quality Objectives Should Apply		
Averaging Period	Objectives Should Apply at:	Objectives Should Generally Not Apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, car homes, etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties.

Table 2: Examples of Where the Air Quality Objectives Should Apply		
Averaging Period	Objectives Should Apply at:	Objectives Should Generally Not Apply at:
		Kerbside sites (as opposed to locations at the building façade) or any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean objectives would apply together with hotels. Gardens of residential properties ^a	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour objectives apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations to which the public might reasonably be expected to spend one hour or longer	Kerbside sites where public would not be expected to have regular access
15-minute mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer	
^a : Such locations should represent parts of the garden where relevant public exposure is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure to pollutants would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied		

2.3 National Planning Policy and Guidance

2.3.1 The National Planning Policy Framework⁸, introduced in March 2012 requires that planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of AQMAs and the cumulative impacts on air quality from individual sites in local areas.

⁸ Department for Communities and Local Government, March 2012, National Planning Policy Framework

Planning decisions should ensure that any new development in AQMAs is consistent with the local air quality action plan.

- 2.3.2 The Planning Practice Guidance⁹ states that whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impacts in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife).
- 2.3.3 Where a proposed development is anticipated to give rise to concerns about air quality an appropriate assessment needs to be carried out. Where the assessment concludes that the proposed development (including mitigation) will not lead to an unacceptable risk from air pollution, prevent sustained compliance with national objectives or fail to comply with the requirements of the Habitats Regulations, then the local authority should proceed to decision with appropriate planning conditions and/or obligations.

2.4 Barnsley Metropolitan Borough Council Local Air Quality Management Review and Assessment

- 2.4.1 Barnsley Metropolitan Borough Council (BMBC) has declared seven Air Quality Management Areas (AQMAs). The nearest AQMA (i.e. Barnsley AQMA NO.1) is located approximately 500m to the west to the development, along the M1 motorway. Therefore, the proposed development is not located within an existing AQMA.
- 2.4.2 BMBC operates two automatic monitoring locations and undertakes non-automatic monitoring of NO₂ at 89 sites. The 2016 Air Quality Annual Status Report (ASR), the most recent air quality report available from SMBC, considered monitoring data collected since the previous Progress Report in 2015.
- 2.4.3 From the 2016 Air Quality Annual Status Report, it is understood the nearest roadside NO₂ diffusion tube located in the surrounding area (approximately 1.5km to the south

⁹ Department for Communities and Local Government, March 2014, Planning Practice Guidance: Air Quality

of the proposed development), showed a monitored annual mean NO₂ concentration of 38µg/m³.

2.5 Barnsley Air Quality and Emissions Good Practice Planning Guidance

2.5.1 Barnsley Air Quality and Emissions Good Practice Planning Guidance provides a template for integrating air quality considerations into land-use planning and development management policies that can influence the reduction of road transport emissions. It has been developed to:

- Introduce an air quality assessment scheme which includes the quantification of impacts, formulating damage costs and identifying mitigation measures to be implemented to negate the impact;
- Tackles cumulative impact; and
- Provides clarity and consistency of the process to developers, planners and local communities.

2.6 Wakefield Council Local Air Quality Management Review and Assessment

2.6.1 Wakefield Council (WC) has declared ten AQMAs. The nearest AQMA (i.e. Wakefield M1 AQMA) is located approximately 2km to the north of the development, along the entire M1 motorway within WC.

2.6.2 BMBC operates three automatic monitoring locations and undertakes non-automatic monitoring of NO₂ at 53 sites. The 2016 Air Quality Annual Status Report (ASR), the most recent air quality report available from WC, considered monitoring data collected since the previous Progress Report in 2015.

2.6.3 From the 2016 Air Quality Annual Status Report, it is understood that the nearest pollutant monitoring location is situated approximately 5.8km to the north of the proposed development and showed a monitored annual mean NO₂ background concentration of 24µg/m³.

2.7 West Yorkshire Air Quality and Emissions Technical Planning guidance

2.7.1 West Yorkshire Air Quality and Emissions Technical Planning guidance forms part of the development of an overarching Low Emissions Strategy to reduce road transport emissions in West Yorkshire. It is aimed at helping planning authorities deliver national

air quality objectives through cost effective service planning brought about by the joint working and individual policy set out in each authority's Local Plan policies.

2.7.2 In this guidance, the air quality assessment process has been required to adopt the following three stage process:

- 1) Determine the classification of the development proposal;
- 2) Assess and quantify the impact on local air quality; and
- 3) Determine the level of a mitigation required by the proposal to meet Local Development Plan requirements.

3 ASSESSMENT METHODOLOGY

3.1 Consultation and Scope of Assessment

3.1.1 The proposed development site is situated within land under the jurisdiction of Barnsley Metropolitan Borough Council (BMBC). However, due to the proximity of the proposed development site to Wakefield Council (WC), consultations were undertaken with both local authorities between 20th December 2016 and 13th February 2017.

Consultation with BMBC

3.1.2 A written methodology was provided by email to Mr Chris Shields, Technical Officer (Pollution Control) for BMBC, on 20th December 2016. This included the following points:

- A construction phase dust assessment will be undertaken in accordance with the Institute of Air Quality Management (IAQM) guidance. This will consider the potential dust soiling, human health and ecological effects (where applicable) at existing sensitive receptor locations;
- A screening assessment will be undertaken using the guidance within the Design Manual for Roads and Bridges (DMRB). This will consider NO₂ and PM₁₀ concentrations at existing sensitive receptor locations to assess the potential air quality impacts of changing traffic flows, as a result of the proposed development. Pollutant concentrations will also be predicted for locations considered to be representative of the proposed residential dwellings within the site;
- There is no representative background monitoring for NO₂ or PM₁₀ in the vicinity of the proposed development. Background pollutant concentrations will therefore be obtained from the Defra default concentration maps. The base year backgrounds from the 2013-based maps will be considered within the baseline and opening/ future year scenarios;
- There are no roadside automatic monitoring station or diffusion tubes located within the study network, therefore model verification cannot be undertaken;

- It is noted that there are a number of ancient woodlands located to the north of the proposed development site, with the closest being Husband Wood situated approximately 612m from the boundary of the development site. Guidance detailed within the Design Manual for Roads and Bridges guidance document: Volume 11, Section 3 – Environmental Assessment, Environmental Assessment Techniques (2007) states that:

“The designated sites that should be considered for assessment are those for which the designated features are sensitive to air pollution, either directly or indirectly, and which could be adversely affected by the effect of local air pollution on vegetation within the following nature conservation sites: SAC (SCI or cSAC), SPA, pSPA, SSSI and Ramsar sites.”

The Husband Wood has not been given any of the above designations. Therefore, it is considered that an assessment of the operational impacts of the proposed development on the Husband Wood is not required.

- The proposed development site is bordered to the west by the Barnsley to Darton railway line. The DEFRA technical guidance document LAQM.TG(16) provides details of railway lines which experience a heavy volume of diesel freight traffic, and which may need to be considered in more detail. This railway line is not included in LAQM.TG(16) and, therefore, assessment of railway emissions is not considered to be required; and
- It is noted that the Two Roses Brewery is located approximately 280m to the south of the proposed development site. It is considered unlikely that this facility has the potential to contribute a significant odour issue for future residents of the proposed development.

3.1.3 The proposed operational phase methodology was agreed by return email, on the 21st December 2016, by Mr Shields. Mr Shields confirmed that there are no odour complaints associated with the Two Roses Brewery. Furthermore, he requested that

the assessment take account of the Barnsley MBC Air Quality and Emissions Good Practice Planning Guidance.

- 3.1.4 The proposed construction phase methodology was agreed by return email, on the 22nd December 2016, by Mr James Gardham, the Pollution Prevention & Control Officer for BMBC.
- 3.1.5 Further correspondence took place between 10th February and 13th February 2017 to agree the locations of sensitive receptors for the operational phase road traffic emissions assessment.

Consultation with WC

- 3.1.6 An identical written methodology (as above in section 3.1.2) was provided by email to Mr Stephen Douglas, Scientific Officer for WC, on 20th December 2016.
- 3.1.7 A response was received from Mr Douglas by email on the 20th December 2016. Mr Douglas requested that the assessment adhere to the adopted West Yorkshire Air Quality and Emissions Planning guidance.

3.2 Construction Phase Assessment – Dust and Fine Particulate Matter Emissions

- 3.2.1 To assess the impacts associated with dust and PM₁₀ releases, during the construction phase of the development, an assessment has been undertaken in accordance with the IAQM guidance¹⁰.

Step 1

- 3.2.2 Step 1 of the assessment is to screen the requirement for a more detailed assessment. The guidance states that an assessment will normally be required where there are existing human sensitive receptors within 350m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).
- 3.2.3 With regards to ecological receptors, the guidance states that an assessment will normally be required where there are existing ecological receptors within 50m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

¹⁰ Guidance on the Assessment of Dust from Demolition and Construction (February 2014)

3.2.4 Where there are existing sensitive receptors locations within 350m of the site boundary, it is necessary to proceed to Step 2 of the assessment.

Step 2

3.2.5 Step 2 of the assessment determines the potential risk of dust arising in sufficient quantities to cause dust soiling, human health and/or ecological effects. The risk is related to:

- The activities being undertaken (demolition, number of vehicles and plant etc);
- The duration of these activities;
- The size of the site;
- The meteorological conditions (wind speed, direction and rainfall);
- The proximity of receptors to the activity;
- The adequacy of the mitigation measures applied to reduce or eliminate dust; and
- The sensitivity of receptors to dust.

3.2.6 The risk of effects is determined using four risk categories: negligible, low, medium and high risk. A site is allocated to a risk category based upon two factors:

- **Step 2A** – the scale and nature of the works which determines the potential dust emission magnitude as small, medium or large; and
- **Step 2B** – the sensitivity of the area to dust impacts which is defined as low, medium or high sensitivity.

3.2.7 These two factors are combined in **Step 2C** to determine the risk of effects with no mitigation applied.

3.2.8 The risk of effects is determined for four types of construction phase activities, with each activity being considered separately. If a construction phase activity is not taking place on the site, then it does not need to be assessed. The four types of activities to be considered are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

Step 3

3.2.9 Step 3 of the assessment determines the site-specific mitigation required for each of the activities, based on the risk determined in Step 2. Mitigation measures are detailed in guidance published by the Greater London Authority¹¹, recommended for use outside the capital by LAQM guidance, and the IAQM guidance document itself. If the risk is classed as negligible, no mitigation measures beyond those required by legislation will be necessary.

Step 4

3.2.10 Step 4 assesses the residual effects, with mitigation measures in place, to determine whether or not these are significant.

Existing Dust Sensitive Receptors – Human Receptors

3.2.11 The closest sensitive human receptor locations to the proposed development are residential in nature, and are detailed in Table 3.

Table 3: Existing Dust Sensitive Receptors		
Receptor	Direction from the Site	Approximate Distance from the Site Boundary (m)
Existing Residential Dwellings along Bloomhouse Lane.	North	<20m at closet point
Existing Residential Dwellings along Sackup Lane.	East	<20m at closet point
Existing Residential Dwellings along Station Road.	South	<20m at closet point

Existing Dust Sensitive Receptors – Ecological Receptors

3.2.12 There are a number of ancient woodlands located to the north of the proposed development site, with the closest being Husband Wood situated approximately 612m from the boundary of the proposed development site.

3.2.13 Therefore, there are no ecological receptors, or potentially dust sensitive statutory designated habitat sites, located within 50m of the site and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site

¹¹ Greater London Authority (2006) The Control of Dust and Emissions from Construction and Demolition: Best Practice Guidance

entrance(s). Ecological effects do not therefore need to be considered within this assessment.

3.3 Operational Phase Assessment – Road Traffic Emissions

Modelling of Road Traffic Emissions

- 3.3.1 The air quality assessment has been undertaken in accordance with the air quality guidance document LAQM.TG(16). The road traffic emissions associated with changing vehicle movements, as a result of the proposed development, are quantified using the methodology detailed in Design Manual for Roads and Bridges (DMRB, Volume 11, Section 3, Part 1, HA207/07, May 2007).
- 3.3.2 DMRB contains a spreadsheet identified as 'The Local Impacts Screening Method'. This has been used to predict the concentrations of NO₂ and PM₁₀ at existing sensitive receptor locations; as these pollutants are considered to be the most likely to exceed the air quality objectives. In addition, pollutant concentrations are also predicted at a proposed sensitive receptor location, considered to be representative of residential areas within the site.
- 3.3.3 A DMRB screening assessment has been undertaken to consider the potential air quality impacts associated with the operational phase of the proposed development. The predicted impacts have been assessed against the air quality objectives and standards set out in the Air Quality Standards Regulations (2010). Changes in pollutant concentrations between 'without development' and 'with development' scenarios are also assessed against a set of significance criteria, detailed in Section 4 of this report.
- 3.3.4 Air quality modelling has been carried out to predict pollutant concentrations, due to road traffic emissions, for three assessment years as follows:
- The base year (2016): This is the most recent year for which traffic data is available;
 - A proposed opening year of the development (2022): This is the year in which the development will be completed and is considered both without the development and with the development (i.e. Phase 1 development) in place.
 - A future year of the development (2027): This is considered both without the development and with the development (i.e. Phase 1 development) in place. Potential cumulative impact from both Phase 1 and Phase 2 of the development in combination has also been considered in 2027.

Road Traffic Data

- 3.3.5 The DMRB screening assessment requires the input of detailed road traffic flow information for those routes which may be affected by the proposed development. The traffic flow information used in the assessment is included in Appendix A.
- 3.3.6 24 hour Annual Average Daily Traffic (AADT) flows and HGV percentages, for use in the DMRB screening assessment, have been obtained from Sanderson Associates Ltd who have undertaken the transport assessment for the project.
- 3.3.7 Traffic flow information has been provided for the following roads:
- Proposed site access;
 - The Grange;
 - Woolley Edge Lane;
 - Sackup Lane;
 - Darton Lane;
 - Station Road;
 - Woolley Colliery Road;
 - Bloomhouse Lane;
 - Church Street; and
 - Barnsley Road.
- 3.3.8 Air quality modelling has been carried out to predict pollutant concentrations, due to road traffic emissions, for a total of six scenarios:
- Scenario 1: 2016 Base Year;
 - Scenario 2: 2022 Proposed Opening Year, Without Development;
 - Scenario 3: 2027 Future Year, Without Development;
 - Scenario 4: 2022 Proposed Opening Year, With Development (i.e. Phase 1);
 - Scenario 5: 2027 Future Year, With Development (i.e. Phase 1); and
 - Scenario 6: 2027 Future Year, With Development (i.e. Phase 1) + cumulative impact from Phase 2 development.

Existing Sensitive Receptor Locations

3.3.9 Ten representative existing sensitive receptor locations (identified as ESR 1 to ESR 10) have been considered in the air quality assessment. These are residential in nature and have been selected as they are locations at which the annual mean air quality objectives apply and are the most likely to be impacted by the proposed development.

3.3.10 Details of the existing sensitive receptor locations are provided in Table 4 and their locations are shown on drawing LE13441-001.

Table 4: Existing Sensitive Receptor Locations					
Receptor	Address	Grid Reference		Roads Considered	Distance from Receptor to Road Centre (m)
		Easting	Northing		
ESR 1	11 Churchfield Ln, Darton, Barnsley	430973	409870	Chruch Street, East of Barnsley Road	60.6
				Barnsley Road, South of Church Street	44
				Churchfield Lane, West of Huddersfield Road	5
				M1 motorway	121.3
ESR2	5 Wells St, Darton, Barnsley	431066	409854	Chruch Street, East of Barnsley Road	56.1
				Barnsley Road, South of Church Street	10.5
				Churchfield Lane, West of Huddersfield Road	85.7
ESR3	2 Darton Ln, Darton, Barnsley	431693	409988	Sacup Lane, North of Darton Lane	50
				Site Access	
				Darton Lane, West of Sackup Lane	6.1
ESR 4	134 Sackup Ln, Darton, Barnsley	431882	410397	Sacup Lane, South of Bloomhouse Lane	14.6
				Sacup Lane, North of Darton Lane	9
ESR 5	39 Station Rd, Darton, Barnsley	431342	410107	Station Road, East of Woolley Colliery Road	16.1
				Woolley Colliery Road, North of Station Road	36.8
ESR 6		431238	410211	Woolley Colliery Road, North of Station Road	5

Table 4: Existing Sensitive Receptor Locations					
Receptor	Address	Grid Reference		Roads Considered	Distance from Receptor to Road Centre (m)
		Easting	Northing		
	22 Woolley Colliery Rd, Darton, Barnsley			Station Road, East of Woolley Colliery Road	124.9
				Chruch Street, West of Woolley Colliery Road	
ESR 7	The Grange, Barnsley	431201	410985	Woolley Colliery Road, North of Bloomhouse Lane	21.4
ESR 8	46 Church St, Darton, Barnsley	431127	410011	Chruch Street, East of Barnsley Road	8.46
				Barnsley Road, South of Church Street	164.48
				Huddersfield Road, North of Churchfield Lane	
				Woolley Colliery Road, North of Station Road	200
ESR 9	20 The Grange, Barnsley	430916	411358	The Grange, West of Woolley Edge Lane	4.7
ESR 10	19 Churchfield Ln, Darton, Barnsley	430892	409809	Chruch Street, East of Barnsley Road	162.5
				Barnsley Road, South of Church Street	142.9
				Churchfield Lane, West of Huddersfield Road	11
				M1 motorway	52

Proposed Sensitive Receptor Locations

- 3.3.11 Two proposed sensitive receptor locations (identified as PR 1 and PR 2) have been selected to represent the proposed residential areas closest to Station Road/Bloomhouse Lane and the proposed site access.
- 3.3.12 Pollutant concentrations at the proposed receptor locations have been predicted for scenario 3 (as detailed in paragraph 3.3.4). It is only necessary to consider the 'with development' scenarios for the proposed receptor locations as they will not experience any 'without development' conditions. It is not therefore necessary to consider the changes in pollutant concentrations at the proposed receptor locations.

3.3.13 Details of the proposed sensitive receptor locations are provided in Table 5 and their locations are shown on drawing LE13441-001.

Table 5: Proposed Sensitive Receptors Location					
Receptor	Location	Grid Reference		Roads Considered	Distance from Receptor to Road Centre (m)
		Easting	Northing		
PR 1	Location considered to be representative of the closest proposed residential properties to Station Road and Site Access; in the southern part of the site	431701	410067	Site Access	10
				Darton Lane, West of Sackup Lane	50
				Station Road, East of Woolley Colliery Road	
PR 2	Location considered to be representative of the closest proposed residential properties to Bloomhouse Lane and Site Access; in the northern part of the site	431507	410448	Sacup Lane, South of Bloomhouse Lane	10

Model Verification

3.3.14 There are no roadside automatic monitoring stations or diffusion tubes located within the study network, therefore model verification cannot be undertaken.

Information Sources

3.3.15 The following sources of information have been used in the preparation of this report:

- 2016 Air Quality Annual Status Report for Barnsley Metropolitan Borough Council;
- 2016 Air Quality Annual Status Report for Wakefield Council;
- Barnsley Metropolitan Borough Council Air Quality and Emissions Good Practice Planning Guidance;
- West Yorkshire Air Quality and Emissions Technical Planning Guidance;
- Traffic flow information, provided by Sanderson Associated Ltd; and
- Multi Agency Geographic Information for the Countryside (www.magic.gov.uk).

4 ASSESSMENT OF SIGNIFICANCE CRITERIA

4.1 Construction Phase Assessment – Dust and Fine Particulate Emissions

4.1.1 The IAQM details criteria for assessing the sensitivity of an area to dust soiling effects and health effects of PM₁₀ in Tables 6 to 8 below.

4.1.2 The guidance then goes on to provide significance criteria for the classification of dust effects from demolition, earthworks, construction and track out, as summarised in Tables 9 to 11 below.

Sensitivity of the Area for Human Receptors

4.1.3 The sensitivity categories for different types of receptors, to both dust soiling effects and the health effects of PM₁₀, are described in Table 6.

Table 6: Sensitivity Categories for Human Receptors		
Sensitivity Category	Dust Soiling Effects	Health effects of PM ₁₀
High	Users can reasonably expect to enjoy a high level of amenity; Appearance, aesthetics or value of a property would be diminished; Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car show rooms.	Locations where members of the public are exposed over a period of time relevant to the air quality objective for PM ₁₀ ; Examples include residential properties, hospitals, schools, and residential care homes.
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; The appearance, aesthetics or value of their property could be diminished; People or property wouldn't reasonably be expected to be continuously present or regularly for extended periods of time; Examples include parks and places of work.	Locations where people are exposed as workers and exposure is over a period of time relevant to the air quality objective for PM ₁₀ ; Examples include office and shop workers but will generally not include workers occupationally exposed to PM ₁₀ .
Low	Enjoyment of amenity would not reasonably be expected; Property would not be diminished in appearance, aesthetics or value; People or property would be expected to be present only for limited periods of time; Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.	Locations where human exposure is transient; Examples include public footpaths, playing fields, parks and shopping streets.

4.1.4 Based upon the category of receptor sensitivity, the sensitivity of the area to dust soiling effects is determined using the criteria detailed in Table 7.

Table 7: Sensitivity of the Area to Dust Soiling Effects on People and Property					
Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20m	<50m	<100m	<350m
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

4.1.5 Based upon the category of receptor sensitivity, the sensitivity of the area to the health effects of PM₁₀ is determined using the criteria detailed in Table 8.

Table 8: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from Source (m)				
			<20m	<50m	<100m	<200m	<350m
High	>32µg/m ³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32µg/m ³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28µg/m ³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg/m ³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32µg/m ³	>10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low

Table 8: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from Source (m)				
			<20m	<50m	<100m	<200m	<350m
	28-32µg/m ³	>10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24-28µg/m ³	>10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	<24µg/m ³	>10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Risk of Dust Impacts

4.1.6 The risk of dust being generated by demolition activities at the site is determined using the criteria in Table 9.

Table 9: Risk of Dust Impacts - Demolition			
Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

4.1.7 The risk of dust being generated by earthworks and construction activities at the site is determined using the criteria in Table 10.

Table 10: Risk of Dust Impacts – Earthworks and Construction			
Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

4.1.8 The risk of dust being generated by trackout from the site is determined using the criteria in Table 11.

Table 11: Risk of Dust Impacts – Trackout			
Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

4.2 Operational Phase Assessment – Road Traffic Emissions

Assessing the Impact of a Proposed Development

4.2.1 Guidance has been prepared by Environmental Protection UK (EPUK) and the IAQM with relation to the assessment of the air quality impacts of proposed developments and their significance¹².

4.2.2 The impact of a development is usually assessed at specific receptors, and takes into account both the long term background concentrations, in relation to the relevant Air Quality Assessment Level (AQAL) at these receptors, and the change with the development in place.

4.2.3 The impact descriptors for individual receptors are detailed in Table 12.

Table 12: Impact Descriptors for Individual Receptors				
Long Term Average Concentration at Receptor in Assessment Year*	Percentage Change in Concentration Relative to Air Quality Assessment Level (AQAL)*			
	1%	2-5%	6-10%	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial

¹² Environmental Protection UK and the Institute of Air Quality Management, Land-Use Planning and Development Control: Planning for Air Quality, January 2017.

Table 12: Impact Descriptors for Individual Receptors				
Long Term Average Concentration at Receptor in Assessment Year*	Percentage Change in Concentration Relative to Air Quality Assessment Level (AQAL)*			
	1%	2-5%	6-10%	>10
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
*Percentage pollutant concentrations have been rounded to whole numbers, to make it easier to assess the impact. Changes of 0% (i.e. less than 0.5%) should be described as negligible				

Determining the Significance of Effects

- 4.2.4 Impacts on air quality, whether adverse or beneficial, will have an effect on human health that can be judged as either 'significant' or 'not significant'.
- 4.2.5 Once the impact of the proposed development has been assessed for the individual impacts, the overall significance is determined using professional judgement. This takes into account a number of factors such as:
- The existing and future air quality in the absence of the development;
 - The extent of the current and future population exposure to the impacts; and
 - The influence and validity of any assumptions adopted when undertaking the prediction of impacts.
- 4.2.6 A discussion of the impacts of the proposed development and their significance are included in sections 6 and 7 of this report, respectively.

5 BASELINE SITUATION

5.1 Operational Phase Assessment – Road Traffic Emissions

Background Air Pollutant Concentrations

- 5.1.1 DMRB states that for local impact assessments it is necessary to specify background concentrations upon which local, traffic-derived pollution is superimposed. These may be through local long term, ambient measurements at background sites, remote from immediate sources of pollution. As an alternative to measured background levels, DMRB recommends the use of background concentrations obtained from default concentration maps, which have been provided by Defra on their Local Air Quality Management web pages¹³.
- 5.1.2 In the absence of representative background NO₂ and PM₁₀ monitoring data being available for the local area, background concentrations have been obtained from the 2013-based Defra default concentration maps for the appropriate 1km x 1km grid squares.
- 5.1.3 Current evidence suggests that background NO₂ concentrations are not decreasing in accordance with expected reductions. 2016 background concentrations and emission factors have therefore been applied to the proposed 2022 Opening Year and 2027 Future Year. This is considered to be a conservative approach, as it is likely that there will be some improvement in background air quality, and emission factors, before 2022.
- 5.1.4 The background pollutant concentrations used in the assessment are detailed in Table 13.

Table 13: Background NO _x , NO ₂ and PM ₁₀ Concentrations Obtained from the 2013-Based Defra Default Concentration Maps (µg/m ³)			
Receptors	2016 Annual Mean Concentration (µg/m ³)		
	Oxides of Nitrogen (NO _x)	Nitrogen Dioxide (NO ₂)	Particulate Matter (PM ₁₀)
ESR 1 & ESR 10 (430500, 409500)	26.82	18.39	17.19
ESR 2 & ESR 3 (431500, 409500)	22.79	15.89	14.65
ESR 4 – ESR 8, PR1 & PR2 (431500, 410500)	22.13	15.48	14.57

¹³ Defra Local Air Quality Management webpage: <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>

Table 13: Background NO _x , NO ₂ and PM ₁₀ Concentrations Obtained from the 2013-Based Defra Default Concentration Maps (µg/m ³)			
Receptors	2016 Annual Mean Concentration (µg/m ³)		
	Oxides of Nitrogen (NO _x)	Nitrogen Dioxide (NO ₂)	Particulate Matter (PM ₁₀)
ESR 9 (430500, 411500)	23.1	16.13	16.13

Modelled Baseline Concentrations

5.1.5 The baseline assessment (i.e. scenarios 1 and 2) has been carried out for the ten existing sensitive receptors considered (i.e. ESR 1 to ESR 10). The unadjusted NO₂ and PM₁₀ concentrations are detailed in Table 14, and are also included in Appendix B.

Table 14: Predicted NO ₂ and PM ₁₀ Concentrations (unadjusted) at Existing Sensitive Receptor Locations for 2016, 2022 and 2027 'Without Development' Scenarios						
Receptor	Calculated Annual Mean Concentrations (µg/m ³)					
	NO ₂ *			PM ₁₀		
	Scenario 1: 2016	Scenario 2: 2022	Scenario 3: 2027	Scenario 1: 2016	Scenario 2: 2022	Scenario 3: 2027
ESR 1	23.26	23.58	23.86	18.43	18.52	18.59
ESR 2	21.41	21.84	22.21	16.12	16.23	16.33
ESR 3	19.11	18.84	19.03	15.40	15.34	15.38
ESR 4	16.74	16.63	16.70	14.86	14.83	14.85
ESR 5	18.14	18.14	18.31	15.18	15.18	15.22
ESR 6	16.24	16.12	16.16	14.74	14.71	14.72
ESR 7	15.86	15.89	15.91	14.65	14.66	14.66
ESR 8	18.22	18.44	18.62	15.25	15.31	15.35
ESR 9	16.50	16.53	16.56	16.22	16.23	16.23
ESR 10	26.64	26.98	27.25	19.21	19.29	19.36
* NO ₂ concentrations obtained by inputting predicted NO _x concentrations into the NO _x to NO ₂ calculator ¹⁴ in accordance with LAQM.TG(16).						

¹⁴ NO_x to NO₂ Calculator, Defra Local Air Quality Management web pages (<http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOXNO2calc>).

Scenario 1: 2016 Verification and Base Year

- 5.1.6 The 2016 baseline annual mean NO₂ concentrations (unadjusted) are predicted to range from 15.86 to 26.64 µg/m³ for the ten existing sensitive receptor locations considered. Exceedance of the annual mean objective concentration for NO₂ (40µg/m³) is not predicted to occur.
- 5.1.7 The 2016 baseline annual mean PM₁₀ concentrations (unadjusted) are predicted to range from 14.65 to 19.21µg/m³ for the ten existing sensitive receptor locations considered. Exceedance of the annual mean objective concentration for PM₁₀ (40µg/m³) is not predicted to occur.

Scenario 2: 2022 Opening/ Future Year, Without Development

- 5.1.8 The 2022 'without development' annual mean NO₂ concentrations (unadjusted) are predicted to range from 15.89 to 26.98µg/m³ for the ten existing sensitive receptor locations considered. Exceedance of the annual mean objective concentration for NO₂ (40µg/m³) is not predicted to occur.
- 5.1.9 The 2022 'without development' annual mean PM₁₀ concentrations (unadjusted) are predicted to range from 14.66 to 19.29µg/m³ for the ten existing sensitive receptor locations considered. Exceedance of the annual mean objective concentration for PM₁₀ (40µg/m³) is not predicted to occur.

Scenario 3: 2027 Future Year, Without Development

- 5.1.10 The 2027 'without development' annual mean NO₂ concentrations (unadjusted) are predicted to range from 15.91 to 27.25µg/m³ for the ten existing sensitive receptor locations considered. Exceedance of the annual mean objective concentration for NO₂ (40µg/m³) is not predicted to occur.
- 5.1.11 The 2027 'without development' annual mean PM₁₀ concentrations (unadjusted) are predicted to range from 14.66 to 19.36µg/m³ for the ten existing sensitive receptor locations considered. Exceedance of the annual mean objective concentration for PM₁₀ (40µg/m³) is not predicted to occur.

6 IMPACT ASSESSMENT

6.1 Construction Phase Assessment – Dust and Fine Particulate Matter Emissions

6.1.1 The main activities involved with the construction phase of works are as follows:

- **Demolition** will be required to demolish the boundary walls to the Darton Primary school.
- **Earthworks** which may be required prior to the construction phase of works. The main sources of dust can include:
 - o Cleaning the site;
 - o Stripping and stockpiling of topsoil and subsoil;
 - o Ground excavation;
 - o Bringing in, tipping and spreading materials on site;
 - o Stockpiling materials;
 - o Levelling ground;
 - o Trenching;
 - o Road construction; and
 - o Vehicle movements on site roads.
- **Construction** which will involve the construction of individual building access roads, the car parking areas and the buildings themselves; and
- **Trackout** which is defined as the transport of dust and dirt by vehicles, travelling from a construction site on to the public road network. This may occur through the spillage of dusty materials onto road surfaces or through the transportation of dirt by vehicles that have travelled over muddy ground on the site. This dust and dirt can then be deposited and re-suspended by other vehicles.

Step 2A

6.1.2 Step 2A of the construction phase dust assessment has defined the potential dust emission magnitude from demolition, earthworks, construction and trackout in the absence of site specific mitigation.

6.1.3 Examples of the criteria for the dust emission classes are detailed in the IAQM guidance.

Step 2B

- 6.1.4 Step 2B of the construction phase dust assessment has defined the sensitivity of the area, taking into account the significance criteria detailed in Tables 6 to 8, for demolition earthworks and construction and trackout. The sensitivity of the area to each activity is assessed for potential dust soiling and human health effects.
- 6.1.5 For demolition there are between 10 and 100 residential receptor locations within 20m of where these activities may take place.
- 6.1.6 For earthworks and construction, there are currently between 10 and 100 residential properties located within 20m of where these activities may take place, which is assumed to be the site boundary for the purposes of this assessment.
- 6.1.7 For trackout, there are between 10 and 100 residential properties located within 20m of where trackout may occur, for a distance of up to 500m from the site entrance when travelling along Station Road and Sackup Lane.

Step 2C

- 6.1.8 Step 2C of the construction phase dust assessment has defined the risk of impacts from each activity. The dust emission magnitude is combined with the sensitivity of the surrounding area.
- 6.1.9 The risk of dust impacts from each activity, with no mitigation in place, has been assessed in accordance with the criteria detailed in Tables 9 to 11.

Summary

- 6.1.10 Table 15 details the results of Step 2 of the construction phase assessment for human receptors.

Table 15: Construction Phase Dust Assessment (Step 2) – Human Receptors				
	Activity			
	Demolition	Earthworks	Construction	Trackout
Step 2A				
Dust Emission Magnitude	Small ^a	Large ^b	Large ^c	Medium ^d
Step 2B				
Sensitivity of Closest Receptors	High	High	High	High

Table 15: Construction Phase Dust Assessment (Step 2) – Human Receptors				
	Activity			
	Demolition	Earthworks	Construction	Trackout
Sensitivity of Area to Dust Soiling Effects	High	High	High	High
Sensitivity of Area to Human Health Effects	Low ^e	Low ^e	Low ^e	Low ^e
Step 2C				
Dust Risk: Dust Soiling	Medium Risk	High Risk	High Risk	Medium Risk
Dust Risk: Human Health	Negligible	Low Risk	Low Risk	Low Risk
a. Total building volume estimated to be less than 20,000m³ b. Total site area estimated to be more than 10,000m² c. Total building volume to be constructed estimated to be more than 100,000m³ d. Based on the assumption of 10-50 HGV movements per day e. Background annual mean PM₁₀ concentration is taken from the LAQM Defra default concentration maps, for the appropriate grid squares for 2016, as detailed in Table 14				

6.2 Operational Phase Assessment – Road Traffic Emissions

2022 Proposed Opening Year - Existing Sensitive Receptor Locations

6.2.1 The impact assessment has been carried out for the ten representative existing sensitive receptor locations (i.e. ESR 1 to ESR 10). Table 16 shows the changes in pollutant concentrations for the 2022 proposed Opening Year for 'without development' and 'with development' scenarios. The unadjusted NO₂ and PM₁₀ concentrations are also included in Appendix B.

Table 16: Predicted NO ₂ and PM ₁₀ Concentrations (Unadjusted) at Existing Sensitive Receptor Locations for 2022 'Without Development' and 'With Development (i.e. Phase 1)' Scenarios			
Receptor	Level of Development	Calculated Annual Mean Concentrations (µg/m ³)	
		NO ₂	PM ₁₀
ESR 1	Without development	23.58	18.52
	With development	23.69	18.55
	Percentage Change Relative to AQAL	+0.28%	+0.07%
ESR 2	Without development	21.84	16.23
	With development	22.04	16.29
	Percentage Change Relative to AQAL	+0.50%	+0.13%

Table 16: Predicted NO₂ and PM₁₀ Concentrations (Unadjusted) at Existing Sensitive Receptor Locations for 2022 'Without Development' and 'With Development (i.e. Phase 1)' Scenarios

Receptor	Level of Development	Calculated Annual Mean Concentrations (µg/m ³)	
		NO ₂	PM ₁₀
ESR 3	Without development	18.84	15.34
	With development	19.05	15.38
	<i>Percentage Change Relative to AQLA</i>	<i>+0.53%</i>	<i>+0.12%</i>
ESR 4	Without development	16.63	14.83
	With development	16.74	14.86
	<i>Percentage Change Relative to AQLA</i>	<i>+0.27%</i>	<i>+0.07%</i>
ESR 5	Without development	18.14	15.18
	With development	18.29	15.22
	<i>Percentage Change Relative to AQLA</i>	<i>+0.37%</i>	<i>+0.08%</i>
ESR 6	Without development	16.12	14.71
	With development	16.18	14.73
	<i>Percentage Change Relative to AQLA</i>	<i>+0.15%</i>	<i>+0.04%</i>
ESR 7	Without development	15.89	14.66
	With development	15.94	14.67
	<i>Percentage Change Relative to AQLA</i>	<i>+0.12%</i>	<i>+0.03%</i>
ESR 8	Without development	18.44	15.31
	With development	18.62	15.35
	<i>Percentage Change Relative to AQLA</i>	<i>+0.45%</i>	<i>+0.11%</i>
ESR 9	Without development	16.53	16.23
	With development	16.59	16.24
	<i>Percentage Change Relative to AQLA</i>	<i>+0.15%</i>	<i>+0.04%</i>
ESR 10	Without development	26.98	19.29
	With development	27.00	19.30
	<i>Percentage Change Relative to AQLA</i>	<i>+0.05%</i>	<i>+0.01%</i>

2027 Future Year - Existing Sensitive Receptor Locations

6.2.2 Table 17 shows the changes in pollutant concentrations for the 2027 Future Year for both the 'without development' and 'with development' scenarios. The NO₂ and PM₁₀ concentrations are also included in Appendix B.

Table 17: Predicted NO ₂ and PM ₁₀ Concentrations (Unadjusted) at Existing Sensitive Receptor Locations for 2027 'Without Development' and 'With Development (i.e. Phase 1)' Scenarios			
Receptor	Level of Development	Calculated Annual Mean Concentrations (µg/m ³)	
		NO ₂	PM ₁₀
ESR 1	Without development	23.86	18.59
	With development	23.94	18.61
	Percentage Change Relative to AQAL	+0.20%	+0.06%
ESR 2	Without development	22.21	16.33
	With development	22.35	16.37
	Percentage Change Relative to AQAL	+0.35%	+0.10%
ESR 3	Without development	19.03	15.38
	With development	19.24	15.43
	Percentage Change Relative to AQLA	+0.52%	+0.12%
ESR 4	Without development	16.70	14.85
	With development	16.82	14.88
	Percentage Change Relative to AQAL	+0.30%	+0.07%
ESR 5	Without development	18.31	15.22
	With development	18.46	15.26
	Percentage Change Relative to AQAL	+0.38%	+0.08%
ESR 6	Without development	16.16	14.72
	With development	16.22	14.74
	Percentage Change Relative to AQAL	+0.15%	+0.04%
ESR 7	Without development	15.91	14.66
	With development	15.97	14.67
	Percentage Change Relative to AQAL	+0.15%	+0.03%

Table 17: Predicted NO ₂ and PM ₁₀ Concentrations (Unadjusted) at Existing Sensitive Receptor Locations for 2027 'Without Development' and 'With Development (i.e. Phase 1)' Scenarios			
Receptor	Level of Development	Calculated Annual Mean Concentrations (µg/m ³)	
		NO ₂	PM ₁₀
ESR 8	Without development	18.62	15.35
	With development	18.81	15.40
	Percentage Change Relative to AQAL	+0.47%	+0.11%
ESR 9	Without development	16.56	16.23
	With development	16.62	16.25
	Percentage Change Relative to AQAL	+0.15%	+0.04%
ESR 10	Without development	27.25	19.36
	With development	27.26	19.37
	Percentage Change Relative to AQAL	+0.03%	+0.01%

Scenario 4: 2022 Proposed Opening Year, With Development

6.2.3 The 2022 'with development' annual mean NO₂ concentrations (unadjusted) are predicted to range from 15.94 to 27.00 µg/m³ for the ten existing sensitive receptor locations modelled. Exceedance of the annual mean objective concentration for NO₂ (40µg/m³) is not predicted to occur.

6.2.4 The 2022 'with development' annual mean PM₁₀ concentrations (unadjusted) are predicted to range from 14.67 to 19.30µg/m³ for the ten existing sensitive receptor locations modelled. Exceedance of the annual mean objective concentration for PM₁₀ (40µg/m³) is not predicted to occur.

Scenario 5: 2027 Future Year, With Development

6.2.5 The 2027 'with development' annual mean NO₂ concentrations (unadjusted) are predicted to range from 15.97 to 27.26 µg/m³ for the ten existing sensitive receptor locations modelled. Exceedance of the annual mean objective concentration for NO₂ (40µg/m³) is not predicted to occur.

6.2.6 The 2022 'with development' annual mean PM₁₀ concentrations (unadjusted) are predicted to range from 14.67 to 19.30µg/m³ for the ten existing sensitive receptor locations modelled. Exceedance of the annual mean objective concentration for PM₁₀ (40µg/m³) is not predicted to occur.

Assessment of Impact

6.2.7 Using the descriptors detailed in Table 12, the impact of the proposed development can be assessed at each of the ten existing sensitive receptors considered.

6.2.8 The impact on NO₂ concentrations in 2022 is detailed in Table 18.

Table 18: Impact on NO₂ Concentrations in 2022			
Receptor	Percentage Change Relative to AQAL	Annual Mean Concentration in Relation to AQAL	Impact
ESR 1	<0.5%*	<75%	Negligible
ESR 2	1%	<75%	Negligible
ESR 3	1%	<75%	Negligible
ESR 4	<0.5%*	<75%	Negligible
ESR 5	<0.5%*	<75%	Negligible
ESR 6	<0.5%*	<75%	Negligible
ESR 7	<0.5%*	<75%	Negligible
ESR 8	<0.5%*	<75%	Negligible
ESR 9	<0.5%*	<75%	Negligible
ESR 10	<0.5%*	<75%	Negligible
* Changes of less than 0.5% should be described as negligible			

6.2.9 The impact on NO₂ concentrations in 2027 is detailed in Table 19.

Table 19: Impact on NO ₂ Concentrations in 2027			
Receptor	Percentage Change Relative to AQAL	Annual Mean Concentration in Relation to AQAL	Impact
ESR 1	<0.5%*	<75%	Negligible
ESR 2	<0.5%*	<75%	Negligible
ESR 3	1%	<75%	Negligible
ESR 4	<0.5%*	<75%	Negligible
ESR 5	<0.5%*	<75%	Negligible
ESR 6	<0.5%*	<75%	Negligible
ESR 7	<0.5%*	<75%	Negligible
ESR 8	<0.5%*	<75%	Negligible
ESR 9	<0.5%*	<75%	Negligible
ESR 10	<0.5%*	<75%	Negligible
* Changes of less than 0.5% should be described as negligible			

6.2.10 The impact on PM₁₀ concentrations in 2022 is detailed in Table 20.

Table 20: Impact on PM ₁₀ Concentrations in 2022			
Receptor	Percentage Change Relative to AQAL	Annual Mean Concentration in Relation to AQAL	Impact
ESR 1	<0.5%*	<75%	Negligible
ESR 2	<0.5%*	<75%	Negligible
ESR 3	<0.5%*	<75%	Negligible
ESR 4	<0.5%*	<75%	Negligible
ESR 5	<0.5%*	<75%	Negligible
ESR 6	<0.5%*	<75%	Negligible
ESR 7	<0.5%*	<75%	Negligible
ESR 8	<0.5%*	<75%	Negligible
ESR 9	<0.5%*	<75%	Negligible
ESR 10	<0.5%*	<75%	Negligible
* Changes of less than 0.5% should be described as negligible			

6.2.11 The impact on PM₁₀ concentrations in 2027 is detailed in Table 21.

Table 21: Impact on PM ₁₀ Concentrations in 2022			
Receptor	Percentage Change Relative to AQAL	Annual Mean Concentration in Relation to AQAL	Impact
ESR 1	<0.5%*	<75%	Negligible
ESR 2	<0.5%*	<75%	Negligible
ESR 3	<0.5%*	<75%	Negligible
ESR 4	<0.5%*	<75%	Negligible
ESR 5	<0.5%*	<75%	Negligible
ESR 6	<0.5%*	<75%	Negligible
ESR 7	<0.5%*	<75%	Negligible
ESR 8	<0.5%*	<75%	Negligible
ESR 9	<0.5%*	<75%	Negligible
ESR 10	<0.5%*	<75%	Negligible
* Changes of less than 0.5% should be described as negligible			

2022 Opening/ Future Year - Proposed Sensitive Receptor Locations

6.2.12 Air pollutant concentrations have also been modelled for two proposed receptor locations for the 2022 'with development' scenario, as detailed in Table 22. The NO₂ and PM₁₀ concentrations are included in Appendix B.

Table 22: Predicted NO ₂ and PM ₁₀ Concentrations (unadjusted) at Proposed Sensitive Receptor Locations for the 2022 and 2027 'With Development' Scenario				
Proposed Receptor Location	Calculated Annual Mean Concentrations (µg/m ³)			
	2022		2027	
	NO ₂	PM ₁₀	NO ₂	PM ₁₀
PR 1	17.08	14.94	17.16	14.95
PR 2	15.70	14.62	15.71	14.63

Scenario 4: 2022 Opening/ Future Year, With Development

- 6.2.13 The 2022 'with development' annual mean NO₂ concentrations (unadjusted) are predicted to be 15.70 and 17.08µg/m³ at the two proposed receptor locations considered. Exceedance of the annual mean objective concentration for NO₂ (40µg/m³) is not predicted to occur.
- 6.2.14 The 2022 'with development' annual mean PM₁₀ concentrations (unadjusted) are predicted to be 14.62 and 14.94µg /m³ at the two proposed receptor location considered. Exceedance of the annual mean objective concentration for PM₁₀ (40µg/m³) is not predicted to occur.

Scenario 5: 2027 Future Year, With Development

- 6.2.15 The 2027 'with development' annual mean NO₂ concentrations (unadjusted) are predicted to be 15.71 and 17.16µg/m³ at the two proposed receptor locations considered. Exceedance of the annual mean objective concentration for NO₂ (40µg/m³) is not predicted to occur.
- 6.2.16 The 2027 'with development' annual mean PM₁₀ concentrations (unadjusted) are predicted to be 14.63 and 14.95µg /m³ at the two proposed receptor location considered. Exceedance of the annual mean objective concentration for PM₁₀ (40µg/m³) is not predicted to occur.

6.3 Qualitative Odour Assessment for Future Residents of Proposed Development

- 6.3.1 After reviewing the existing land uses surrounding the site, it is noted that the Two Roses Brewery is located approximately 280m to the south of the proposed development site. After consultation with Mr Chris Shields, the EHO at BMBC, it is understood that *'there does not appear to be any odour complaints associated with the brewery'*. Given the distance involved and the lack of any complaint history, it is considered unlikely that this facility has the potential to contribute a significant odour issue for future residents of the proposed development.

6.4 Qualitative Railway Assessment for Future Residents of Proposed Development

- 6.4.1 The proposed development site is bordered to the west by the Barnsley to Darton railway line. The DEFRA technical guidance document LAQM.TG(16) provides details of railway lines which experience a heavy volume of diesel freight traffic, and which may need to be considered in more detail. This railway line is not included in

LAQM.TG(16) and, therefore, assessment of railway emissions is not considered to be required.

6.5 Qualitative Impact Assessment for Ecological Receptors: Ancient Woodland

6.5.1 It is noted that there are a number of ancient woodlands located to the north of the proposed development site, with the closest being Husband Wood situated approximately 612m from the boundary of the development site.

6.5.2 Guidance detailed within the Design Manual for Roads and Bridges guidance document: Volume 11, Section 3 – Environmental Assessment, Environmental Assessment Techniques (2007) states that:

“The designated sites that should be considered for assessment are those for which the designated features are sensitive to air pollution, either directly or indirectly, and which could be adversely affected by the effect of local air pollution on vegetation within the following nature conservation sites: SAC (SCI or cSAC), SPA, pSPA, SSSI and Ramsar sites.”

6.5.3 The Husband Wood has not been given any of the above designations. Therefore, it is considered that an assessment of the operational impacts of the proposed development on the Husband Wood is not required.

7 ASSESSMENT OF SIGNIFICANCE

7.1.1 The significance of the overall effects of the proposed development has been assessed with the EPUK/IAQM guidance. This assessment is based on professional judgement and takes into account a number of factors, including:

- Baseline pollutant concentrations in the 2016 Base Year are all well below the relevant annual mean objectives;
- With regard to the future baseline (i.e. the 2022 proposed opening Year 'without development' scenario and 2027 future year 'without development' scenario), all pollutant concentrations are predicted to remain below the relevant annual mean objectives;
- The assessment predicts a negligible impact on NO₂ and PM₁₀ concentrations in 2022 and 2027 at all ten existing sensitive receptor locations, with the development (i.e. Phase 1) in place, even when a worst case scenario is considered which assumes no improvement in either background pollutant concentrations or vehicle emissions; and
- Pollutant concentrations within the proposed development site are predicted to be well below the relevant annual mean objectives in 2022 and 2027.

7.1.2 Based on these factors, the overall effect of the proposed development on human health is considered to be 'not significant'.

8 MITIGATION MEASURES

8.1 Construction Phase Assessment – Dust and Fine Particulate Emissions

Step 3

8.1.1 During the construction phase the implementation of effective mitigation measures will substantially reduce the potential for nuisance dust and particulate matter to be generated.

8.1.2 Step 2C of the construction phase assessment identified that:

- The risk of dust soiling effects is classed as medium for demolition and trackout and high for earthworks and construction; and
- The risk of human health effects is classed as negligible for demolition and low for earthworks, construction and trackout.

8.1.3 This assumes that no mitigation measures are applied, except those required by legislation. Site specific mitigation measures do not need to be recommended if the risk category is negligible.

8.1.4 As the risk of dust soiling and human health effects is not negligible for earth works, construction and trackout and therefore site specific mitigation will need to be implemented to ensure dust effects from these activities will be 'not significant'.

8.1.5 A best practice dust mitigation plan will be written and implemented for the site. This will set out the practical measures that could be incorporated as part of a best working practice scheme. This will take into account the recommendations included within the IAQM guidance, which may include but are not limited to:

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Protection of surfaces and exposed material from winds until disturbed areas are sealed and stable;
- Dampening down of exposed stored materials, which will be stored as far from sensitive receptors as possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;

- Avoidance of activities that generate large amounts of dust during windy conditions;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
- Avoid dry sweeping of large areas;
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Ensuring that all vehicles will be sheeted when loaded;
- Ensure vehicles entering and leaving the sites are covered to prevent escape of materials during transport;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Confining vehicles to areas of the site where appropriate dust control measures can be in operation;
- Minimisation of vehicle movements and limitation of vehicle speeds – the slower the vehicle speeds, the lower the dust generation;
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever the site size and layout permits; and
- Access gates to be located at least 10m from receptors, where possible.

8.1.6 It is recognised that the final design solutions will be developed with the input of the Contractor to maximise construction efficiencies, to use modern construction techniques and sustainable materials, and to incorporate the particular skills and experience offered by the successful contractor. It is considered it is also the Contractor's responsibility to provide the following information:

- Emergency measures to be adopted in the event of unforeseen circumstances; and
- Incident logging and reporting procedures.

Step 4

8.1.7 Step 4 of the construction phase dust assessment has been undertaken to determine the significance of the dust effects arising from earthworks, construction and trackout associated with the proposed development.

8.1.8 The implementation of effective mitigation measures during the construction phase, such as those detailed in Step 3, will substantially reduce the potential for nuisance dust and particulate matter to be generated and any residual impact should be 'not significant'.

8.2 Operational Phase Assessment – Road Traffic Emissions

Existing Sensitive Receptor Locations

8.2.1 An air quality assessment has been undertaken to consider the potential impact of development-generated vehicles on air quality at eight existing sensitive receptor locations.

8.2.2 The air quality assessment predicts that there will be a negligible impact and not significant effect on concentrations of NO₂ and PM₁₀ at all ten of the existing sensitive receptors considered, in 2022 with the development in place.

8.2.3 The air quality assessment assumes a robust approach where no improvement in either background pollutant concentrations or vehicle emissions is considered in future year scenarios.

8.2.4 Exceedance of the NO₂ and PM₁₀ annual mean air quality objectives of 40µg/m³ is not predicted to occur in 2022 or 2027, for any of the ten existing sensitive receptors, for either the 'without development' or 'with development' scenarios.

Proposed Sensitive Receptor Locations

8.2.5 The air quality assessment has also predicted pollutant concentrations at two proposed receptor locations within the proposed development site. These locations are considered to be representative of the proposed residential areas closest to Station Road and proposed site access.

8.2.6 Predicted NO₂ and PM₁₀ concentrations are well below the annual mean air quality objectives of 40µg/m³, in 2022 and 2027, at the proposed sensitive receptor locations considered.

8.3 Qualitative Odour Assessment for Future Residents of Proposed Development

8.3.1 Two Roses Brewery is located approximately 280m to the south of the proposed development site. Given this distance and the absence of any current complaint history it is considered unlikely that this facility has the potential to contribute a significant odour issue for future residents of the proposed development. Therefore, it is considered no odour mitigation will be required.

8.4 Damage Cost Calculation & Recommendations for Mitigation

8.4.1 As detailed in Section 3.1, *Barnsley MBC Air Quality and Emissions Good Practice Planning Guidance* and *West Yorkshire Air Quality and Emissions Planning guidance* has been requested to be considered by BMBC and WC separately.

8.4.2 In accordance with the '*Barnsley MBC Air Quality and Emissions Good Practice Planning Guidance*' and '*West Yorkshire Air Quality and Emissions Planning guidance*', it is considered that the development is classed as 'major', due to the following reasons:

- The development is dwelling houses (C3) and comprises more than 50 units; and
- The development generates 100 or more two-way vehicle movements per day.

8.4.3 Where a development is classed as a 'major', both of the two guidance state that the calculation of pollutant emissions costs from the development will be required. Therefore, an air pollution damage cost assessment has been carried out.

8.4.4 It is considered that the damage cost assessment provides a basis for quantifying the financial commitment required for offsetting potential development-generated emissions and is suggested for use within the 2015 IAQM/EPUK guidance. The air pollution damage cost assessment utilises the current DEFRA Emission Factor Toolkit (version 7.0), available on the Defra website¹⁵, to estimate the annual link emissions associated with the additional development generated vehicles over a 5 year period.

8.4.5 The calculation attributes a monetary value to those emissions using the Interdepartmental Group on Costs and Benefits¹⁶ (IGCB) Damage Cost Guidelines. The

¹⁵ Defra Local Air Quality Management website (<http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>)

¹⁶ Defra, Interdepartmental Group on Costs and Benefits (<https://www.gov.uk/air-quality-economic-analysis#damage-costs-approach>)

total number of 24-hour trips, generated by the proposed development, was included within the damage cost assessment to determine the transport related emissions.

8.4.6 The total trip generation (i.e. trips generated by the proposed development) in a 24 hour period is 1539 vehicles. The average trip length is assumed to be 10km and the average speed as 50kph. The calculation was undertaken for both NO_x and particulate matter (PM) emissions, as these are the major pollutants associated with road traffic emissions. The IGCB gives a central estimated cost (2015) of £58,125/tonne for PM. For NO_x, the IGCB gives a central estimated cost (2015) of £21,044/tonne when PM is also valued¹⁷.

8.4.7 The results of the calculation are detailed in Table 23.

Table 23: Damage Cost Calculation Undertaken Using EFT and by Taking into Account the IGCB Damage Cost Figures		
Step	NO _x	PM ₁₀
Emission calculation using EFT spreadsheet	1019.625kg/yr	174.498kg/yr
Conversion into tonnes per annum	1.019625tonnes/yr	0.174498tonnes/yr
IGCB air quality damage costs per tonne	NO _x (Central Estimate): £21,044	PM ₁₀ (Central Estimate): £58,125
Calculation of air quality damage per year	£ 21,457.00	£ 10,142.72
Calculation of air quality damage over 5 year period	£ 107,284.98	£ 50,713.61

8.4.8 The total damage cost of both NO_x and PM₁₀ for the proposed development over a five-year period is £157,998.60. The input and output data for the damage cost calculation can be seen in Figure 1 and Figure 2, respectively.

¹⁷ Defra, Damage costs by location and source

(https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/460398/air-quality-econanalysis-damagecost.pdf)

Figure 1: Damage Cost Calculation Inputs

Select Pollutants ☒ NOx ☐ CO2 ☒ PM10 ☐ PM2.5		Select Outputs ☐ Air Quality Modelling (g/km/s) ☐ Breakdown by Vehicle ☐ Emissions Rates (g/km) ☐ Source Apportionment ☒ Annual Link Emissions ☐ PM by Source		Advanced Options ☐ Euro Compositions ☐ Alternative Technologies ☐ Output % Contributions from Euro Classes	Click the button to: Run EFT Clear Input Data	
Please Select from the Following Options: Area : England (not London) Year : 2022 Traffic Format : Basic Split Select 'Basic Split' or 'Detailed Option 1 to 3' above		Export Outputs ☐ Save Output to New Workbook File Name : Bloomhouse Lane, Darton, Barnsley				
SourceID	Road Type	Traffic Flow	%HDV	Speed(kph)	No of Hours	Link Length (km)
Emission Calculation	Urban (not London)	1539	0	50	24	10

Figure 2: Damage Cost Calculation Outputs

Source Name	Pollutant Name	All Vehicles (Annual Emissions (kg/yr except CO2 tonnes/yr))	All LDVs (Annual Emissions (kg/yr except CO2 tonnes/yr))	All HDVs (Annual Emissions (kg/yr except CO2 tonnes/yr))
Emission Calculation	NOx	1019.625366	1019.625366	0.000000
Emission Calculation	PM10	174.498459	174.498459	0.000000
	NOx	1.019625 tonnes		
	PM10	0.174498 tonnes		
	NOx	21456.996207		
	PM10	10142.722921		
	NOx	107284.981033		
	PM10	50713.614607		
	NOx and PM10	157998.595640		

8.4.9 In accordance with the 'Barnsley MBC Air Quality and Emissions Good Practice Planning Guidance' and 'West Yorkshire Air Quality and Emissions Planning guidance', mitigation measures which could be implemented include:

- **Type 1:** The provision of one electric vehicle charging point per unit (dwelling with dedicated parking), or one charging point per ten spaces (where there is unallocated parking); and
- **Type 2:** A Travel Plan which could include:
 - o An agreed strategy for discouraging high emission vehicle use and encouraging modal shift (i.e. to public transport, cycling and walking), as well as uptake of low emission fuels and technologies;
 - o Improved pedestrian access to public transport;
 - o New or improved bus stop infrastructure;
 - o Provision of ticketing;
 - o Site layout designed to encourage walking;
 - o Cycle paths to link to local cycle network.
- **Type 3:**
 - o Local sourcing of staff, products and raw materials;
 - o Development and use of hub distribution centres employing low emission deliveries;

- o Explore alternative working practices – flexitime, teleworking, homeworking, videoconferencing, compressed working hours;
- o Contribution to the emerging low emission vehicle infrastructure;
- o Contribution to site low emission waste collection services;
- o Support improving information services for public transport;
- o Support air quality monitoring programmes;
- o Improvements to district walking and cycling networks including lighting, shelters and information points and timetables;
- o Provision of secure and safe cycle parking facilities;
- o Supporting community/local organisation groups to promote sustainable travel.

8.4.10 It is considered that the mitigation measures implemented should be equivalent to the value determined by the damage cost calculation (£157,998.60) and should focus on mitigating elevations in NO₂ and PM₁₀ concentration, as a result of development-generated traffic.

9 CUMULATIVE IMPACTS

9.1.1 This air quality assessment report has been undertaken to support of the full planning application for 214 dwellings (Phase 1). However, the potential cumulative impact from both Phase 1 and Phase 2 (83 dwellings) of the development in combination has also been considered within this report.

9.2 Construction Phase: Assessment of Dust and Fine Particulate Matter Emissions

9.2.1 The proposed Phase 2 development is located to the west of the proposed Phase 1 development. The timescales for the construction of the two phases of the proposed development are not known at this stage. It is anticipated that Phase 2 will likely to be built after Phase 1. Therefore, there is unlikely to be any potential for cumulative effects during the construction phase on existing receptors surrounding the development site.

9.3 Operational Phase – Road Traffic Emissions

Existing Sensitive Receptor Locations

9.3.1 There is the potential for cumulative air quality effects associated with traffic from both phases of the proposed development in combination, as vehicles associated with both phases are likely to use the same sections of the road network. A cumulative impact assessment has therefore been carried out for the ten representative existing sensitive receptor locations (ESR 1 to ESR 10) for scenario six: 'With proposed development (i.e. Phase 1) + Phase 2 development'.

9.3.2 Table 23 below shows the changes in pollutant concentrations for the 2027 Future Year 'Without Development' and 'With proposed development (i.e. Phase 1) + Phase 2 Development' scenario. The NO₂ and PM₁₀ concentrations are included in Appendix B of this air quality assessment report.

Table 23: Predicted NO ₂ and PM ₁₀ Concentrations (Unadjusted) at Existing Sensitive Receptor Locations for 2027 'Without Development' and 'With Development (i.e. Phase 1) + Phase 2 Development' Scenarios			
Receptor	Level of Development	Calculated Annual Mean Concentrations (µg/m ³)	
		NO ₂	PM ₁₀
ESR 1	Without development	23.86	18.59
	With development	23.97	18.62

Table 23: Predicted NO₂ and PM₁₀ Concentrations (Unadjusted) at Existing Sensitive Receptor Locations for 2027 'Without Development' and 'With Development (i.e. Phase 1) + Phase 2 Development' Scenarios

Receptor	Level of Development	Calculated Annual Mean Concentrations (µg/m ³)	
		NO ₂	PM ₁₀
	<i>Percentage Change Relative to AQAL</i>	+0.27%	+0.07%
ESR 2	Without development	22.21	16.33
	With development	22.40	16.38
	<i>Percentage Change Relative to AQAL</i>	+0.47%	+0.13%
ESR 3	Without development	19.03	15.38
	With development	19.31	15.45
	<i>Percentage Change Relative to AQAL</i>	+0.70%	+0.17%
ESR 4	Without development	16.70	14.85
	With development	16.87	14.89
	<i>Percentage Change Relative to AQAL</i>	+0.43%	+0.09%
ESR 5	Without development	18.31	15.22
	With development	18.51	15.27
	<i>Percentage Change Relative to AQAL</i>	+0.50%	+0.11%
ESR 6	Without development	16.16	14.72
	With development	16.25	14.74
	<i>Percentage Change Relative to AQAL</i>	+0.23%	+0.05%
ESR 7	Without development	15.91	14.66
	With development	15.98	14.68
	<i>Percentage Change Relative to AQAL</i>	+0.18%	+0.04%
ESR 8	Without development	18.62	15.35
	With development	18.87	15.42
	<i>Percentage Change Relative to AQAL</i>	+0.63%	+0.16%
ESR 9	Without development	16.56	16.23
	With development	16.64	16.25
	<i>Percentage Change Relative to AQAL</i>	+0.20%	+0.05%

Table 23: Predicted NO₂ and PM₁₀ Concentrations (Unadjusted) at Existing Sensitive Receptor Locations for 2027 'Without Development' and 'With Development (i.e. Phase 1) + Phase 2 Development' Scenarios			
Receptor	Level of Development	Calculated Annual Mean Concentrations (µg/m ³)	
		NO ₂	PM ₁₀
ESR 10	Without development	27.25	19.36
	With development	27.26	19.37
	Percentage Change Relative to AQAL	+0.03%	+0.01%

Scenario 6: 2027 Future Year, With Proposed development (i.e. Phase 1) + Phase 2 development

- 9.3.3 The 2027 'with proposed development (i.e. Phase 1) + Phase 2 Development' annual mean NO₂ concentrations (unadjusted) are predicted to range from 15.98 to 27.26µg/m³ for the ten existing sensitive receptor locations considered. Exceedance of the annual mean objective concentration for NO₂ (40µg/m³) is not predicted to occur.
- 9.3.4 The 2027 'with proposed development (i.e. Phase 1) + Phase 2 Development' annual mean PM₁₀ concentrations (unadjusted) are predicted to range from 14.68 to 19.37µg/m³ for the ten existing sensitive receptor locations considered. Exceedance of the annual mean objective concentration for PM₁₀ (40µg/m³) is not predicted to occur.

Assessment of Impact

- 9.3.5 Using the descriptors detailed in Table 12 the impact of the proposed development (i.e. Phase 1) and Phase 2 development can be assessed at each of the ten existing sensitive receptors considered.
- 9.3.6 The cumulative impact on NO₂ concentrations in 2027 is detailed in Table 24.

Table 24: Cumulative Impact on NO ₂ Concentrations in 2027			
Receptor	Percentage Change Relative to AQAL	Annual Mean Concentration in Relation to AQAL	Impact
ESR 1	<0.5%*	<75%	Negligible
ESR 2	<0.5%*	<75%	Negligible
ESR 3	1%	<75%	Negligible
ESR 4	<0.5%*	<75%	Negligible
ESR 5	1%	<75%	Negligible
ESR 6	<0.5%*	<75%	Negligible
ESR 7	<0.5%*	<75%	Negligible
ESR 8	1%	<75%	Negligible
ESR 9	<0.5%*	<75%	Negligible
ESR 10	<0.5%*	<75%	Negligible
* Changes of less than 0.5% should be described as negligible			

9.3.7 The cumulative impact on PM₁₀ concentrations in 2027 is detailed in Table 25.

Table 25: Impact on PM ₁₀ Concentrations in 2027			
Receptor	Percentage Change Relative to AQAL	Annual Mean Concentration in Relation to AQAL	Impact
ESR 1	<0.5%*	<75%	Negligible
ESR 2	<0.5%*	<75%	Negligible
ESR 3	<0.5%*	<75%	Negligible
ESR 4	<0.5%*	<75%	Negligible
ESR 5	<0.5%*	<75%	Negligible
ESR 6	<0.5%*	<75%	Negligible
ESR 7	<0.5%*	<75%	Negligible
ESR 8	<0.5%*	<75%	Negligible
ESR 9	<0.5%*	<75%	Negligible
ESR 10	<0.5%*	<75%	Negligible
* Changes of less than 0.5% should be described as negligible			

Proposed Sensitive Receptor Locations

9.3.8 Air pollutant concentrations have also been modelled for two proposed receptor locations for the 2027 'with proposed development (i.e. Phase 1) + Phase 2 Development' scenario, as detailed in Table 26. The NO₂ and PM₁₀ concentrations are included in Appendix B.

Table 26: Predicted NO ₂ and PM ₁₀ Concentrations (unadjusted) at Proposed Sensitive Receptor Locations for the 2027 'With Phase 1 Development + Phase 2 Development' Scenarios		
Proposed Receptor Location	Calculated Annual Mean Concentrations (µg/m ³)	
	NO ₂	PM ₁₀
PR 1	17.34	14.99
PR 2	15.72	14.63

Scenario 6: 2027 Future Year, With proposed development (i.e. Phase 1) + Phase 2 Development

9.3.9 The 2027 'With proposed development (i.e. Phase 1) + Phase 2 Development' annual mean NO₂ concentrations (unadjusted) are predicted to be 15.72 and 17.34µg/m³ at the two proposed receptor locations considered. Exceedance of the annual mean objective concentration for NO₂ (40µg/m³) is not predicted to occur.

9.3.10 The 2027 'With proposed development (i.e. Phase 1) + Phase 2 Development' annual mean PM₁₀ concentrations (unadjusted) are predicted to be 14.63 and 14.99µg /m³ at the two proposed receptor location considered. Exceedance of the annual mean objective concentration for PM₁₀ (40µg/m³) is not predicted to occur.

9.4 Assessment of Significance

9.4.1 The significance of the cumulative effect of the proposed development (i.e. phase 1 development) and Phase 2 proposed development has been assessed in accordance with the *EPUK/IAQM* guidance. This assessment is based on professional judgement and takes into account a number of factors, including:

NO₂ Concentrations

- Future baseline NO₂ concentrations are elevated, with no exceedance of the annual mean objective concentrations for NO₂ (40µg/m³) predicted at all ten receptor locations;

- The cumulative assessment predicts Negligible impacts on NO₂ concentrations at all the ten receptors locations considered, in 2027 with the proposed developments (i.e. Phase 1 Development) and Phase 2 development in place, even when adopting a **worst case** approach;
- The cumulative assessment predicts that on-site NO₂ concentrations will be below the relevant air quality objective.

PM₁₀ Concentrations

- Future baseline PM₁₀ concentrations are below the relevant air quality objective at the ten existing sensitive receptors considered;
- The cumulative assessment predicts a Negligible impact on PM₁₀ concentrations at the ten existing sensitive receptor locations considered, in 2027 with the development in place (i.e. phase 1 Development) and Phase 2 development; and
- The cumulative assessment predicts that on-site PM₁₀ concentrations will be below the relevant air quality objectives.

9.4.2 Based on these factors, the cumulative effect of the proposed development (i.e. Phase 1) and Phase 2 development on human health is considered to be 'not significant'.

10 CONCLUSIONS

10.1 Construction Phase Assessment – Dust and Fine Particulate Matter Emissions

10.1.1 The construction phase assessment has been undertaken to determine the risk and significance of dust effects from demolition, earthworks, construction and trackout at the proposed development site. The assessment has been undertaken in accordance with the guidance on assessing the impacts of construction phase dust published by the IAQM.

10.1.2 The risk of dust soiling effects is classed as medium for demolition and trackout, and high for earthworks and construction. The risk of human health effects is classed as negligible for demolition, and low for earthworks, construction and trackout.

10.1.3 With site specific mitigation measures in place, such as those detailed in Section 8 of this report, the significance of dust effects from earthworks, construction and trackout are considered to be 'not significant'.

10.2 Operational Phase Assessment – Road Traffic Emissions

Existing Sensitive Receptor Locations

10.2.1 The air quality assessment has considered air quality at ten representative existing sensitive receptor locations.

10.2.2 The air quality assessment assumes a worst-case robust scenario where improvements in vehicle emission factors and pollutant background concentrations are not realised.

10.2.3 All predicted NO₂ and PM₁₀ concentrations are well below the objective/limit values and no exceedances of the NO₂ or PM₁₀ annual mean air quality objective of 40µg/m³ are predicted to occur in 2022 or 2027, for both the 'without development' and 'with development' scenarios.

10.2.4 For both NO₂ and PM₁₀, all ten existing receptor locations are predicted to experience a negligible impact and not significant effect, as a result of the proposed development in 2022 and 2027.

10.2.5 A cumulative assessment has also been undertaken, which considers the air quality effects associated with the operation of both the Proposed Development (i.e. Phase 1) and Phase 2 development. The air quality effects of both two developments in operation together predicts Negligible impacts on NO₂ and PM₁₀ concentrations, in 2027 with the developments in place, even when a worst case scenario is considered which assumes no improvement in either background pollutant concentrations or vehicle emissions.

10.2.6 The cumulative assessment predicts that on-site pollutant concentrations will be below the relevant air quality objectives, in 2027 with the developments in place.

Proposed Sensitive Receptor Locations

10.2.7 NO₂ and PM₁₀ concentrations are predicted to be well below the respective annual mean air quality objectives in 2022 and 2027, at the proposed sensitive receptor locations considered.

Qualitative Railway Assessment for Future Residents of Proposed Development

10.2.8 The proposed development site is bordered to the west by the Barnsley to Darton railway line. The DEFRA technical guidance document LAQM.TG(16) provides details of railway lines which experience a heavy volume of diesel freight traffic, and which may need to be considered in more detail. This railway line is not included in LAQM.TG(16) and, therefore, assessment of railway emissions is not considered to be required.

Qualitative Impact Assessment for Ecological Receptors: Ancient Woodland

10.2.9 It is noted that there are a number of ancient woodlands located to the north of the proposed development site, with the closest being Husband Wood situated approximately 612m from the boundary of the development site.

10.2.10 The Husband Wood has not been given any of the designations (i.e. SAC (SCI or cSAC), SPA, pSPA, SSSI and Ramsar sites) required by Guidance detailed within the Design Manual for Roads and Bridges guidance document: Volume 11, Section 3 – Environmental Assessment, Environmental Assessment Techniques (2007). Therefore, it is considered that an assessment of the operational impacts of the proposed development on the Husband Wood is not required.

Recommendations for Mitigation

Construction Phase

- 10.2.11 The implementation of effective dust mitigation measures during the construction phase, such as those detailed in section 8, will substantially reduce the potential for nuisance dust and particulate matter to be generated and any residual impact should be 'not significant'.

Operational Phase

- 10.2.12 In accordance with the *Barnsley MBC Air Quality and Emissions Good Practice Planning Guidance* and *West Yorkshire Air Quality and Emissions Planning guidance*, an air pollution damage cost assessment has been carried out. It is considered that the damage cost assessment provides a basis for quantifying the financial commitment required for offsetting potential development-generated emissions and is suggested for use within the 2015 IAQM/EPUK guidance. The total damage cost of both PM₁₀ and NO_x for the proposed development over a five year period is £157,998.60.
- 10.2.13 It is considered that the mitigation measures implemented should be equivalent to the value determined by the damage cost calculation (£157,998.60) and should focus on mitigating any elevation in PM₁₀ and NO₂ concentrations as a result of development-generated traffic.

Summary

- 10.2.14 The assessment has demonstrated that the proposed development will not lead to an unacceptable risk from air pollution, or to any breach in national objectives, or to a failure to comply with the Habitats Regulations as required by national policy. There are no material reasons in relation to air quality why the proposed scheme should not proceed, subject to appropriate planning conditions.

Appendix A
Traffic Flow Information
Used in the Air Quality Assessment

24 Hour Annual Average Daily Traffic (AADT) Flows, provided by Sanderson Associates Ltd on 16th February 2017.

	Link Name	Speed Limit (mph)	Scenario 1: 2016 Base Year		Scenario 2: 2022 Opening Year Without Development		Scenario 3: 2027 Future Year Without Development		Scenario 4: 2022 Opening Year with proposed development (i.e. Phase 1)		Scenario 5: 2027 Opening Year with proposed development (i.e. Phase 1)		Scenario 6: 2027 Opening Year with proposed development (i.e. Phase 1) and Phase 2 development	
			Total (24hr AADT)	HGV %	Total (24hr AADT)	HGV %	Total (24hr AADT)	HGV %	Total (24hr AADT)	HGV %	Total (24hr AADT)	HGV %	Total (24hr AADT)	HGV %
1	The Grange, West of Woolley Edge Lane	30	1355	0.80	1463	0.80	1557	0.80	1690	0.80	1784	0.80	1871	0.80
2	Woolley Edge Lane, North of The Grange	30	9571	1.36	10332	1.36	10995	1.36	10560	1.36	11223	1.36	11310	1.36
3	Woolley Edge Lane, South of The Grange	30	8628	1.38	9314	1.38	9912	1.38	9314	1.38	9912	1.38	9912	1.38
4	Sacup Lane, North of Bloomhouse Lane	30	3349	2.59	3616	2.59	3848	2.59	3908	2.59	4140	2.59	4249	2.59
5	Sacup Lane, South of Bloomhouse Lane	30	1637	0.66	796	0.66	847	0.66	882	0.66	933	0.66	977	0.66
6	Sacup Lane, North of Darton Lane	30	3176	2.05	3428	2.05	3649	2.05	3764	2.05	3985	2.05	4125	2.05
7	Darton Lane, East of Sackup Lane	30	8682	2.25	9373	2.25	9974	2.25	9774	2.25	10375	2.25	10527	2.25
8	Darton Lane, West of Sackup Lane	30	10568	1.64	9513	1.64	10124	1.64	9914	1.64	10525	1.64	10677	1.64
9	Station Road, East of Woolley Colliery Road	30	10590	1.74	10870	1.74	11568	1.74	11412	1.74	12110	1.74	12305	1.74
10	Woolley Colliery Road, North of Station Road	30	1854	2.34	1439	2.34	1532	2.34	1613	2.34	1705	2.34	1770	2.34
11	Chruch Street, West of Woolley Colliery Road	30	11403	2.00	12310	2.00	13100	2.00	13025	2.00	13815	2.00	14086	2.00
12	Woolley Colliery Road, North of Bloomhouse Lane	30	1669	3.25	1802	3.25	1918	3.25	2040	3.25	2156	3.25	2243	3.25

	Link Name	Speed Limit (mph)	Scenario 1: 2016 Base Year		Scenario 2: 2022 Opening Year Without Development		Scenario 3: 2027 Future Year Without Development		Scenario 4: 2022 Opening Year with proposed development (i.e. Phase 1)		Scenario 5: 2027 Opening Year with proposed development (i.e. Phase 1)		Scenario 6: 2027 Opening Year with proposed development (i.e. Phase 1) and Phase 2 development	
			Total (24hr AADT)	HGV %	Total (24hr AADT)	HGV %	Total (24hr AADT)	HGV %	Total (24hr AADT)	HGV %	Total (24hr AADT)	HGV %	Total (24hr AADT)	HGV %
13	Chruch Street, East of Barnsley Road	30	10363	0.63	11186	0.63	11904	0.63	11902	0.63	12620	0.63	12891	0.63
14	Barnsley Road, South of Church Street	60	12910	1.89	13936	1.89	14831	1.89	14359	1.89	15253	1.89	15416	1.89
15	Churchfield Lane, West of Huddersfield Road	30	3469	0.94	3744	0.94	3985	0.94	3744	0.94	3985	0.94	3985	0.94
16	Huddersfield Road, North of Churchfield Lane	60	10720	1.97	11572	1.97	12315	1.97	11865	1.97	12608	1.97	12716	1.97
17	Site Access ^a	30	0	2.10 ^b	562	2.10	598	2.10	2101	2.10	2137	2.10	2733	2.10
18	M1 Motorway ^c	70	92148	9.92	101264	9.92	108453	9.92	101264	9.92	108453	9.92	108453	9.92

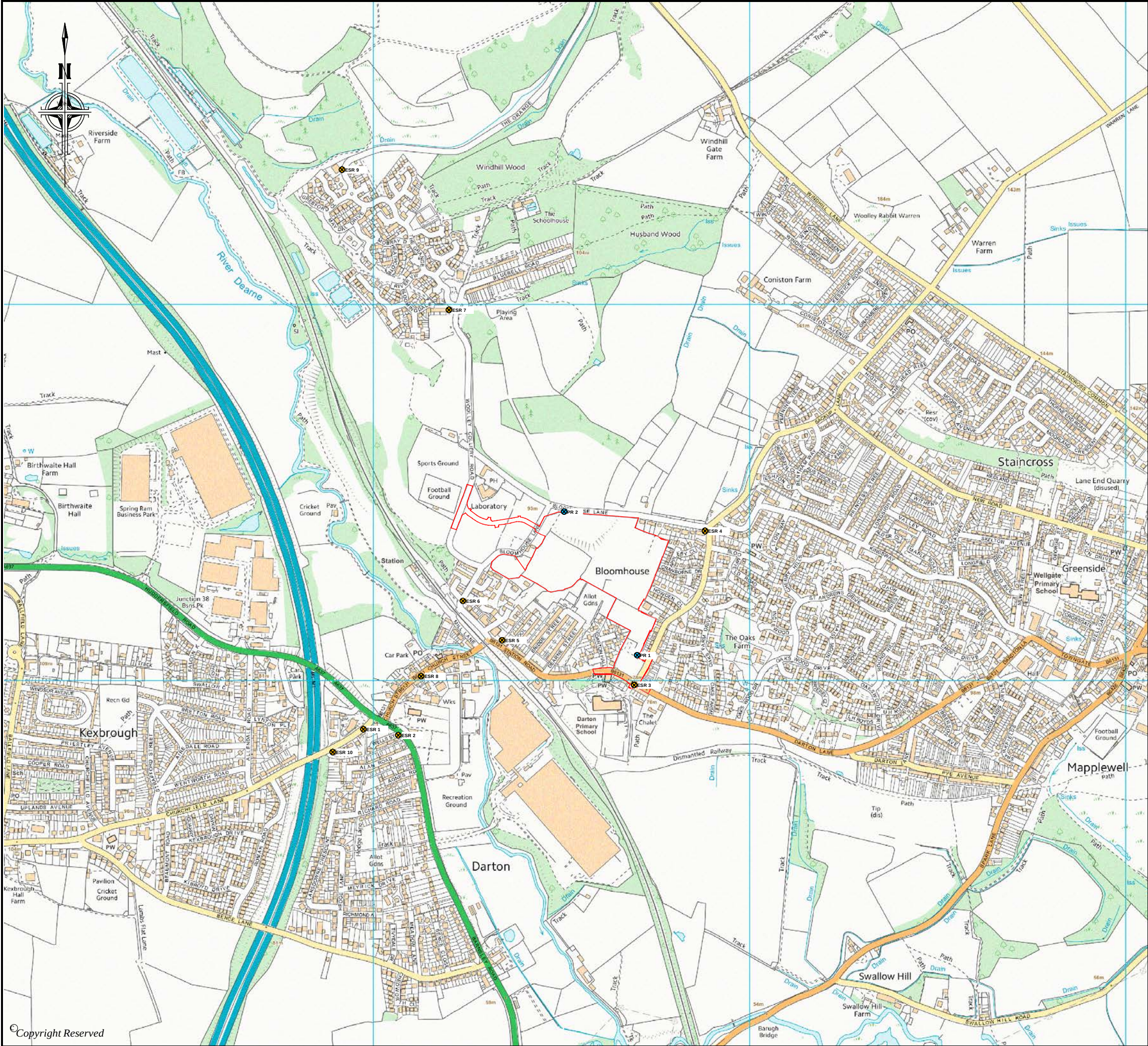
- a. It is understood that traffic from the existing surrounding residential properties will also use the site access road, once it is built. In order to consider the impact for the proposed development only, the proportion of traffic flow from the existing residential properties was treated as background traffic data and included in the proposed opening/future without development scenarios.
- b. A worst case scenario has been adopted in the assessment, by applying 2016 base year HGV% in the 2022 proposed opening year and 2027 future year. From the information provided by the transport consultant, it is understood that the proposed development will generate a negligible amount of HGVs. The HGV% for site access road (i.e. link 17) is based on redistributed of existing traffic flow. This approach is considered to be robust.
- c. Traffic data for M1 Motorway was obtained from the Department for Transport website (<https://www.dft.gov.uk/traffic-counts/>), growth factors for 2015- 2022 and 2015- 2027 have been obtained from the appointed traffic consultant.

Appendix B
Air Quality Assessment Results

Annual Mean NO₂ and PM₁₀ Concentrations in µg/m³

Receptor	Scenario 1: 2016 Base Year		Scenario 2: 2022 Opening Year Without Development		Scenario 3: 2027 Future Year Without Development		Scenario 4: 2022 Opening Year with proposed development (i.e. Phase 1)		Scenario 5: 2027 Opening Year with proposed development (i.e. Phase 1)		Scenario 6: 2027 Opening Year with proposed development (i.e. Phase 1) and Phase 2 development	
	NO ₂	PM ₁₀	NO ₂	PM ₁₀	NO ₂	PM ₁₀	NO ₂	PM ₁₀	NO ₂	PM ₁₀	NO ₂	PM ₁₀
ESR 1	23.26	18.43	23.58	18.52	23.86	18.59	23.69	18.55	23.94	18.61	23.97	18.62
ESR 2	21.41	16.12	21.84	16.23	22.21	16.33	22.04	16.29	22.35	16.37	22.40	16.38
ESR 3	19.11	15.40	18.84	15.34	19.03	15.38	19.05	15.38	19.24	15.43	19.31	15.45
ESR 4	16.74	14.86	16.63	14.83	16.70	14.85	16.74	14.86	16.82	14.88	16.87	14.89
ESR 5	18.14	15.18	18.14	15.18	18.31	15.22	18.29	15.22	18.46	15.26	18.51	15.27
ESR 6	16.24	14.74	16.12	14.71	16.16	14.72	16.18	14.73	16.22	14.74	16.25	14.74
ESR 7	15.86	14.65	15.89	14.66	15.91	14.66	15.94	14.67	15.97	14.67	15.98	14.68
ESR 8	18.22	15.25	18.44	15.31	18.62	15.35	18.62	15.35	18.81	15.40	18.87	15.42
ESR 9	16.50	16.22	16.53	16.23	16.56	16.23	16.59	16.24	16.62	16.25	16.64	16.25
ESR 10	26.64	19.21	26.98	19.29	27.25	19.36	27.00	19.30	27.26	19.37	27.26	19.37
PR 1							17.08	14.94	17.16	14.95	17.34	14.99
PR 2							15.70	14.62	15.71	14.63	15.72	14.63

Drawing



DO NOT SCALE FROM THIS DRAWING

REFERENCE

SITE BOUNDARY

EXISTING SENSITIVE RECEPTOR LOCATION

PROPOSED SENSITIVE RECEPTOR LOCATION

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
CLIENT					
Jones Homes (Yorkshire)					
PROJECT					
Bloomhouse Lane, Darton, Barnsley					
DRAWING TITLE					
Existing and Proposed Sensitive Receptor Locations					
DRG No.		LE13441-001		REV	
DRG SIZE		SCALE		DATE	
A3		1:10000		16/02/17	
DRAWN BY		CHECKED BY		APPROVED BY	
LS		EZ		MTW	
LEIGH BIRMINGHAM EDINBURGH NEWCASTLE UPON TYNE CARDIFF GLASGOW SHEFFIELD CARLISLE LONDON STOKE ON TRENT CROYDON MANCHESTER TAUNTON TEL 0194 226 0101 WEB: WWW.WARDELL-ARMSTRONG.COM					
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