St George's Avenue, South Tyneside

Air quality assessment

9735.8

9th March 2026

Revision A

St George's Avenue, South Tyneside

Air quality assessment

9734.8

Revision	Description	Issued by	Date
A	First issue	EF	9th March 2026

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1 Contents

1 Contents 2
2 Summary 3
3 Introduction 4
4 Legislation and Policy 5
5 Methodology 9
6 Baseline 14
7 Assessment 19
8 Conclusion 31
9 References 32
10 Appendix 1 - Assessment Input Data 33

2 Summary

2.1 This report has been prepared to support the planning application for a residential development on land off St George's Avenue, South Tyneside.

2.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

2.3 Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of demolition, earthworks, construction and trackout activities. The results were utilised to identify suitable mitigation for inclusion in a Construction Environmental Management Plan or similar. It is considered that the use of these good practice control measures would ensure impacts are minimised throughout construction.

2.4 Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the development. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations both with and without the development in place. Results were subsequently verified using local monitoring data.

2.5 Review of the dispersion modelling results indicated that air quality impacts as a result of traffic generated by the development were not predicted to be significant at any sensitive location in the vicinity of the site. As such, the site is considered suitable for the proposed end use from an air quality perspective and mitigation is not required.

2.6 Based on the assessment results, air quality issues are not considered a constraint to planning consent for the development.

3 Introduction

Background

3.1 This report has been prepared to support the planning application for a residential development on land off St George's Avenue, South Tyneside.

3.2 The development has the potential to cause air quality impacts at sensitive locations during the construction and operational phases. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential impacts associated with the scheme.

Site Location and Context

3.3 The development is located on land off St George's Avenue, South Tyneside, at approximate National Grid Reference (NGR): 437370, 565960. Reference should be made to Figure 1 for a map of the site and surrounding area.

3.4 The proposals comprise construction of 198 residential units and associated infrastructure.

3.5 The development has the potential to cause air quality impacts at sensitive locations. These may include fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the development during the operational phase. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions, consider the site suitability for the proposed end use and assess potential impacts as a result of the scheme. This is detailed in the following report.

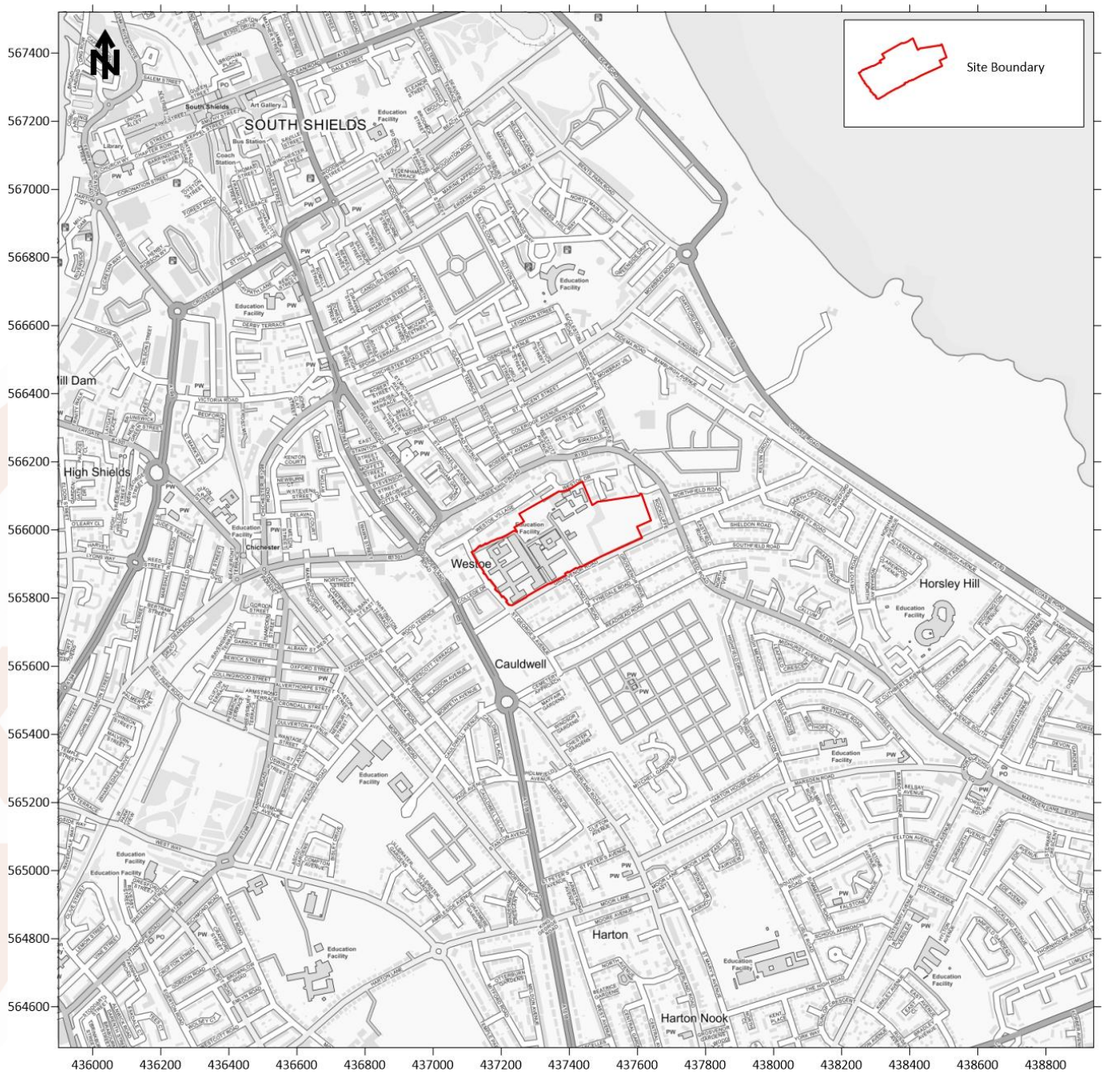


Figure 1: Site Location Plan

4 Legislation and Policy

Legislation

4.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO_2);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$);
- Benzene; and,
- Carbon monoxide.

4.2 Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for $PM_{2.5}$ stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

4.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published on 28th April 2023[1]. The AQS sets out Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

4.4 The Environmental Improvement Plan[2] was published in December 2025, providing long term and Interim Targets in order to reduce population exposure to $PM_{2.5}$. The Concentration Target for 2040 was adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

4.5 Table 1 presents the AQOs, Interim Target and Concentration Target for pollutants considered within this assessment.

Pollutant	Air Quality Objective/ Interim Target/ Concentration Target	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
$PM_{2.5}$	10	Annual mean Interim Target to be achieved by 2030
	10	Annual mean Concentration Target to be achieved by 2040

Table 1: Air Quality Objectives/ Interim Target/ Concentration Target

4.6 Table 2 summarises the advice provided in DEFRA guidance[3] on where the AQOs for pollutants considered within this report apply.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades 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 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	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations 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 where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

Table 2: Examples of Where the Air Quality Objectives Apply

Local Air Quality Management

4.7 Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

Dust

4.8 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

4.9 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

National Planning Policy

4.10 The revised National Planning Policy Framework[4] (NPPF) was published in December 2024 and amended in February 2025. The document sets out the Government's planning policies for England and how these are expected to be applied.

4.11 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives including the following of relevance to air quality:

"c) An environmental objective - to protect and enhance our natural, built and historic environment, including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

4.12 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

[…]

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

possible, help to improve local environmental conditions such as air and water quality […]"

4.13 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

4.14 The implications of the NPPF have been considered throughout this assessment.

National Planning Practice Guidance

4.15 The National Planning Practice Guidance[5] (NPPG) web-based resource was launched by the Department for Communities and Local Government to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

4.16 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

Local Planning Policy

4.17 The South Tyneside Local Development Framework (LDF)[6] was adopted by South Tyneside Council (STC) in June 2007 and sets out the strategy, policies and proposals by which all planning applications for development are assessed.

4.18 A review of the document indicated the following policy of relevance to the report:

"Policy EA5 Environmental Protection

To complement the regeneration of the Borough, the Council will control new development so that it:

A acts to reduce levels of pollution, environmental risk and nuisance throughout the Borough

[…]

D ensures that the individual and cumulative effects of development do not breach noise, hazardous substances or pollution limits […]"

4.19 STC also adopted the Development Management Policies (DPD)[7] document in December 2011. The DPD complements the LDF and sets out detailed criteria against which development in the borough is assessed. Review of the DPD indicated the following policy of relevance to the assessment:

"Policy DM1 Management of Development

In determining all applications under the planning Acts we will ensure that, where relevant:

[…]

L the development does not adversely impact upon air pollution levels, particularly of nitrogen dioxide in the Boldon Lane/Stanhope Road and Leam Lane/Lindisfarne Roundabout Air Quality Management Areas (as shown on the proposals Map), or any other designated area where air quality objectives are not

met or not likely to be met in the foreseeable future as a result of the proposed development; […]"

4.20 STC are currently producing a new Local Plan that will replace the LDF once formally adopted. Review of the draft Local Plan 2023 - 2040[8] indicated the following policies of relevance to this assessment:

"Policy 1: Promoting Healthy Communities

The Council and its partners, including the NHS, will seek to improve the health, wellbeing and quality of life of South Tyneside residents, reduce health inequalities and to help people live longer and healthier lives. This will be achieved by:

[…]

2. Ensure that pollutants, including noise and air pollution, and hazards detrimental to public health and residential amenity are addressed prior to development

[…]"

"Policy 2: Air Quality

1. Development will be supported where it contributes to the improvement of air quality.

2. Where significant air quality impacts are likely to be generated by the development, an appropriate air quality assessment will be required.

3. Development that would result in exposure to air pollution that exceeds national air quality objectives will only be approved where satisfactory mitigation measures can be implemented."

"Policy 3: Pollution

1. Development that may cause pollution of water, soil, or air through noise, vibration, odour, light, fumes, dust, or other pollutants, either individually or cumulatively, shall incorporate measures to prevent or reduce pollution to an acceptable standard to avoid negative impacts on people, the environment or biodiversity.

2. Development which could lead to significant pollution, either individually or cumulatively, shall be accompanied by a detailed assessment of the likely impacts.

Development proposals where pollution levels are assessed as being unacceptable will only be permitted where mitigation measures can be introduced to provide an acceptable living or working environment in relation to all existing or potential future occupants of the land.

3. Where the Council considers it likely that the proposal will result in significant adverse environmental effects during the construction phase a Construction Environmental Management Plan (CEMP) will be required."

4.21 The implications of the above policies were taken into consideration throughout the undertaking of this assessment.

5 Methodology

5.1 The proposed development has the potential to cause air quality impacts during the construction and operational phases. These have been assessed in accordance with the following methodology.

Construction Phase Fugitive Dust Emissions

5.2 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V2.2'[9].

5.3 Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

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

5.4 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to PM_{10}.

Step 1

5.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 250m of the boundary or 50m from the construction vehicle route up to 250m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route, then the assessment also proceeds to Step 2.

5.6 Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

Step 2

5.7 Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

5.8 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

5.9 Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 3.

Magnitude	Activity	Criteria
Large	Demolition	Total volume of building to be demolished greater than 75,000m^3 Potentially dusty material (e.g. concrete) On-site crushing and screening Demolition activities more than 12m above ground level
	Earthworks	Total site area greater than 110,000m^2 Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) More than 10 heavy earth moving vehicles active at any one time Formation of bunds greater than 6m in height
	Construction	Total building volume greater than 75,000m^3 On site concrete batching Sandblasting
	Trackout	More than 50 Heavy Duty Vehicle (HDV) trips per day Potentially dusty surface material (e.g. high clay content) Unpaved road length greater than 100m

Magnitude	Activity	Criteria
Medium	Demolition	Total volume of building to be demolished between 12,000m^3 and 75,000m^3 Potentially dusty construction material Demolition activities between 6m and 12m above ground level
	Earthworks	Total site area 18,000m^2 to 110,000m^2 Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time Formation of bunds 3m to 6m in height
	Construction	Total building volume 12,000m^3 to 75,000m^3 Potentially dusty construction material (e.g. concrete) On site concrete batching
	Trackout	20 to 50 HDV trips per day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50m to 100m
Small	Demolition	Total volume of building to be demolished less than 12,000m^3 Construction material with low potential for dust release (e.g. metal cladding or timber) Demolition activities less than 6m above ground and during wetter months
	Earthworks	Total site area less than 18,000m^2 Soil type with large grain size (e.g. sand) Less than 5 heavy earth moving vehicles active at any one time Formation of bunds less than 3m in height
	Construction	Total building volume less than 12,000m^3 Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	Less than 20 HDV trips per day Surface material with low potential for dust release Unpaved road length less than 50m

Table 3: Construction Dust - Magnitude of Emission

5.10 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The sensitivities of specific receptors are shown in Table 4.

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	Users expect of high levels of amenity High aesthetic or value property People expected to be present continuously for extended periods of time Locations where members of the public are exposed over a time period relevant to the AQO for PM_{10} e.g. residential properties, hospitals, schools and residential care homes	Internationally or nationally designated site e.g. Special Area of Conservation
Medium	Users would expect to enjoy a reasonable level of amenity Aesthetics or value of their property could be diminished by soiling People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	Nationally designated site e.g. Sites of Special Scientific Interest
Low	Enjoyment of amenity would not reasonably be expected Property would not be expected to be diminished in appearance Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, farmland, short term car parks and roads	Locally designated site e.g. Local Nature Reserve

Table 4: Construction Dust - Sensitivities of People and Ecological Receptors

5.11 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 5.

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 250
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

Table 5: Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

5.12 Table 6 outlines the criteria for determining the sensitivity of the area to human health impacts.

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)			
			Less than 20	Less than 50	Less than 100	Less than 250
High	Greater than 32µg/m³	More than 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32µg/m³	More than 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28µg/m³	More than 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	Less than 24µg/m³	More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	Greater than 32µg/m³	More than 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 - 32µg/m³	More than 10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24 - 28µg/m³	More than 10	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low

Table 6: Construction Dust - Sensitivity of the Area of Human Health Impacts

5.13 Table 7 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table 7: Construction Dust - Sensitivity of the Area to Ecological Impacts

5.14 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

5.15 Table 8 outlines the risk category from demolition activities.

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Medium	Low	Negligible

Table 8: Construction Dust - Dust Risk Category from Demolition Activities

5.16 Table 9 outlines the risk category from earthworks, construction and trackout activities.

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low

Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 9: Construction Dust - Dust Risk Category from Earthworks, Construction and Trackout

Step 3

5.17 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance[9] to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

5.18 Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

Operational Phase Assessment

5.19 The proposed development has the potential to cause impacts as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site. Potential impacts have therefore been assessed by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- 2024 - Verification;
- Opening year Do-Minimum (DM) (predicted traffic flows in 2031 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2031 should the proposals be completed).

5.20 Reference should be made to Appendix 1 for assessment input data and details of the verification process.

5.21 Locations sensitive to potential changes in off-site pollutant concentrations were identified within 200m of the highway network in accordance with National Highways guidance[10]. The criteria provided within DEFRA guidance[3] on where the AQOs apply, as summarised in Table 2, was utilised to determine appropriate receptor positions.

5.22 The significance of predicted air quality impacts was determined in accordance with the guidance provided within the IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'[11] document. Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration from the DS scenario and the magnitude of change between the DM and DS scenarios as outlined in Table 10.

Concentration at Receptor in Assessment Year	Predicted Concentration Change as Proportion of AQO/ Concentration Target (%)			
	1	2 - 5	6 - 10	>10
75% or less of AQO/ Concentration Target	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO/ Concentration Target	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO/ Concentration Target	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO / Concentration Target	Moderate	Moderate	Substantial	Substantial
110% or more of AQO/ Concentration Target	Moderate	Substantial	Substantial	Substantial

Table 10: Significance of Impact

5.23 The matrix shown in Table 10 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

5.24 Following the prediction of impacts at discrete receptor locations, the IAQM document[11] provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

- The existing and future air quality in the absence of the development;

- The extent of current and future air quality in the absence of the development; and,
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

5.25 The IAQM guidance[11] states that an assessment must reach a conclusion on the likely significance of the predicted impact. It should be noted that this is a binary judgment of either it is **significant** or it is **not significant**.

5.26 The determination of significance relies on professional judgement and reasoning should be provided as far as is practicable. This has been considered throughout the assessment when defining predicted impacts. The IAQM guidance[11] suggests the provision of details of the assessor's qualifications and experience. These may be provided on request.

6 Baseline

6.1 Existing air quality conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

Local Air Quality Management

6.2 As required by the Environment Act (1995), as amended by the Environment Act (2021), STC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that concentrations of all pollutants considered within the AQS are currently below the relevant AQOs. As such, no AQMAs have been designated within the borough.

Air Quality Monitoring

6.3 Monitoring of pollutant concentrations is undertaken by STC throughout their area of jurisdiction. Recent results recorded in the vicinity of the development are shown in Table 11.

Monitoring Site		Monitored NO_2 Concentration ($\mu g/m^3$)		
		2022	2023	2024
CM1	Boldon Lane, South Shields	18	18	19.6
CM2	Lindisfarne Roundabout, Jarrow	22	23.6	25.1
DT8	Holland Park Drive (A19)	18.5	19.1	19.3
DT17	Hadrian Road	24.1	27.3	25.0
DT18	Lindisfarne Road (55)	22.5	23.3	26.6
DT19	Hadrian Road/Finchale Terrace Junction	25.3	27.8	28.5
DT20, DT21, DT22	Edinburgh Road Monitoring Station[(a)]	21.5	24.4	27.2
DT24	Opposite 173 Hadrian Road	28.8	30.1	27.9
DT25	Opposite 237 Newcastle Road	25.4	27.0	32.8
DT26	Stanhope Road/ Newcastle Road	27.8	27.1	28.1
DT27	A194 Arches Roundabout	33.2	33.9	28.0
DT28	Commercial Road	23.7	25.6	31.5
DT29	Corner of Boldon Lane/ Stanhope Road	29.1	28.9	27.3
DT30	Stanhope Road/ Newcastle Road	28.1	29.8	29.9
DT31	Boldon Lane	28.1	30.1	31.0
DT32	King George Road	23.5	22.8	33.0
DT33	Sunderland Road/next to the Cranny	25.0	26.4	32.0
DT34	Westoe Road	27.7	28.6	23.9
DT36	Chichester Metro	27.4	34.1	29.9
DT38	Alice Street (A194)	19.4	18.2	31.3
DT42	West Park Roundabout	25.5	27.7	33.4
DT43	Redhead Park	22.5	24.3	21.7
DT44	Imeary Street	22.5	23.6	25.7

Table 11: Monitoring Results - NO_2

Note: (a) Diffusion tubes co-located with Continuous Analyser

6.4 As shown Table 11, annual mean NO_2 concentrations were below the relevant AQO at all monitoring positions in the vicinity of the site in recent years.

6.5 Recent PM_{10} concentrations recorded in the vicinity of the site are shown in Table 12.

Monitoring Site		Monitored PM_{10} Concentration ($\mu g/m^3$)		
		2022	2023	2024
CM2	Lindisfarne Roundabout, Jarrow	12	12	10.1

Table 12: Monitoring Results - PM_{10}

6.6 As shown in Table 12, annual mean PM_{10} concentrations were below the relevant AQO at the CM2 monitor in recent years.

6.7 Recent $PM_{2.5}$ concentrations recorded in the vicinity of the site are shown in Table 13.

Monitoring Site		Monitored $PM_{2.5}$ Concentration ($\mu g/m^3$)		
		2022	2023	2024
CM2	Lindisfarne Roundabout, Jarrow	8.4	8.4	7.2

Table 13: Monitoring Results - $PM_{2.5}$

6.8 As shown in Table 13, annual mean $PM_{2.5}$ concentrations were below the Concentration Target at the CM2 monitor in recent years.

6.9 Reference should be made to Figure 2 for a map of the survey positions.

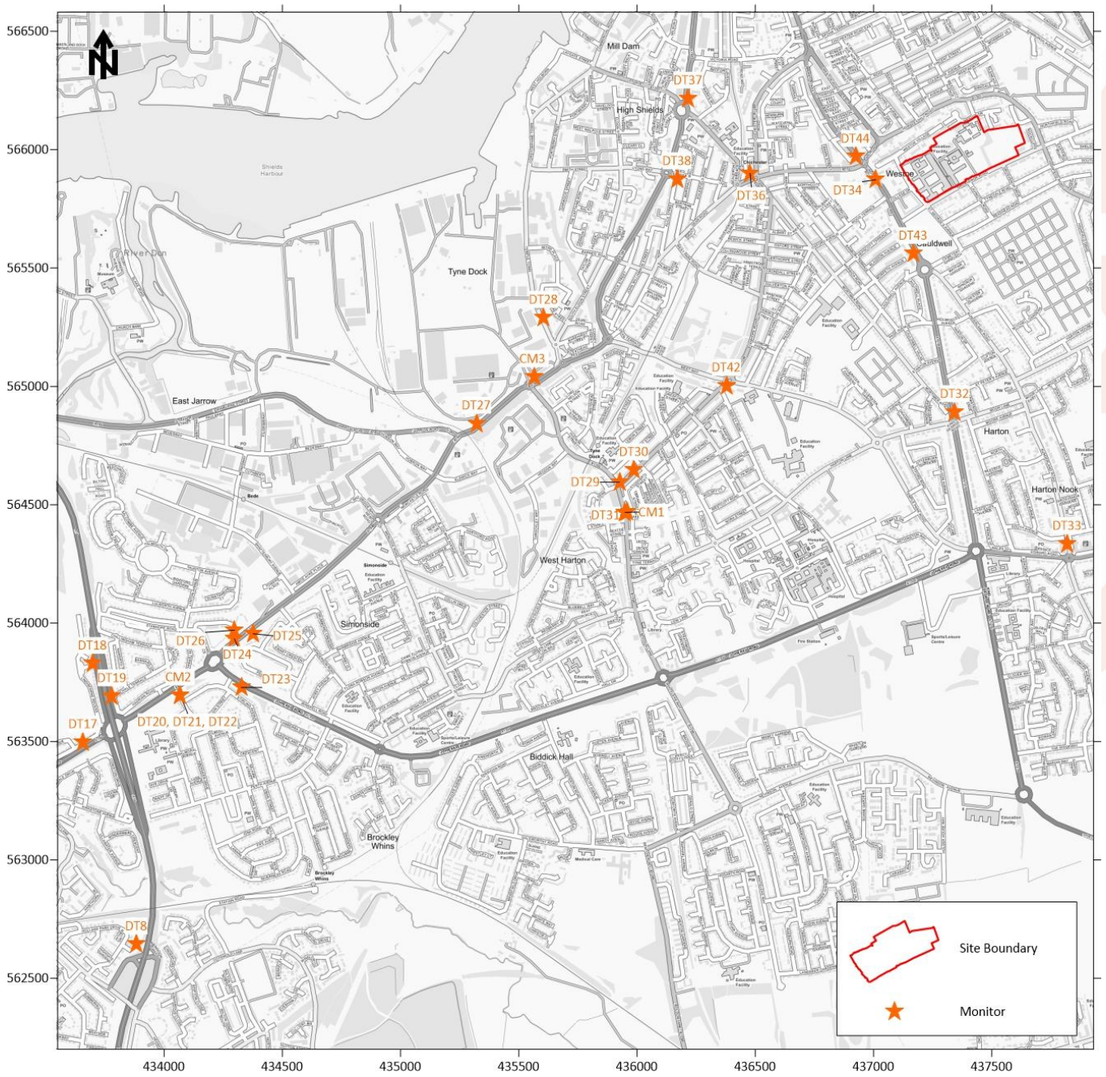


Figure 2: Monitoring Locations

Background Pollutant Concentrations

6.10 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in two grid squares. Data for these locations was downloaded from the DEFRA website[12] for the purpose of the assessment and is summarised in Table 14.

NGR (m)	Pollutant	Predicted Background Concentration ($\mu g/m^3$)		
		2024	2026	2031
437500, 565500	NO_2	10.04	9.25	7.48
	PM_{10}	11.36	11.17	10.90
	$PM_{2.5}$	6.95	6.76	6.50
437500, 566500	NO_2	10.46	9.65	7.89
	PM_{10}	11.45	11.26	10.99
	$PM_{2.5}$	6.87	6.68	6.42

Table 14: Background Pollutant Concentrations

6.11 As shown in Table 14, predicted background NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant AQOs and Concentration Target at the development site.

Sensitive Receptors

6.12 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

Construction Phase Sensitive Receptors

6.13 Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk-top study of the area up to 250m from the development boundary. These are summarised in Table 15.

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	More than 100	0
Less than 50	More than 100	0

Less than 100	More than 100	-
Less than 250	More than 100	-

Table 15: Demolition, Earthworks and Construction Dust Sensitive Receptors

6.14 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 250m of the site access. These are summarised in Table 16.

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	More than 100	0
Less than 50	More than 100	0

Table 16: Trackout Dust Sensitive Receptors

6.15 There are no ecological receptors within 50m of the site or trackout boundary. As such, ecological impacts have not been assessed further within this report.

6.16 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are determined in Table 17.

Guidance	Comment
Whether there is any history of dust generating activities in the area	The desk top study did not indicate any dust generating activities in the local area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal did not indicate any additional development proposals likely to result in concurrent dust generation in the vicinity of the site
Pre-existing screening between the source and the receptors	Trees and shrubs are located sporadically along the western and northern site boundary. These may act as a barrier between emission sources and receptors should they be retained during construction
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the west. As such, receptors to the east of the development are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is likely that it will extend over one year. The sensitivity of nearby receptors is unlikely to change during this time
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

Table 17: Additional Area Sensitivity Factors

6.17 Based on the criteria shown in Table 5, the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This was because identified receptors included residential properties.

6.18 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 4, is shown in Table 18.

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Medium	Medium	Medium	Medium

Table 18: Sensitivity of the Surrounding Area to Specific Dust Impacts

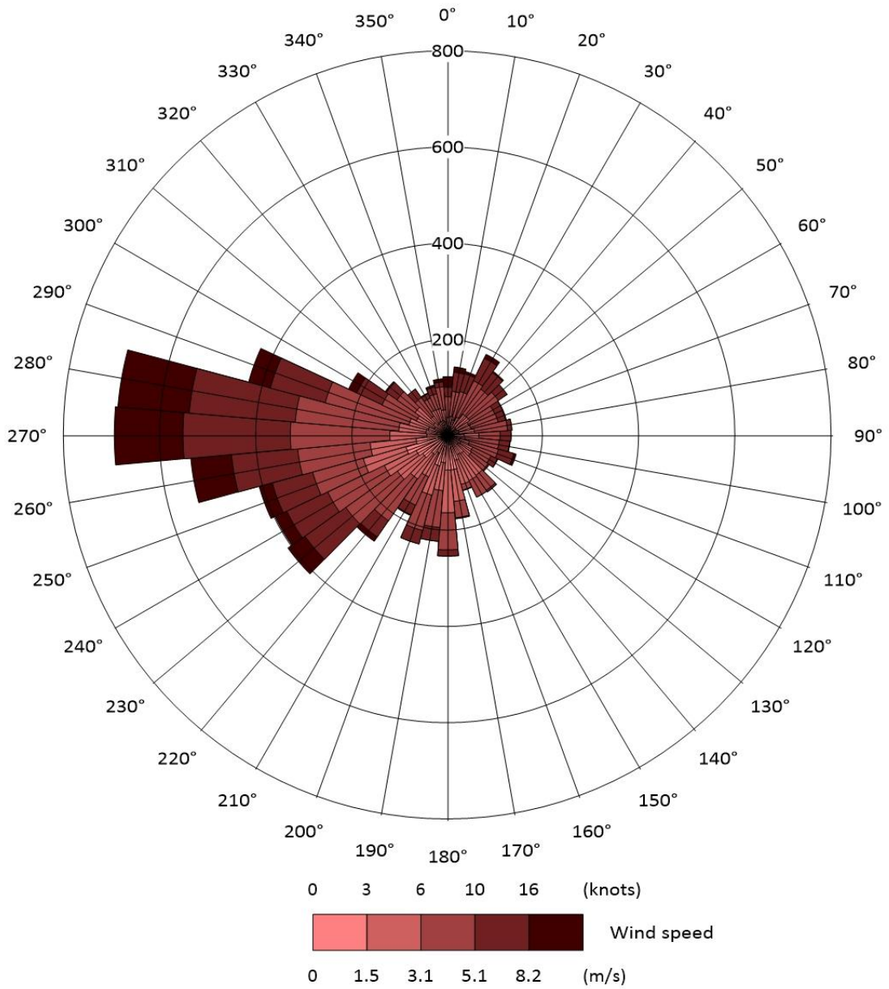


Figure 3: Wind Rose of 2024 Newcastle Meteorological Data

Operational Phase Sensitive Receptors

6.19 Receptors sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 19. Receptor heights were selected based on the location of residential units to allow for less sensitive land uses, such as retail, at ground level. Existing monitoring locations within the model extents were also included as receptors within the assessment.

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Residential - Sunderland Road	437017.5	565889.7	1.5
R2	Residential - Sunderland ROad	436993.9	565953.0	1.5
R3	Residential - Imeary Street	436944.1	565978.9	4.0
R4	Residential - Imeary Street	436706.4	566350.3	1.5
R5	Residential - Chichester Road	436531.9	566219.8	1.5
R6	Educational - Laygate Community School	436404.2	566019.8	1.5
R7	Residential - Dean Road	436253.9	565717.6	1.5
R8	Residential - Dean Road	435982.9	565344.5	1.5
R9	Residential - The Staithes	435794.5	565107.6	1.5
R10	Residential - Newcastle Road	435119.1	564556.4	1.5
R11	Residential - Drummond Crescent	434536.6	564068.0	1.5
R12	Residential - Leam Lane	434162.4	563843.0	1.5
R13	Residential - Hadrian Road	433819.5	563635.8	1.5
R14	Educational - Simonside Primary School	433925.9	563564.3	1.5
R15	Residential - Lawson Avenue	433707.7	563536.8	1.5
R16	Residential - Canberra Drive	434544.7	563614.1	1.5
R17	Educational - Monkton Infant School	435068.6	563474.7	1.5
R18	Residential - Hall Drive	435985.9	563773.8	1.5
R19	Residential - Boldon Lane	436000.8	564087.5	1.5
R20	Residential - Boldon Lane	435969.7	564396.0	1.5
R21	Residential - Stanhope Road	435928.2	564605.0	4.0
R22	Residential - The Wynde	436568.5	563954.7	1.5
R23	Residential - Wylam Close	437403.3	564339.3	1.5
R24	Residential - King George Road	437383.9	564748.1	1.5
R25	Residential - King George Road	437261.3	565388.1	1.5

Receptor		NGR (m)		Height (m)
		X	Y	
R26	Residential - King George Road	437490.8	564174.6	1.5
R27	Residential - Boldon Lane	435985.2	564171.4	1.5
R28	Residential - Harton Lane	436423.8	564399.7	1.5
R29	Residential - Stanhope Road	436527.8	565491.9	1.5
R30	Residential - Horsley Hill Road	437049.5	566067.7	1.5
R31	Residential - Grosvenor Road	437399.0	565846.5	1.5
R32	Residential - Grosvenor Road	437248.5	565758.8	1.5
R33	Residential - Grosvenor Road	437134.5	565725.4	1.5
R34	Residential - Grosvenor Road	437458.2	565877.2	1.5
R35	Residential - Grosvenor Road	437590.0	565940.9	1.5
R36	DT34 - Westoe Road	437010.0	565873.0	2.35
R37	DT43 - Redhead Park	437161.0	565572.0	2.5
R38	DT44 - Imeary Street	436923.0	565967.0	2.5

Table 19: Operational Phase Road Vehicle Exhaust Emissions Sensitive Receptor Locations

6.20 Reference should be made to Figure 4 for a graphical representation of the sensitive receptor locations.

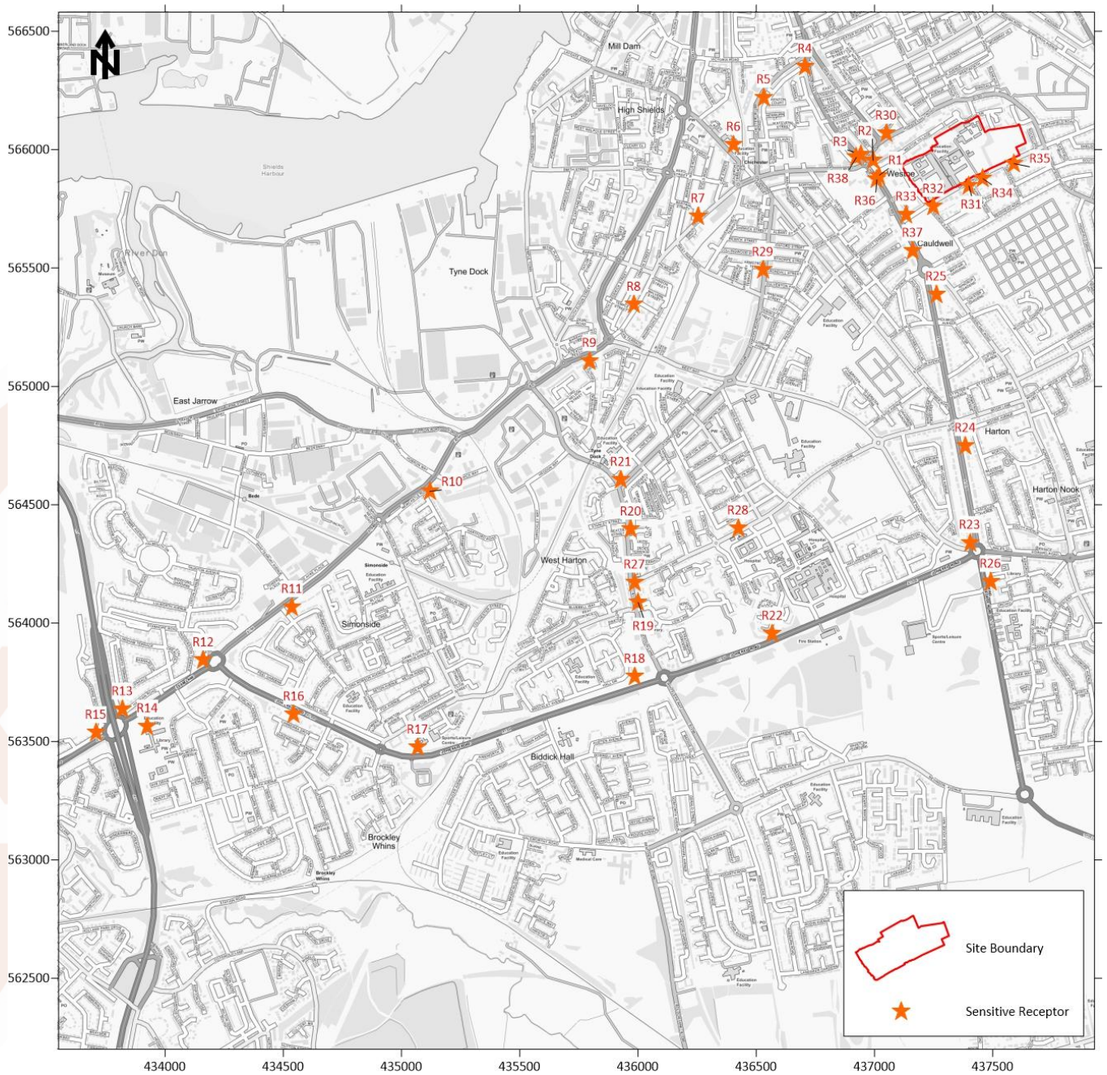


Figure 4: Operational Phase Sensitive Receptor Locations

7 Assessment

Construction Phase Fugitive Dust Emissions

Step 1

7.1 The undertaking of activities such as demolition, ground works, cutting, construction and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements on the local road network also have the potential to result in the re-suspension of dust from highway surfaces.

7.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

7.3 The desk-top study undertaken to inform the baseline identified a number of sensitive receptors within 250m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Demolition

7.4 Demolition will be undertaken at the start of the construction phase and will involve clearance of existing buildings on site. It is estimated that the total building volume to be demolished is between 12,000m^3 and 75,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from demolition is therefore **medium**.

7.5 Table 18 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria in Table 8, the development is considered to be a **medium** risk site for dust soiling as a result of demolition activities.

7.6 Table 18 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 8, the development is considered to be a **medium** risk site for human health impacts as a result of demolition activities.

Earthworks

7.7 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The proposed area of works is between 18,000m^2 and 110,000m^2. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **medium**.

7.8 Table 18 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for dust soiling as a result of earthworks.

7.9 Table 18 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for human health impacts as a result of earthworks.

Construction

7.10 It is estimated that the total building volume will be greater than 75,000m^3. In accordance with the criteria outlined in accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **large**.

7.11 Table 18 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **high** risk site for dust soiling as a result of construction.

7.12 Table 18 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for human health impacts as a result of construction.

Trackout

7.13 Based on the site area, it is anticipated that the unpaved road length may be greater than 100m during certain stages of construction. In accordance with the criteria outlined in accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **large**.

7.14 Table 18 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **high** risk site for dust soiling as a result of trackout.

7.15 Table 18 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for human health impacts as a result of trackout.

Summary of Potential Unmitigated Dust Risks

7.16 A summary of the risk from each dust generating activity is provided in Table 20.

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	High	High
Human Health	Medium	Medium	Medium	Medium

Table 20: Summary of Potential Unmitigated Dust Risks

7.17 As indicated in Table 20, the potential risk of dust soiling is **high** from construction and trackout and **medium** from demolition and earthworks. The potential risk of human health impacts is **medium** from demolition, earthworks, construction and trackout.

7.18 It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

Step 3

7.19 The IAQM guidance[9] provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 21. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan if required by the LA.

Issue	Control Measure
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager Display the head or regional office contact information Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken Make the complaints log available to the LA upon request Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Monitoring	Undertake daily on-site and off-site inspection to monitor dust, record inspection results, and make the log available to the LA upon request Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the LA upon request Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Site preparation	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible Fully enclose site or specific operations where there is a high potential for dust production and they are active for an extensive period Avoid site runoff of water or mud Keep site fencing, barriers and scaffolding clean using wet methods Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used

Issue	Control Measure
Operating vehicle/ machinery and sustainable travel	Ensure all vehicles switch off engines when stationary - no idling vehicles Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate Use enclosed chutes and conveyors and covered skips Minimise drop heights and use fine water sprays wherever appropriate Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	Avoid bonfires or burning of waste materials
Demolition	Soft strip inside buildings before demolition Ensure effective water suppression is used during demolition operations Avoid explosive blasting using appropriate manual or mechanical alternatives Bag and remove any biological debris or damp down such material before demolition
Earthworks	Re-vegetate earthworks and exposed areas Use Hessian, mulches or trackifiers, if practicable Only remove cover in small areas during work and not all at once
Construction	Avoid scabbling (roughening of concrete surfaces) if possible Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos
Trackout	Use water-assisted dust sweeper on access and local roads, if required
	Avoid dry sweeping of large areas Ensure vehicles entering and leaving site are covered to prevent escape of materials Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably possible Record all inspections of haul routes and any subsequent action in a site log book Implement a wheel washing system, if required

Table 21: Fugitive Dust Emission Mitigation Measures

Step 4

7.20 Assuming the relevant mitigation measures outlined in Table 21 are implemented, the residual impact from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance[9].

Operational Phase Assessment

7.21 Vehicle movements associated with the operation of the proposal will generate exhaust emissions on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations.

7.22 The assessment considered the following scenarios:

- 2024 - Verification;
- 2031 DM; and,
- 2031 DS.

7.23 The DM scenario (i.e. without development) included anticipated baseline traffic data, inclusive of anticipated growth, for the relevant assessment year. The DS scenario (i.e. with development) included anticipated baseline traffic data, inclusive of anticipated growth, for the relevant assessment year, in addition to predicted vehicle trips associated with the operation of the proposals.

7.24 For the purpose of the assessment traffic data for 2031 was utilised as the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors for 2024 were

utilised within the dispersion model. The use of 2031 traffic data and 2024 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollutant concentrations.

7.25 Reference should be made to Appendix 1 for full assessment input details.

Potential Development Impacts

Predicted Concentrations

7.26 Annual mean NO_2 concentrations were predicted at sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 22.

Receptor		Predicted Annual Mean NO_2 Concentration (µg/m³)		
		DM	DS	Change
R1	Residential - Sunderland Road	27.45	27.68	0.23
R2	Residential - Sunderland Road	24.90	25.04	0.14
R3	Residential - Imeary Street	22.68	22.78	0.10
R4	Residential - Imeary Street	20.39	20.44	0.05
R5	Residential - Chichester Road	24.32	24.33	0.01
R6	Educational - Laygate Community School	22.01	22.03	0.02
R7	Residential - Dean Road	22.51	22.58	0.07
R8	Residential - Dean Road	23.19	23.26	0.07
R9	Residential - The Staithes	23.00	23.05	0.05
R10	Residential - Newcastle Road	18.37	18.38	0.01
R11	Residential - Drummond Crescent	20.06	20.08	0.02
R12	Residential - Leam Lane	27.83	27.97	0.14
R13	Residential - Hadrian Road	34.76	34.88	0.12
R14	Educational - Simonside Primary School	23.03	23.10	0.07
R15	Residential - Lawson Avenue	26.50	26.59	0.09
R16	Residential - Canberra Drive	18.15	18.25	0.10
R17	Educational - Monkton Infant School	18.17	18.29	0.12
R18	Residential - Hall Drive	17.67	17.77	0.10
R19	Residential - Boldon Lane	25.94	26.03	0.09
R20	Residential - Boldon Lane	26.79	26.88	0.09
R21	Residential - Stanhope Road	23.72	23.79	0.07
R22	Residential - The Wynde	18.89	19.07	0.18
R23	Residential - Wylam Close	20.84	21.06	0.22
R24	Residential - King George Road	19.50	19.76	0.26
R25	Residential - King George Road	19.68	19.98	0.30
R26	Residential - King George Road	19.62	19.68	0.06
R27	Residential - Boldon Lane	30.65	30.73	0.08
R28	Residential - Harton Lane	22.93	22.96	0.03
R29	Residential - Stanhope Road	22.38	22.45	0.07
R30	Residential - Horsley Hill Road	20.68	20.73	0.05
R31	Residential - Grosvenor Road	15.79	16.25	0.46
R32	Residential - Grosvenor Road	16.43	16.88	0.45
R33	Residential - Grosvenor Road	19.55	20.02	0.47
R34	Residential - Grosvenor Road	15.64	15.88	0.24
R35	Residential - Grosvenor Road	15.53	15.58	0.05
R36	DT34 - Westoe Road	24.82	25.02	0.20
R37	DT43 - Redhead Park	19.10	19.36	0.26
R38	DT44 - Imeary Street	21.82	21.92	0.10

Table 22: Predicted Annual Mean NO_2 Concentrations

7.27 As indicated in Table 22, predicted annual mean NO_2 concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

7.28 Annual mean PM_{10} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 23.

Receptor		Predicted Annual Mean PM_{10} Concentration ($\mu g/m^3$)		
		DM	DS	Change
R1	Residential - Sunderland Road	13.51	13.54	0.03
R2	Residential - Sunderland Road	13.19	13.21	0.02
R3	Residential - Imeary Street	13.02	13.03	0.01
R4	Residential - Imeary Street	12.77	12.78	0.01
R5	Residential - Chichester Road	13.34	13.34	0.00
R6	Educational - Laygate Community School	12.99	12.99	0.00
R7	Residential - Dean Road	13.06	13.07	0.01
R8	Residential - Dean Road	13.14	13.15	0.01
R9	Residential - The Staithes	13.04	13.05	0.01
R10	Residential - Newcastle Road	12.46	12.47	0.00
R11	Residential - Drummond Crescent	12.69	12.69	0.00
R12	Residential - Leam Lane	13.56	13.58	0.02
R13	Residential - Hadrian Road	14.14	14.16	0.02
R14	Educational - Simonside Primary School	12.81	12.82	0.01
R15	Residential - Lawson Avenue	13.42	13.43	0.01
R16	Residential - Canberra Drive	12.42	12.44	0.01
R17	Educational - Monkton Infant School	12.45	12.47	0.02
R18	Residential - Hall Drive	12.39	12.40	0.01
R19	Residential - Boldon Lane	13.60	13.61	0.01
R20	Residential - Boldon Lane	13.73	13.74	0.01
R21	Residential - Stanhope Road	13.25	13.26	0.01
R22	Residential - The Wynde	12.56	12.59	0.02
R23	Residential - Wylam Close	12.77	12.80	0.03
R24	Residential - King George Road	12.66	12.69	0.04
R25	Residential - King George Road	12.68	12.72	0.04
R26	Residential - King George Road	12.66	12.67	0.01
R27	Residential - Boldon Lane	14.37	14.38	0.01
R28	Residential - Harton Lane	13.14	13.14	0.00
R29	Residential - Stanhope Road	13.05	13.06	0.01
R30	Residential - Horsley Hill Road	12.69	12.70	0.01
R31	Residential - Grosvenor Road	12.13	12.19	0.06
R32	Residential - Grosvenor Road	12.21	12.27	0.06
R33	Residential - Grosvenor Road	12.65	12.71	0.06
R34	Residential - Grosvenor Road	12.11	12.14	0.03
R35	Residential - Grosvenor Road	12.10	12.10	0.01
R36	DT34 - Westoe Road	13.18	13.21	0.02
R37	DT43 - Redhead Park	12.50	12.53	0.03
R38	DT44 - Imeary Street	12.93	12.94	0.01

Table 23: Predicted Annual Mean PM_{10} Concentrations

7.29 As indicated in Table 23, predicted annual mean PM_{10} concentrations were below the relevant AQO at all sensitive receptors for both scenarios.

7.30 Annual mean $PM_{2.5}$ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 24.

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration ($\mu g/m^3$)		
		DM	DS	Change
R1	Residential - Sunderland Road	7.92	7.93	0.02
R2	Residential - Sunderland Road	7.74	7.75	0.01
R3	Residential - Imeary Street	7.65	7.66	0.01
R4	Residential - Imeary Street	7.52	7.52	0.00
R5	Residential - Chichester Road	7.82	7.82	0.00
R6	Educational - Laygate Community School	7.63	7.63	0.00
R7	Residential - Dean Road	7.67	7.68	0.01
R8	Residential - Dean Road	7.72	7.72	0.01

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m³)		
		DM	DS	Change
R9	Residential - The Staithes	7.66	7.66	0.00
R10	Residential - Newcastle Road	7.36	7.36	0.00
R11	Residential - Drummond Crescent	7.47	7.48	0.00
R12	Residential - Leam Lane	7.95	7.96	0.01
R13	Residential - Hadrian Road	8.32	8.33	0.01
R14	Educational - Simonside Primary School	7.57	7.57	0.00
R15	Residential - Lawson Avenue	7.89	7.89	0.01
R16	Residential - Canberra Drive	7.34	7.34	0.01
R17	Educational - Monkton Infant School	7.35	7.36	0.01
R18	Residential - Hall Drive	7.31	7.32	0.01
R19	Residential - Boldon Lane	7.96	7.96	0.01
R20	Residential - Boldon Lane	8.03	8.03	0.01
R21	Residential - Stanhope Road	7.77	7.78	0.01
R22	Residential - The Wynde	7.41	7.42	0.01
R23	Residential - Wylam Close	7.52	7.54	0.02
R24	Residential - King George Road	7.46	7.48	0.02
R25	Residential - King George Road	7.47	7.49	0.02
R26	Residential - King George Road	7.46	7.47	0.00
R27	Residential - Boldon Lane	8.37	8.38	0.01
R28	Residential - Harton Lane	7.71	7.71	0.00
R29	Residential - Stanhope Road	7.67	7.67	0.00
R30	Residential - Horsley Hill Road	7.48	7.48	0.00
R31	Residential - Grosvenor Road	7.18	7.21	0.03
R32	Residential - Grosvenor Road	7.22	7.25	0.03
R33	Residential - Grosvenor Road	7.45	7.49	0.03
R34	Residential - Grosvenor Road	7.16	7.18	0.02
R35	Residential - Grosvenor Road	7.16	7.16	0.00
R36	DT34 - Westoe Road	7.74	7.75	0.01
R37	DT43 - Redhead Park	7.37	7.39	0.02
R38	DT44 - Imeary Street	7.60	7.61	0.01

Table 24: Predicted Annual Mean $PM_{2.5}$ Concentrations

7.31 As indicated in Table 24, predicted annual mean $PM_{2.5}$ concentrations were below the Concentration Target at all locations in both scenarios.

Predicted Impacts

7.32 Predicted impacts on annual mean NO_2 concentrations at the sensitive receptor locations are summarised in Table 25.

Receptor		Predicted Concentration	Predicted Conc. Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Sunderland Road	Below 75% of AQO	1	Negligible
R2	Residential - Sunderland Road	Below 75% of AQO	0	Negligible
R3	Residential - Imeary Street	Below 75% of AQO	0	Negligible
R4	Residential - Imeary Street	Below 75% of AQO	0	Negligible
R5	Residential - Chichester Road	Below 75% of AQO	0	Negligible
R6	Educational - Laygate Community School	Below 75% of AQO	0	Negligible
R7	Residential - Dean Road	Below 75% of AQO	0	Negligible
R8	Residential - Dean Road	Below 75% of AQO	0	Negligible

Receptor		Predicted Concentration	Predicted Conc. Change as Proportion of AQO (%)	Impact Significance
R9	Residential - The Staithes	Below 75% of AQO	0	Negligible
R10	Residential - Newcastle Road	Below 75% of AQO	0	Negligible
R11	Residential - Drummond Crescent	Below 75% of AQO	0	Negligible
R12	Residential - Leam Lane	Below 75% of AQO	0	Negligible
R13	Residential - Hadrian Road	76 - 94% of AQO	0	Negligible
R14	Educational - Simonside Primary School	Below 75% of AQO	0	Negligible
R15	Residential - Lawson Avenue	Below 75% of AQO	0	Negligible
R16	Residential - Canberra Drive	Below 75% of AQO	0	Negligible
R17	Educational - Monkton Infant School	Below 75% of AQO	0	Negligible
R18	Residential - Hall Drive	Below 75% of AQO	0	Negligible
R19	Residential - Boldon Lane	Below 75% of AQO	0	Negligible
R20	Residential - Boldon Lane	Below 75% of AQO	0	Negligible
R21	Residential - Stanhope Road	Below 75% of AQO	0	Negligible
R22	Residential - The Wynde	Below 75% of AQO	0	Negligible
R23	Residential - Wylam Close	Below 75% of AQO	1	Negligible
R24	Residential - King George Road	Below 75% of AQO	1	Negligible
R25	Residential - King George Road	Below 75% of AQO	1	Negligible
R26	Residential - King George Road	Below 75% of AQO	0	Negligible
R27	Residential - Boldon Lane	76 - 94% of AQO	0	Negligible
R28	Residential - Harton Lane	Below 75% of AQO	0	Negligible
R29	Residential - Stanhope Road	Below 75% of AQO	0	Negligible
R30	Residential - Horsley Hill Road	Below 75% of AQO	0	Negligible
R31	Residential - Grosvenor Road	Below 75% of AQO	1	Negligible
R32	Residential - Grosvenor Road	Below 75% of AQO	1	Negligible
R33	Residential - Grosvenor Road	Below 75% of AQO	1	Negligible
R34	Residential - Grosvenor Road	Below 75% of AQO	1	Negligible
R35	Residential - Grosvenor Road	Below 75% of AQO	0	Negligible
R36	DT34 - Westoe Road	Below 75% of AQO	1	Negligible
R37	DT43 - Redhead Park	Below 75% of AQO	1	Negligible
R38	DT44 - Imeary Street	Below 75% of AQO	0	Negligible

Table 25: Predicted Annual Mean NO_2 Impacts

7.33 As indicated in Table 25, impacts on annual mean NO_2 concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

7.34 Predicted impacts on annual mean PM_{10} concentrations at the sensitive receptor locations are summarised in Table 26.

Receptor		Predicted Concentration	Predicted Conc. Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Sunderland Road	Below 75% of AQO	0	Negligible
R2	Residential - Sunderland Road	Below 75% of AQO	0	Negligible
R3	Residential - Imeary Street	Below 75% of AQO	0	Negligible
R4	Residential - Imeary Street	Below 75% of AQO	0	Negligible
R5	Residential - Chichester Road	Below 75% of AQO	0	Negligible
R6	Educational - Laygate Community School	Below 75% of AQO	0	Negligible
R7	Residential - Dean Road	Below 75% of AQO	0	Negligible
R8	Residential - Dean Road	Below 75% of AQO	0	Negligible
R9	Residential - The Staithes	Below 75% of AQO	0	Negligible
R10	Residential - Newcastle Road	Below 75% of AQO	0	Negligible
R11	Residential - Drummond Crescent	Below 75% of AQO	0	Negligible
R12	Residential - Leam Lane	Below 75% of AQO	0	Negligible
R13	Residential - Hadrian Road	Below 75% of AQO	0	Negligible
R14	Educational - Simonside Primary School	Below 75% of AQO	0	Negligible
R15	Residential - Lawson Avenue	Below 75% of AQO	0	Negligible
R16	Residential - Canberra Drive	Below 75% of AQO	0	Negligible
R17	Educational - Monkton Infant School	Below 75% of AQO	0	Negligible
R18	Residential - Hall Drive	Below 75% of AQO	0	Negligible
R19	Residential - Boldon Lane	Below 75% of AQO	0	Negligible
R20	Residential - Boldon Lane	Below 75% of AQO	0	Negligible
R21	Residential - Stanhope Road	Below 75% of AQO	0	Negligible
R22	Residential - The Wynde	Below 75% of AQO	0	Negligible
R23	Residential - Wylam Close	Below 75% of AQO	0	Negligible
R24	Residential - King George Road	Below 75% of AQO	0	Negligible
R25	Residential - King George Road	Below 75% of AQO	0	Negligible
R26	Residential - King George Road	Below 75% of AQO	0	Negligible
R27	Residential - Boldon Lane	Below 75% of AQO	0	Negligible
R28	Residential - Harton Lane	Below 75% of AQO	0	Negligible
R29	Residential - Stanhope Road	Below 75% of AQO	0	Negligible
R30	Residential - Horsley Hill Road	Below 75% of AQO	0	Negligible
R31	Residential - Grosvenor Road	Below 75% of AQO	0	Negligible

Receptor		Predicted Concentration	Predicted Conc. Change as Proportion of AQO (%)	Impact Significance
R32	Residential - Grosvenor Road	Below 75% of AQO	0	Negligible
R33	Residential - Grosvenor Road	Below 75% of AQO	0	Negligible
R34	Residential - Grosvenor Road	Below 75% of AQO	0	Negligible
R35	Residential - Grosvenor Road	Below 75% of AQO	0	Negligible
R36	DT34 - Westoe Road	Below 75% of AQO	0	Negligible
R37	DT43 - Redhead Park	Below 75% of AQO	0	Negligible
R38	DT44 - Imeary Street	Below 75% of AQO	0	Negligible

Table 26: Predicted Annual Mean PM_{10} Impacts

7.35 As indicated in Table 26, impacts on annal mean PM_{10} concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

7.36 Predicted impacts on annual mean $PM_{2.5}$ concentrations at the sensitive receptor locations are summarised in Table 27.

Receptor		Predicted Concentration	Predicted Conc. Change as Proportion of Concentration Target (%)	Impact Significance
R1	Residential - Sunderland Road	76 - 94% of Concentration Target	0	Negligible
R2	Residential - Sunderland Road	76 - 94% of Concentration Target	0	Negligible
R3	Residential - Imeary Street	76 - 94% of Concentration Target	0	Negligible
R4	Residential - Imeary Street	76 - 94% of Concentration Target	0	Negligible
R5	Residential - Chichester Road	76 - 94% of Concentration Target	0	Negligible
R6	Educational - Laygate Community School	76 - 94% of Concentration Target	0	Negligible
R7	Residential - Dean Road	76 - 94% of Concentration Target	0	Negligible
R8	Residential - Dean Road	76 - 94% of Concentration Target	0	Negligible
R9	Residential - The Staithes	76 - 94% of Concentration Target	0	Negligible
R10	Residential - Newcastle Road	Below 75% of Concentration Target	0	Negligible
R11	Residential - Drummond Crescent	Below 75% of Concentration Target	0	Negligible
R12	Residential - Leam Lane	76 - 94% of Concentration Target	0	Negligible
R13	Residential - Hadrian Road	76 - 94% of Concentration Target	0	Negligible

Receptor		Predicted Concentration	Predicted Conc. Change as Proportion of Concentration Target (%)	Impact Significance
R14	Educational - Simonside Primary School	76 - 94% of Concentration Target	0	Negligible
R15	Residential - Lawson Avenue	76 - 94% of Concentration Target	0	Negligible
R16	Residential - Canberra Drive	Below 75% of Concentration Target	0	Negligible
R17	Educational - Monkton Infant School	Below 75% of Concentration Target	0	Negligible
R18	Residential - Hall Drive	Below 75% of Concentration Target	0	Negligible
R19	Residential - Boldon Lane	76 - 94% of Concentration Target	0	Negligible
R20	Residential - Boldon Lane	76 - 94% of Concentration Target	0	Negligible
R21	Residential - Stanhope Road	76 - 94% of Concentration Target	0	Negligible
R22	Residential - The Wynde	Below 75% of Concentration Target	0	Negligible
R23	Residential - Wylam Close	76 - 94% of Concentration Target	0	Negligible
R24	Residential - King George Road	Below 75% of Concentration Target	0	Negligible

Receptor		Predicted Concentration	Predicted Conc. Change as Proportion of Concentration Target (%)	Impact Significance
R25	Residential - King George Road	Below 75% of Concentration Target	0	Negligible
R26	Residential - King George Road	Below 75% of Concentration Target	0	Negligible
R27	Residential - Boldon Lane	76 - 94% of Concentration Target	0	Negligible
R28	Residential - Harton Lane	76 - 94% of Concentration Target	0	Negligible
R29	Residential - Stanhope Road	76 - 94% of Concentration Target	0	Negligible
R30	Residential - Horsley Hill Road	Below 75% of Concentration Target	0	Negligible
R31	Residential - Grosvenor Road	Below 75% of Concentration Target	0	Negligible
R32	Residential - Grosvenor Road	Below 75% of Concentration Target	0	Negligible
R33	Residential - Grosvenor Road	Below 75% of Concentration Target	0	Negligible
R34	Residential - Grosvenor Road	Below 75% of Concentration Target	0	Negligible
R35	Residential - Grosvenor Road	Below 75% of Concentration Target	0	Negligible

Receptor		Predicted Concentration	Predicted Conc. Change as Proportion of Concentration Target (%)	Impact Significance
R36	DT34 - Westoe Road	76 - 94% of Concentration Target	0	Negligible
R37	DT43 - Redhead Park	Below 75% of Concentration Target	0	Negligible
R38	DT44 - Imeary Street	76 - 94% of Concentration Target	0	Negligible

Table 27: Predicted Annual Mean $PM_{2.5}$ Impacts

7.37 As indicated in Table 27, impacts on annual mean $PM_{2.5}$ concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

Overall Impact Significance

7.38 The overall significance of operational phase road traffic exhaust emission impacts was determined to be **negligible**. This was based on the predicted impacts at discrete receptor locations and the considerations outlined in Section 4. Further justification is provided in Table 28.

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations were below the relevant AQOs and Concentration Target at all locations in the DM scenario It is considered unlikely that future air quality conditions will change significantly in the absence of the development given the relatively established nature of the area
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs or Concentration Target
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	The assessment assumed vehicle exhaust emission rates and background pollutant level will not reduce in future years. This provides worse-case results when compared with DEFRA and National Highways methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

Table 28: Overall Impact Significance

7.39 The IAQM guidance[11] states that only if the impact is greater than **slight**, the effect is considered **significant**. As impacts were predicted to be **negligible**, the effect of the proposals is considered to be **not significant**, in accordance with the stated methodology.

Interim Planning Guidance for $PM_{2.5}$

7.40 Interim Planning Guidance[13] on the consideration of $PM_{2.5}$ targets identified in the Environment Act (2021) in planning decisions has been produced by DEFRA. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise emissions of $PM_{2.5}$ and its precursors as far as is reasonably practicable be provided in support of planning applications. To assist the process, two questions and associated considerations are provided. These are summarised in Table 29.

Question	Response
How has exposure to $PM_{2.5}$ been considered when selecting the development site? Factors to consider include: - Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the	The site is located in a predominantly residential area with a large population. As outlined in Section 7, air quality impacts associated with the development are predicted to be **not significant** The proposals are distanced from any major pollution sources and are not located within an AQMA. As such, future residents are not predicted to be exposed to elevated $PM_{2.5}$ concentrations

Question	Response
impact of the development on these - Site proximity to pollution sources and the impact of these on users of the development - Exposure and emissions during both construction and in-use	As outlined in Table 21, a number of mitigation measures will be used throughout the construction phase in order to reduce fugitive dust emissions as far as practicable. This will control potential exposure at off-site locations
What actions and/or mitigations have been considered to reduce $PM_{2.5}$ exposure for development users and nearby receptors and to reduce emissions of $PM_{2.5}$ and its precursors? Factors to consider include: - Site layout - The development's design - Technology used in the construction or installed for use in the development - Construction and future use of the development	In order to reduce emissions of $PM_{2.5}$ with associated impacts at nearby receptors, the following measures have been included: - Provision of cycle parking in order to encourage the use of sustainable transport measures - Provision of Electric Vehicle (EV) charging points. This will encourage the use of alternative transport modes Further to the above, in order to reduce emissions during the construction phase, a number of mitigation measures will be used to minimise dust generation from associated activities

Table 29: Interim Planning Guidance Questions

7.41 Based on the responses provided in Table 29 and the assessment results, as outlined in Section 7, it is considered that the development has identified key sources of air pollution and taken appropriate action to minimise emissions of $PM_{2.5}$.

8 Conclusion

8.1 This report has been prepared to support of a planning application for a residential development on land off St George's Avenue, South Tyneside.

8.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

8.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and trackout activities was predicted to be **not significant**.

8.4 Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the local highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

8.5 Review of the dispersion modelling results indicated that impacts on annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations as a result of traffic generated by the development were predicted to be **negligible** at all sensitive receptor locations. Following consideration of the relevant issues, air quality impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance[11].

8.6 Based on the assessment results, air quality issues are not considered a constraint to planning consent for the development.

9 References

1 AQS: Framework for Local Authority Delivery, DEFRA, 2023

2 Environmental Improvement Plan, DEFRA, 2025

3 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022

4 NPPF, Ministry of Housing, Department for Communities and Local Government, 2024

5 https://www.gov.uk/guidance/air-quality--3

6 South Tyneside LDF, STC, 2007

7 DPD STC, 2011

8 South Tyneside Publication Draft Local Plan 2023 - 2040, STC, 2024

9 Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024

10 LA 105 Air Quality, National Highways, 2024

11 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017

12 http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021

13 https://uk-air.defra.gov.uk/pm25targets/planning.

14 https://roadtraffic.dft.gov.uk/count-points#15/54.986837/-1.408607

10 Appendix 1 - Assessment Input Data

Introduction

10.1 The proposed development has the potential to cause air quality impacts as a result of vehicles travelling to and from the site. In order to assess NO_2, PM_{10} and $PM_{2.5}$ concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

Dispersion Model

10.2 Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.1.0.2). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

10.3 The model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z_0); and,
- Monin-Obukhov length.

10.4 These are detailed in the following Sections.

Assessment Area

10.5 Ambient concentrations were predicted over the area NGR: 433708, 563481 to 437506, 566352, in order to determine pollutant concentrations at the sensitive receptor locations identified in the main report text.

10.6 Reference should be made to Figure 5 for a graphical representation of assessment extents.

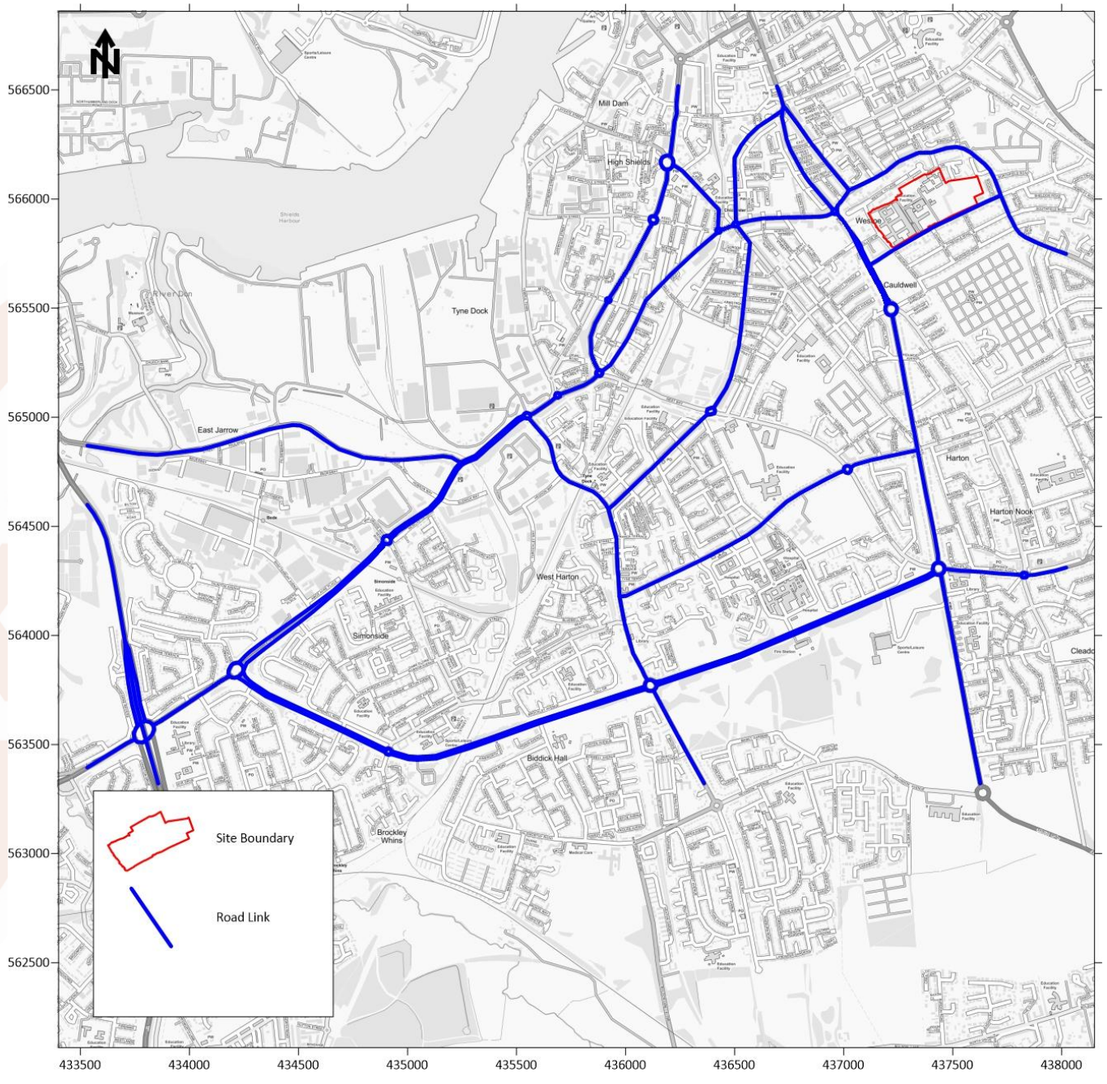


Figure 5: ADMS-Roads Inputs

Traffic Flow Data

10.7 Traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as HDV proportion, was obtained from the Department for Transport (DfT)[14]. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as

well as selected minor roads, in Great Britain for the years 2000 to 2024. It should be noted that the DfT web tool is referenced in DEFRA guidance[3] as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

10.8 The baseline data was converted to the relevant assessment year utilising a factor obtained from TEMPro (version 8.0). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

10.9 Predicted trip generation from the development was provided by i Transport Planning Ltd, the Transport Consultants for the project. These values were added to the relevant links in the 2031 DS scenario in order to represent traffic flows during the opening year of the development. It is noted that a Travel Plan will be produced which will look to secure modal shift during the operation of the development. As such, traffic predictions are considered to be robust.

10.10 Road widths were estimated from aerial photography and UK highway design standards. A summary of the traffic data used in the assessment is provided in Table 30.

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Mean Vehicle Speed (km/h)	Road Width (m)
		2024	2031 DM	2031 DS			
L1	A19 (Flyover)	44,454	49,473	49,607	6.14	100	13.2
L2	A194, west of A19	43,519	48,432	48,795	3.83	45	15.9
L3	A19, Northbound (NB) entry slip	6,668	7,421	7,488	6.14	45	5.6
L4	A19, Southbound (SB) exit slip	6,668	7,421	7,488	6.14	30	6.2
L5	Leam Lane, Slow Phase (SP) A19 roundabout	44,239	49,234	49,859	3.23	30	21.2
L6	Leam Lane	44,239	49,234	49,859	3.23	50	18.7
L7	Leam Lane, SP A1300 roundabout	44,239	49,234	49,859	3.23	25	18.7
L8	John Reid Road, Eastbound (EB) SP	12,362	13,758	14,070	1.27	25	8.2
L9	John Reid Road, EB	12,362	13,758	14,070	1.27	50	7.6
L10	John Reid Road, EB Dykelands Way to Whiteleas Way	12,362	13,758	14,070	1.27	50	7.4
L11	John Reid Road, EB Whiteleas Way to King George Road	12,362	13,758	14,164	1.27	50	7.4
L12	John Reid Road, Westbound (WB) SP	12,668	14,098	14,411	1.31	25	11.5
L13	John Reid Road, WB	12,668	14,098	14,411	1.31	50	7.1
L14	John Reid Road, WB Dykelands Way to Whiteleas Way	12,668	14,098	14,411	1.31	50	6.7
L15	John Reid Road, WB Whiteleas Way to King George Road	12,668	14,098	14,505	1.31	50	8.7
L16	Whiteleas Way	17,841	19,869	19,918	3.98	45	10.9
L17	King George Road, south of John Reid Road Roundabout	16,869	18,774	18,876	1.78	50	14.2
L18	Prince Edward Road, east of John Reid Road Roundabout	7,475	8,319	8,341	5.87	45	8.2
L19	Prince Edward Road, east of Sunderland Road	7,475	8,319	8,341	5.87	45	8.2
L20	Newcastle Road, NB John Reid Road to Wenlock Road	8,934	9,943	9,943	3.64	40	7.7

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Mean Vehicle Speed (km/h)	Road Width (m)
		2024	2031 DM	2031 DS			
L21	Newcastle Road, SP NB John Reid Road to Wenlock Road	8,934	9,943	9,943	3.64	25	8.7
L22	Newcastle Road, SB SP John Reid Road Roundabout	8,964	9,976	9,976	3.27	25	7.4
L23	Newcastle Road, SB John Reid Road to Wenlock Road	8,964	9,976	9,976	3.27	40	7.7
L24	Newcastle Road, SB SP Wenlock Road Roundabout	8,964	9,976	9,976	3.27	25	8.6
L25	Newcastle Road, SP Wenlock Road to B1302 SP Wenlock Road Roundabout	8,934	9,943	9,943	3.64	25	7.2
L26	Newcastle Road, Wenlock Road to A185 eastbound (EB)	8,934	9,943	9,943	3.64	45	7.0
L27	Newcastle Road, Jarrow Road to B1302 SP B1302 Roundabout EB	17,966	19,994	20,097	3.82	40	8.0
L28	A185	20,059	22,324	22,528	4.16	45	11.2
L29	A185, Jarrow Road	20,059	22,324	22,528	4.16	45	11.2
L30	Boldon Lane	17,841	19,869	20,009	3.98	40	13.7
L31	Boldon Lane, SP	17,841	19,869	20,009	3.98	25	8.3
L32	Stanhope Road	17,841	19,869	20,009	3.98	40	10.3
L33	Stanhope Road, West Way to Stanhope Parade	17,841	19,869	20,009	3.98	40	9.4
L34	King George Road, John Reid Road to Moor Lane	14,942	16,629	17,567	2.58	45	15.2
L35	A194, B1302 to South Heldon Street	38,481	42,826	43,030	3.54	30	20.3
L36	A194, South Heldon Street to West Way	38,481	42,826	43,030	3.54	30	15.8
L37	A194, SP between West Way and Barnes Road (West Way Roundabout)	38,481	42,826	42,826	3.54	30	17.3
L38	A194, between West Way and Barnes Road	38,481	42,826	42,826	3.54	50	17.3
L39	A194, SP between West Way and Barnes Road (Barnes Road Roundabout)	38,481	42,826	42,826	3.54	45	17.8
L40	A194, SP between Barnes Road and Lyons Way (Barnes Road Roundabout)	38,481	42,826	42,826	3.54	30	17.4
L41	A194, between Barnes Road and Lyons Way	38,481	42,826	42,826	3.54	45	17.4
L42	A194, SP between Barnes Road and Lyons Way (Lyons Way Roundabout)	38,481	42,826	42,826	3.54	25	17.4
L43	A194, between Lyons Way and Beaufront Terrace	38,481	42,826	42,826	3.54	45	18.0
L44	A194, between Beaufront Terrace and Cross Gate	38,481	42,826	42,826	3.54	45	15.6
L45	Chichester Road	17,841	19,869	19,869	3.98	40	10.8
L46	Dean Road. Between Stanhope Parade and Sunderland Road	17,841	19,869	20,074	3.98	40	9.9

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Mean Vehicle Speed (km/h)	Road Width (m)
		2024	2031 DM	2031 DS			
L47	Dean Road, between Beaufront Terrace and Stanhope Parade	17,841	19,869	20,074	3.98	25	13.0
L48	Beaufront Terrace	17,841	19,869	19,869	3.98	40	8.1
L49	Dean Road, SP Sunderland Road and Ada Street	9,344	10,399	10,523	3.70	25	8.2
L50	Westoe Road	9,344	10,399	10,523	3.70	40	8.3
L51	Horsley Hill Road, SP	5,590	6,225	6,225	6.24	25	7.5
L52	Horsley Hill Road between Dean Road and Grosvenor Road	5,590	6,225	6,225	6.24	40	7.5
L53	Sunderland Road, NB SP	7,839	8,724	9,211	2.42	25	7.3
L54	Sunderland Road NB between Grosvenor Road and Cemetery Approach Roundabout	7,839	8,724	9,211	2.42	45	7.3
L55	Sunderland Road, SB SP	7,103	7,905	8,392	2.75	25	7.3
L56	Sunderland Road SB between Grosvenor Road and Cemetery Approach Roundabout	7,103	7,905	8,392	2.75	45	7.3
L57	Sunderland Road, SP Roundabout Approach	14,942	16,629	16,958	2.58	20	8.0
L58	Imeary Street	10,430	11,608	11,732	3.80	45	7.5
L59	Westoe Road, north of Chichester Road	10,430	11,608	11,732	3.80	40	7.4
L60	Dean Road	17,841	19,869	20,074	3.98	45	8.0
L61	Harton Lane west of Roundabout	17,841	19,869	19,905	3.98	40	8.1
L62	Harton Lane east of Roundabout	17,841	19,869	19,905	3.98	40	10.3
L63	King George Road, Moor Lane to Cauldwell Avenue	14,942	16,629	17,603	2.58	45	15.2
L64	Newcastle Road, Wenlock Road to A185 westbound (WB)	8,964	9,976	9,976	3.27	25	7.6
L65	Newcastle Road, Wenlock Road to A185 WB	8,964	9,976	9,976	3.27	45	7.6
L66	Newcastle Road, Jarrow Road to B1302 SP B1302 Roundabout WB	20,515	22,831	22,933	3.30	40	7.6
L67	Grosvenor Road east of Site Access	2,637	2,935	4,238	0.53	30	7.4
L68	Grosvenor Road west of Site Access	2,637	2,935	2,979	0.53	30	7.4
L69	Highfield Road south of Grosvenor Road	5,756	6,225	6,269	6.24	40	7.5
L70	Sunderland Road NB north of Grosvenor Road	7,839	8,724	8,889	2.42	40	7.3
L71	Sunderland Road SB north of Grosvenor Road	7,103	7,905	8,070	2.75	40	7.3
R1	A19 Roundabout	25,274	28,127	28,439	6.14	30	11.9
R2	Leam Lane Roundabout	29,056	32,336	32,649	3.64	30	9.5
R3	John Reid Road Roundabout	25,030	27,856	28,168	1.31	30	9.5
R4	Whiteleas Way Roundabout	21,436	23,863	24,269	3.98	30	8.4
R5	King George Road Roundabout	16,079	17,894	18,363	5.87	30	8.3

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Mean Vehicle Speed (km/h)	Road Width (m)
		2024	2031 DM	2031 DS			
R6	Wenlock Road Roundabout	17,898	19,919	19,919	3.64	30	9.6
R7	Boldon Lane Roundabout	31,601	35,173	35,346	3.98	30	11.8
R8	Temple Town Roundabout	38,481	42,826	42,928	3.54	30	10.9
R9	West Way Roundabout	38,481	42,826	42,928	3.54	30	11.4
R10	Barne's Road Roundabout	38,481	42,826	42,826	3.54	30	11.7
R11	Lyons Way Roundabout	38,481	42,826	42,826	3.54	30	10.9
R12	Laygate Roundabout	31,601	35,173	35,173	3.98	30	12.2
R13	Dean Road Roundabout	17,841	19,869	19,972	3.98	30	9.8
R14	Stanhope Parade Roundabout	17,841	19,869	19,972	3.98	30	6.8
R15	Sunderland Road Roundabout	13,139	14,626	14,791	3.98	30	11.0
R16	Cemetery Approach Roundabout	14,574	16,219	16,706	2.75	30	10.3
R17	Prince Edward Road Roundabout	7,475	8,319	8,330	5.87	30	9.5
R18	Harton Lane Roundabout	17,841	19,869	19,887	3.98	30	7.3
R19	Stanhope Road Roundabout	17,841	19,869	19,939	3.98	30	8.6

Table 30: Traffic Data

10.11 Reference should be made to Figure 5 for a graphical representation of the road link locations.

Emission Factors

10.12 Emission factors for each link were calculated using the relevant traffic flows and the Emission Factor Toolkit (EFT) (version 13.1). This has been produced by DEFRA and incorporates COPERT 5.8 vehicles emission factors and fleet information.

10.13 There is current uncertainty over NO_2 concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2024 emission factors were utilised in preference to the development opening year in order to provide robust concentration predictions. As predictions for 2024 were verified, it is considered the results are an indicated of worse case concentrations during the operation of the proposals.

Meteorological Data

10.14 Meteorological data used in the assessment was taken from Newcastle Airport Meteorological Station over the period 1st January 2024 to 31st December 2024 (inclusive). Newcastle Airport Meteorological Station is located at NGR: 419274, 570648, which is approximately 18.7km north-west of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

10.15 All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 3 for a wind rose of the utilised meteorological data.

Roughness Length

10.16 The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 1m was used to describe the modelling extents. This value is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'cities, woodland'.

10.17 A z_0 of 0.1m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area due to the large expanse of flat land

use, such as runways and surrounding grassland, and is suggested within ADMS-Roads as being suitable for 'root crops'.

Monin-Obukhov Length

10.18 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used to describe the modelling extents. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

10.19 A minimum Monin-Obukhov length of 10m was used to describe the meteorological site. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'small towns <50,000'.

Background Concentrations

10.20 Annual mean NO_2, PM_{10} and $PM_{2.5}$ background concentrations for use in the assessment were taken from the DEFRA mapping study for the grid square containing the DT37 monitor, NGR: 436500, 566500. These are shown in Table 31.

Pollutant	Predicted 2024 Background Pollutant Concentration ($\mu g/m^3$)
NO_2	18.69
PM_{10}	11.46
$PM_{2.5}$	7.19

Table 31: Background Pollutant Concentrations - Modelling Extents

10.21 The values shown in Table 31 were chosen to represent concentrations throughout the dispersion modelling extents without the contribution from road vehicles as they were higher than the DEFRA background for the grid square containing the site, as shown in Table 14.

10.22 Background concentrations from 2024 were utilised in preference to the development opening year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO_2 Conversion

10.23 Predicted annual mean NO_x concentrations were converted to NO_2 concentrations using the spreadsheet (version 9.1) provided by DEFRA, which is the method detailed within DEFRA guidance[3].

Verification

10.24 The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

10.25 Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

10.26 For the purpose of this assessment model verification was undertaken for 2024 using traffic data, meteorological data and monitoring results from this year.

10.27 STC undertook monitoring of NO_2 concentrations at 19 locations within the vicinity of roads included within the model during 2024. The results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance[3]. The monitored annual mean NO_2 concentrations and calculated road NO_x concentrations are summarised in Table 32.

Monitoring Location		Monitored NO_2 Concentration ($\mu g/m^3$)	Calculated Road NO_x Concentration ($\mu g/m^3$)
CM1	Boldon Lane	19.6	14.21
CM2	Lindisfarne	25.1	27.55
DT17	Hadrian Road	25.0	27.30
DT18	Lindisfarne Road (55)	26.6	31.43
DT19	Hadrian Road/Fnchale Terrace Junction	28.5	36.50
DT23	John Reid Road, Junction with Stirling Avenue	25.5	28.58
DT24	Opposite 173 Hadrian Road	27.9	34.88
DT25	Opposite 237 Newcastle Road	33.0	48.72
DT27	A194 Arches Roundabout	28.0	35.15
DT29	Corner of Boldon Lane/Stanhope Road	27.3	33.27
DT30	Stanhope Road	29.9	40.36
DT31	Boldon Lane	31.0	43.47
DT32	King George Road	33.0	49.31
DT34	Westoe Road	23.9	24.53
DT36	Chichester Metro	29.9	40.36
DT37	Western Approach (Laygate flats)	26.7	31.69
DT42	West Park Roundabout	33.4	50.51
DT43	Readhead Park	21.7	19.16
DT44	Imeary Street	25.7	29.09

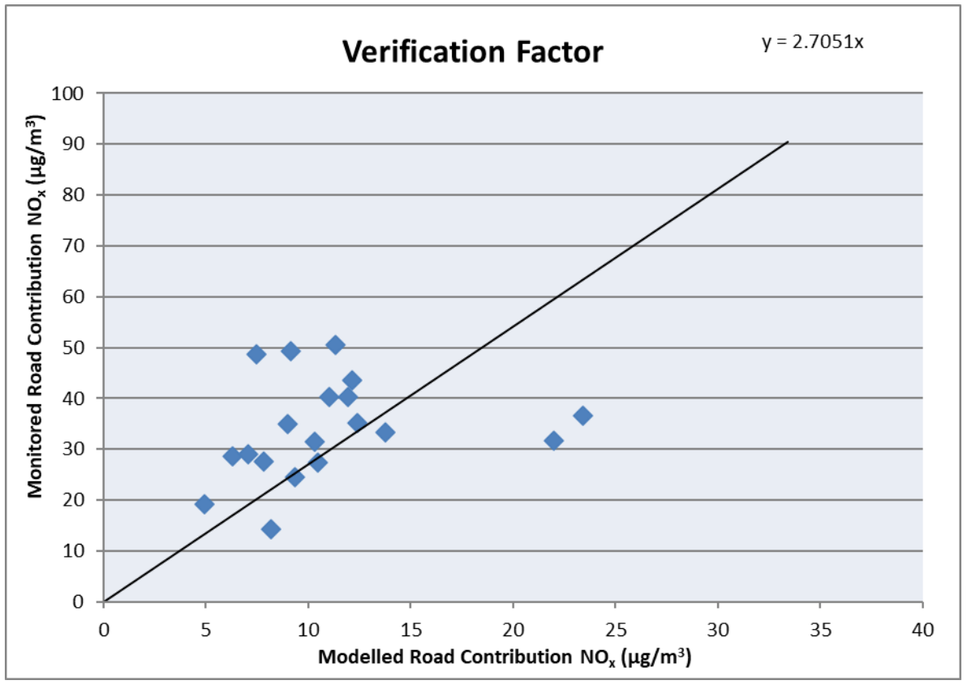
Table 32: NO_x Verification - Monitoring Results

10.28 The annual mean road NO_x concentrations predicted from the dispersion model and the road NO_x concentrations calculated from the 2024 monitoring results are summarised in Table 33.

Monitoring Location		Calculated Road NO_x Concentration ($\mu g/m^3$)	Modelled Road NO_x Concentration ($\mu g/m^3$)
CM1	Boldon Lane	14.21	8.20
CM2	Lindisfarne	27.55	7.84
DT17	Hadrian Road	27.30	10.45
DT18	Lindisfarne Road (55)	31.43	10.30
DT19	Hadrian Road/Fnchale Terrace Junction	36.50	23.42
DT23	John Reid Road, Junction with Stirling Avenue	28.58	6.32
DT24	Opposite 173 Hadrian Road	34.88	8.98
DT25	Opposite 237 Newcastle Road	48.72	7.45
DT27	A194 Arches Roundabout	35.15	12.39
DT29	Corner of Boldon Lane/Stanhope Road	33.27	13.76
DT30	Stanhope Road	40.36	11.92
DT31	Boldon Lane	43.47	12.14
DT32	King George Road	49.31	9.13
DT34	Westoe Road	24.53	9.37
DT36	Chichester Metro	40.36	11.05
DT37	Western Approach (Laygate flats)	31.69	21.99
DT42	West Park Roundabout	50.51	11.33
DT43	Readhead Park	19.16	4.94
DT44	Imeary Street	29.09	7.08

Table 33: NO_x Verification - Modelling Results

10.29 The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated a verification factor of 2.7051 was required to be applied to all NO_x modelling results, as shown in Graph 1.



Graph 1: NO_x Verification Factor

10.30 STC undertook monitoring of PM_{10} concentrations at one location within the modelling extents during 2024. The monitored annual mean PM_{10} concentration and modelled PM_{10} concentration are shown in Table 34.

Monitoring Location		Monitored PM_{10} Concentration ($\mu g/m^3$)	Modelled PM_{10} Concentration ($\mu g/m^3$)
CM2	Lindisfarne Roundabout, Jarrow	10.1	12.9

Table 34: PM_{10} Verification - Modelling Result

10.31 The monitored and modelled PM_{10} concentrations were compared to calculate the associated ratio. This indicated that a verification factor of 0.7803 was required to be applied to all modelling results. However, to provide a conservative assessment, a verification factor of 1.0 was adopted.

10.32 STC undertook monitoring of $PM_{2.5}$ concentrations at one location within the modelling extents during 2024. The monitored annual mean $PM_{2.5}$ concentration and modelled $PM_{2.5}$ concentration are shown in Table 35.

Monitoring Location		Monitored $PM_{2.5}$ Concentration ($\mu g/m^3$)	Modelled $PM_{2.5}$ Concentration ($\mu g/m^3$)
CM2	Lindisfarne Roundabout, Jarrow	7.2	7.6

Table 35: $PM_{2.5}$ Verification - Modelling Result

10.33 The monitored and modelled $PM_{2.5}$ concentrations were compared to calculate the associated ratio. This indicated that a verification factor of 0.9446 was required to be applied to all modelling results. However, to provide a conservative assessment, a verification factor of 1.0 was adopted.