

Ramsden House, Huddersfield

Air Quality Assessment

Columbia Threadneedle

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Executive Summary

Cundall has been commissioned by Columbia Threadneedle to provide an air quality assessment to support a full planning application for a proposed student residential development at Ramsden House in Huddersfield town centre.

The development proposes a change of use to the existing building, converting the eight-storey tower office accommodation into 45 studio apartments for students, with the ground floor and first floor to be developed as a gym, takeaway food and drink unit, residence lounge, study area and entrance.

The site is located within an Air Quality Management Area covering Huddersfield Town Centre; existing conditions within the study area indicate that there is potential for nitrogen dioxide (NO₂) concentrations in the wider area to exceed the European Limit Value and National Air Quality Objective threshold levels.

This air quality assessment has been prepared in accordance with West Yorkshire Low Emissions Strategy (WYLES) Air Quality & Emissions Technical Planning Guidance, and the site has been classified as a 'minor' scheme. In setting the scope of assessment, consideration has been made of the potential for impacts to occur during both the construction and operation phases of the development, and the exposure of nearby residents and future occupants of the site to air pollution.

A construction dust impact assessment was undertaken in accordance with Institute of Air Quality Management (IAQM) guidance. It was concluded that without appropriate mitigation measures, negligible risks were posed by construction, earthworks and trackout activities. Overall, the proposed site posed negligible risk of causing significant effects. With the additional implementation of additional best practise mitigation measures identified within the report, it was concluded that the construction effects of the proposed development would be not significant.

The Transport Statement prepared in support of the planning application states that the application site is highly sustainable, being located within easy walking distance of the bus and train stations, and the facilities of the town centre. Unlike the occupiers of the existing office space, the student residents will have no need to own cars due to the proximity of the university campus. Hence the impact of the scheme will be positive, leading to a reduction in traffic congestion and associated pollution. Cycle parking will be provided, but car parking will not be required.

On this basis, it is assumed that there will be a net reduction in development trips, therefore the impact of traffic related emissions has been scoped out of the air quality assessment.

The final development designs will include some combustion plant used for heating and supply of hot water. This will be provided by a natural gas fired modular boiler system. As specific details are unavailable at present, combustion plant emissions have been scoped out of the current assessment, however potential impacts may need to be addressed during subsequent phases of the planning process once details are confirmed.

Air quality conditions for future occupants and visitors of the proposed development have also been considered. Both the annual mean and short-term (1-hour) mean nitrogen dioxide concentrations are predicted to meet the relevant air quality objectives.

The allocated parking provision falls below the threshold level required for electric vehicle charging points in the WYLES planning guidance document. However, other operation phase mitigation measures are set out in the supporting Transport Statement and include measures to promote walking, cycling, the use of public transport and initiatives to reduce vehicle use.

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1.0

Introduction

1.0 Introduction

Cundall has been commissioned by Columbia Threadneedle to provide an air quality assessment to support a full planning application for a proposed student residential development at Ramsden House, Huddersfield. The site is located within Kirklees Council's Air Quality Management Area (AQMA) No. 9 covering Huddersfield Town Centre.

The development proposes a change of use to the existing building, converting the eight-storey tower office accommodation (second to sixth floors) into 45 studio apartments for students, with the ground floor and first floor to be developed as a gym, takeaway food and drink unit, residence lounge, study area and entrance.

Currently, the basement level is occupied by parking, delivery drop off, plant and refuse, which will remain unchanged. There will be no new additional car parking spaces, however cycle parking at the rate of one storage unit per apartment will be provided in the basement.

1.1 Scope of Assessment

In setting the scope of assessment, consideration has been made of the potential for effects to occur during both the construction and operation phases of the development. Evaluation of the proposals within the wider context of West Yorkshire Low Emissions Strategy (WYLES) Air Quality & Emissions Technical Planning Guidance indicated that the proposed development was classified as 'Minor'. This is because the C3 element of the proposals contains less than 50 residential units, therefore the development does not meet the threshold criteria for Transport Assessment. As such, the WYLES technical guidance document requires assessment of relevant exposure and implementation of practical mitigation measures supported by the National Planning Policy Framework (NPPF). These should include adoption of an agreed protocol to control emissions during the construction phase, suitable allocation of electric vehicle charging points (where appropriate) and general provision of wider mitigation measures (Appendix A).

1.1.1 Construction

The proposed development does not involve any significant demolition activities. It is anticipated that the construction stage will take up to twelve months, and this is assumed to include limited construction, earthworks and trackout activities. The potential for air quality effects during the construction phase has been assessed, and the extent of mitigation required for dust/ Particulate Matter (PM₁₀) generated by construction activities has been considered.

Machinery used during construction can generate new sources of emissions, as well as traffic movements to/from the site and the works themselves. When assessing the effect of dust emissions generated during construction works, receptors include those nearest to the construction boundary of the site in each direction. These receptors have the potential to experience effects of greater magnitude due to emissions of dust generated by the works, when compared with more distant receptors.

Without appropriate mitigation controls in place, there is the potential for adverse effects to occur during the construction of the proposed development. The implementation of best practice mitigation controls can ensure any potential adverse effects would be not significant.

Best practice mitigation controls have been identified in accordance with the IAQM guidance, Guidance on the Assessment of Dust from Demolition and construction v1.1 (2016).

1.1.2 Operation

During the development's operation, consideration has been made of the potential emissions from road traffic generation as any additional traffic increase on local roads has the potential to effect concentrations of NO₂ and PM₁₀.

The final development designs will include some combustion plant used for heating and supply of hot water. This will be provided by a natural gas fired modular boiler system. Emissions from the boiler plant may have the potential to affect air quality at existing residential properties as well as future occupants of the proposed development. However, as final details of the boiler system are yet to be confirmed, combustion plant emissions have been scoped out of the current assessment. However, potential impacts may need to be addressed during subsequent phases of the

planning process once final details are confirmed.

Potential exposure of future occupants of the site and nearby residential receptors was also considered in accordance with the IAQM Planning Guidance. It has been assumed that the operation phase of the development will commence in 2020.

1.2 Study Area

Ramsden House is an existing eight-story building comprising retail and office accommodation and is located within Huddersfield Town Centre adjacent to the Huddersfield Conservation Area. It is bounded by Ramsden Street to the north, Corporation Street to the East, Princess Street to the south and New Street to the West. The surrounding land use is mainly retail and commercial, and the University of Huddersfield campus is located 200m to the east of the site.

The site is accessed for vehicular traffic off the A62 Queensgate Ring Road via Alfred Street and Princess Street, with the entrance level off Corporation Street to the east of the site.

A location plan is provided in Figure 1.

Figure 1 Location of the Development Site (Courtesy of Google Maps)



2.0

Legislation, Policy and Guidance

2.0 Legislation, Policy and Guidance

2.1 Key Legislation and Policy

This assessment considers key air quality legislation, which is summarised in Table 1.

Table 1 Key Legislation

Legislation	Description
EU Ambient Air Quality Directive 2008/50/EC	Establishes the requirements of Member States in terms of improvements required to air quality. Sets standards for a variety of pollutants for human-health and the environment.
The Air Quality Standards Regulations 2010	Transposes formalised EU Limit Values set out in directive 2008/50/EC to UK law.
The Clean Air Quality Strategy 2019	The Clean Air Strategy sets out the case for action and demonstrates the government's determination to improve air quality. In some cases, the goals are even more ambitious than EU requirements to reduce people's exposure to toxic pollutants like nitrogen oxides, ammonia, particulate matter, non-methane volatile organic compounds and sulphur dioxide.
Environment Act 1995, Part IV	Defines the requirements for Local Air Quality Management (LAQM).
Environment Protection Act 1990, Amended by the Pollution Prevention and Control Act 1999	Part III provides statutory nuisance provisions for nuisance dust.

Relevant planning policy is also considered at the National, Regional, and Local levels as summarised in Table 2.

Table 2 Key Policy and Guidance

Policy	Description
National Planning Policy Framework (NPPF) 2018	Paragraph 181 of the NPPF 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 AQMAs 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 AQMAs and Clean Air Zones is consistent with the local air quality action plan".
Defra LAQM Technical Guidance 2016 (2018)	The guidance issued under Part IV of the Environment Act 1995 is designed to help local authorities with their LAQM duties. The guidance sets out the general approach to use and detailed technical guidance to guide local authorities through the Review and Assessment process.

Policy	Description
EPUK/IAQM Land Use Planning & Development Control (2017)	This guidance has been produced to ensure that air quality is adequately considered in the land use planning and development control processes by relevant officers within local authorities, developers, and consultants involved in the preparation of development proposals and planning applications. This document is best practice guidance and has no formal or legal status.
Environmental Protection UK (EPUK) / IAQM Assessment of Dust from Demolition and Construction (2016)	The document provides guidance for developers, their consultants and environmental health practitioners on how to undertake a construction impact assessment (including demolition and earthworks).
Air Quality Action Plan 2019-2024: Kirklees Council (June 2019).¹	Provides an implementation plan and timescales for the implementation of broad actions to reduce levels of NO ₂ and other pollutants within the metropolitan borough of Kirklees. Actions AQMA9.1-9.10 provide specific focus on the improvement of air quality in Huddersfield Town Centre.
Kirklees Air Quality Strategy (2007)²	This strategy outlines the approach Kirklees takes for: ▪ Achieving and maintaining good air quality in Kirklees; ▪ Informing other strategies and developing plans where air quality is a linking theme; ▪ Identifying the responsibilities of different stakeholders; ▪ Providing a framework for decisions about development proposals where air quality should be considered at an early stage; ▪ Setting out the approach to development control (planning applications) where air quality is a material consideration; ▪ Highlighting initiatives involving the Council demonstrating best practice for minimising pollution
Kirklees Local Plan- Strategies and Policies 2013 to 2031 (Adopted February 2019)	POLICY LP15 Residential Use in Town Centres Proposals for residential uses (including student accommodation) within the defined town centres as set out on the Policies Map will be supported subject to: ...d. the protection of the amenity of existing residents and future occupiers of the proposed residential use in accordance with amenity and design policies within the plan, and will in particular consider matters such as privacy, noise and air quality; Policy LP20 Sustainable travel ...The council will support demand management measures which discourage single occupancy car travel within new development and encourage the use of low emission vehicles to improve areas with low levels of air quality. Proposals should include measures to encourage the use of sustainable travel options, including public transport, the promotion of personal journey planning, walking, cycling, car sharing, electronic communication and home working.

¹ Currently in draft form. Consultation period continues until July 2019. See <https://www.kirklees.gov.uk/beta/crime-and-safety/air-quality-action-plan-consultation.aspx>. Accessed 25th June 2019.

² To be revised following adoption of AQAP.

Policy	Description
West Yorkshire Low Emission Strategy 2016 to 2021	This document examines West Yorkshire's economic and transport plans, energy and land use policies and promotes opportunities to encourage sustainable travel modes.
West Yorkshire Low Emission Strategy (WYLES) Air Quality Emissions Planning Technical Guidance (2014).	This guidance aims to define the meaning of "sustainable" in air quality terms and to simplify the approach to dealing with air quality within the planning system.

The air quality EU limit values and UK AQO which apply to the development are shown in Table 3, and these will be used as the basis of assessment.

Table 3 AQO and EU Limit Values

Pollutant	Averaging Period	Objective Threshold / EU Limit Value ($\mu\text{g}/\text{m}^3$)
Nitrogen Dioxide (NO_2)	Annual mean	40
	1-hour mean	200 Not to be exceeded more than 18 times per year (equivalent to the 99.79th percentile of 1-hour mean values)
Particulate Matter (PM_{10})	Annual mean	40
	24-hour mean	50 Not to be exceeded more than 35 times per year (equivalent to the 90.4th percentile of 24-hour mean values)
Particulate Matter ($\text{PM}_{2.5}$)	Annual mean	25

Previous research carried out on behalf of Defra identified that exceedances of the NO_2 1-hour mean are unlikely to occur where the annual mean is below $60 \mu\text{g}/\text{m}^3$. This assumption is still considered valid; therefore, Defra's Technical Guidance document, LAQM.TG (16) confirms that this figure can be referenced where 1-hour mean monitoring data are not available (typically if monitoring NO_2 using passive diffusion tubes).

3.0

Approach and Methodology

3.0 Approach and Methodology

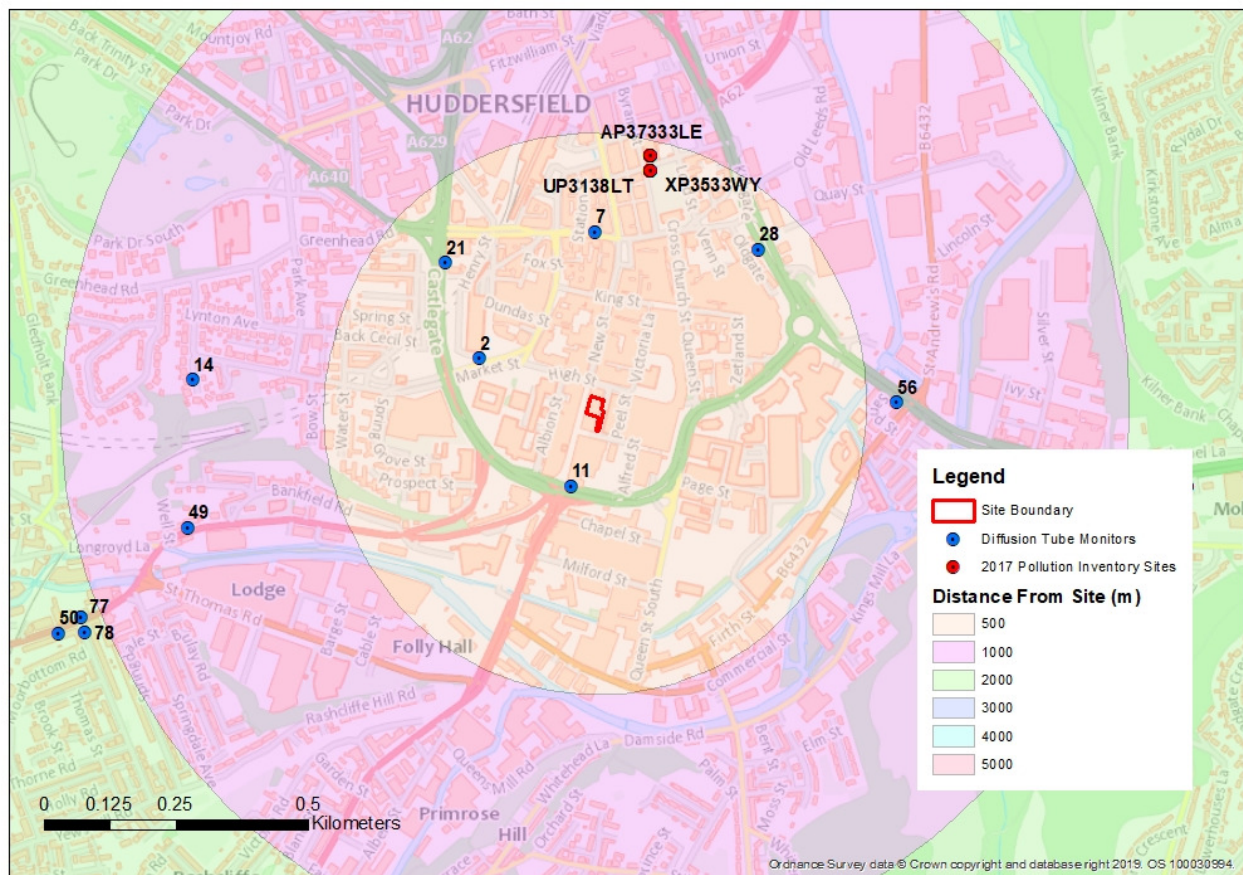
3.1 Existing Conditions

Existing sources of emissions within the study area have been defined using several approaches. Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register and the Environment Agency's Pollution Inventory Data. Local sources have also been reviewed through examination of the Council's Air Quality Review and Assessment reports.

Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. This covers both the study area and nearby sites; the latter being used to provide context for the assessment. Background concentrations have been defined using the national pollution maps published by Defra. These cover the whole country on a 1x1 km grid. Comparison of the mapped background concentrations with those measured at background locations in Warwick indicate that the use of monitored data is generally more conservative.

The location of the site in relation to local monitoring sites and industrial permitted processes is illustrated in Figure 2.

Figure 2 Local Monitoring Sites and Industrial Permitted Processes



3.2 Construction Phase

The impact of anticipated construction activities has been assessed in accordance with IAQM guidance. The construction phase assessment considers the anticipated physical activities occurring on-site that are likely to result in the generation of dust which gives rise to impacts on dust soiling and human-health, especially through the generation of PM₁₀ and PM_{2.5}.

The assessment involves the identification of whether each phase of on-site activity (demolition, earthworks, construction, and trackout) represents a low, medium, or high risk of causing a significant effect and then identifies suitable mitigation measures for the relevant level of risk assigned. Details of the IAQM construction impact assessment procedure are presented in Appendix B.

3.3 Operation Phase

3.3.1 Road Traffic Emissions

3.3.1.1 Comparison Against IAQM Criteria

IAQM's guidance note 'Land-Use Planning & Development Control: Planning for Air Quality' (updated in January 2017) was issued to ensure that air quality is adequately considered in the land-use planning and developmental control process. Full details are provided in Appendix C.

The guidance includes a method for screening the requirement for an air quality assessment, the undertaking of an air quality assessment, the determination of the air quality impact associated with a development proposal and whether this impact is significant. Interpretation of this guidance was used to develop a methodology for the assessment of road impact emissions.

3.3.1.2 Assessment Methodology

The Transport Statement prepared in support of the planning application states that the application site is highly sustainable, being located within easy walking distance of the bus and train stations, and the facilities of the town centre. Unlike the occupiers of the existing office space, the student residents will have no need to own cars due to the proximity of the University campus. Hence the impact of the scheme will be positive, leading to a reduction in traffic congestion and associated pollution. Cycle parking will be provided, but car parking will not be required.

On this basis, it is assumed that there will be a net reduction in development trips, therefore the impact of traffic related emissions has been scoped out of the air quality assessment.

3.3.2 Human Exposure

A desktop air quality assessment of the impacts of the local area's emissions on the proposed development itself was undertaken to determine the exposure that occupants of Ramsden House might experience during the operation phase.

The current/baseline conditions were established qualitatively by reviewing air quality information relating to that is readily available from Kirklees Council, including Review and Assessment Reports, historic monitoring data and information generated for the Detailed Assessment contained within the latest revision of the AQAP. These data were used to understand current and future baseline pollutant concentrations at receptors within the study area, and the risk that any changes in air quality may cause exceedance of AQOs at these locations.

Where assumptions have been made, a realistic conservative approach has been adopted.

4.0

Site Description and Baseline Conditions

4.0 Site Description and Baseline Conditions

To assess the significance of any new development proposal (in terms of air quality), it is necessary to identify and understand the baseline air quality conditions in and around the study area. This provides a reference against which any potential changes in air quality can be assessed. Since air quality is predicted to change in the future (mainly because of changes to vehicle emissions), the baseline situation is extrapolated forward to the opening year. The future baseline scenario is the predicted baseline for the opening year.

To identify the existing air quality conditions, a review of publicly available information has been undertaken, including the latest local authority air quality reports, monitoring data, and background concentration maps. This section presents the results of the review.

4.1 Local Air Quality Management

The proposed development is located within Kirklees AQMA No. 9 covering Huddersfield Town Centre (declared for exceedances of the annual mean NO₂ AQO).

The baseline assessment includes a brief review and summary of Kirklees Council's LAQM Annual Status Report (ASR). The 2018 ASR concluded that the main air quality issues within Kirklees are focused around the road network connecting the towns, and traffic which passes between the West Yorkshire conurbation along the M62 and Greater Manchester.

There are currently 9 AQMAs declared in the district, including the one for Huddersfield Town Centre which came into effect in November 2011.

Current 5-year trends for NO₂ indicate that the levels fell significantly between 2012 & 2013 within the Kirklees District, but since that time concentrations have stagnated for 3 years around 45 to 40 µg/m³, which indicates further work is required in addition to improvements in vehicle engine technology and fleet turnover in order to bring about compliance.

An updated draft AQAP, which encompasses all nine AQMAs, was updated in June 2019 and is currently under consultation.

There are currently no AQMAs declared for PM₁₀ exceedances in Kirklees.

4.2 Local Sources of Pollution

A review of data held by the Environment Agency indicated that four industrial pollution sources are located within 0.5km of the proposed development site boundary. Relevant information is summarised in Table 4.

Table 4 Industrial Sources Within 5km of Site

Site	Activity Details	Activity Type	Potential Pollutant Emissions	Permit Reference	Distance from Site
Lubrizol Ltd	Organic chemicals; oxygen containing compounds e.g. alcohols	A1	Carbon Monoxide, Nitrogen Oxides (NO and NO ₂ as NO ₂), Non-methane volatile organic compounds, Particulate Matter, Sulphur Oxides (SO ₂ and SO ₃) as SO ₂ , Carbon Dioxide	AP37333LE	450m NE
Syngenta	Plant health and biocides; producing plant health products/biocides	A1	Carbon Monoxide, Nitrogen Oxides (NO and NO ₂ as NO ₂), Particulate Matter, Sulphur Oxides (SO ₂ and SO ₃) as SO ₂ , Carbon Dioxide, Non-methane volatile organic compounds, Hydrofluorocarbons, Chlorofluorocarbons, Hydrogen Cyanide, chlorine compounds (as HCl)	UP3138LT	450m NE

Site	Activity Details	Activity Type	Potential Pollutant Emissions	Permit Reference	Distance from Site
Engie FM Ltd	Combustion; any fuel =>50mw	A1	Carbon Monoxide, Nitrogen Oxides (NO and NO ₂ as NO ₂), Particulate Matter, Sulphur Oxides (SO ₂ and SO ₃) as SO ₂ , Carbon Dioxide	WP3633CS	450m NE
Arch Timber Protection Ltd	Inorganic chemicals; salts e.g. ammonium chloride and associated processes	A1	Ammonia, Non-Methane Volatile Hydrocarbons	XP3533WY	450m NE

Emission of pollutants from these processes is regulated by the Environment Agency under the Environmental Permitting regime. Emissions to air are monitored and controlled in accordance with the respective permit requirements.

4.3 Local Air Quality Monitoring

Kirklees Council operates a network of automatic monitors and diffusion tube monitoring sites. The closest monitoring points are located within a 500m radius to the north and south of the site. These include three roadside diffusion tube sites, one urban centre site and one located at the bus station.

Table 5 summarises the NO₂ concentrations recorded at the sites between 2013 and 2017.

All sites show a general downward trend in NO₂ concentrations over this period, apart from site 52 on the Ring Road, where values have increased from 51.8 µg/m³ to 55.9 µg/m³ NO₂ between 2013 and 2017.

Site 11 is the most representative of roadside conditions near to the site. Values reduced from 42.4 µg/m³ to 36.5 µg/m³ NO₂ between 2015 and 2017.

There is one urban centre diffusion tube (No. 7) located 400m north of the proposed development; monitored NO₂ concentrations reduced from 46.3 µg/m³ to 35.4 µg/m³ NO₂ between 2013 and 2017.

No continuous monitors were available in the local area to assist in the evaluation of PM₁₀ concentrations.

Table 5 Local Air Quality Monitoring

Site ID	Address	Site Type	Distance from Site	Annual Mean Concentration* (µg/m ³)				
				2013	2014	2015	2016	2017
2	Bus Station - Huddersfield	Other	240m NW	43.4	45.0	46.7	41.6	42.3
7	Westgate Huddersfield	Urban Centre	400m N	46.3	42.8	44.8	38.8	35.4
11	Chapel Hill Huddersfield	Roadside	150m SW	41.2	41.6	42.4	37.8	36.5
21	Castlegate Huddersfield	Roadside	400m NW	45.2	43.9	44.9	45.1	40.1
28	Ring Road Huddersfield	Roadside	430m NE	51.8	49.0	54.7	53.1	55.9

4.4 Defra's Background Pollutant Concentration Mapping

Defra background maps indicate that background pollutant concentrations around the proposed development are below the respective annual mean objective thresholds for NO₂, PM₁₀, and PM_{2.5}. Details of background concentrations are shown in Table 6.

Table 6 Defra's Background Concentrations

Pollutant	Grid Reference	2017 Annual Mean ($\mu\text{g}/\text{m}^3$)	2018 Annual Mean ($\mu\text{g}/\text{m}^3$)
NO ₂	414500, 416500	22.9	22.1
PM ₁₀		12.3	12.1
PM _{2.5}		8.2	8.1

Background concentrations of NO₂, PM₁₀, and PM_{2.5} are currently within the objective thresholds and it is anticipated that they should improve over time due to the expected reduction in emissions from all emission sources.

4.5 Sensitive Residential Receptors

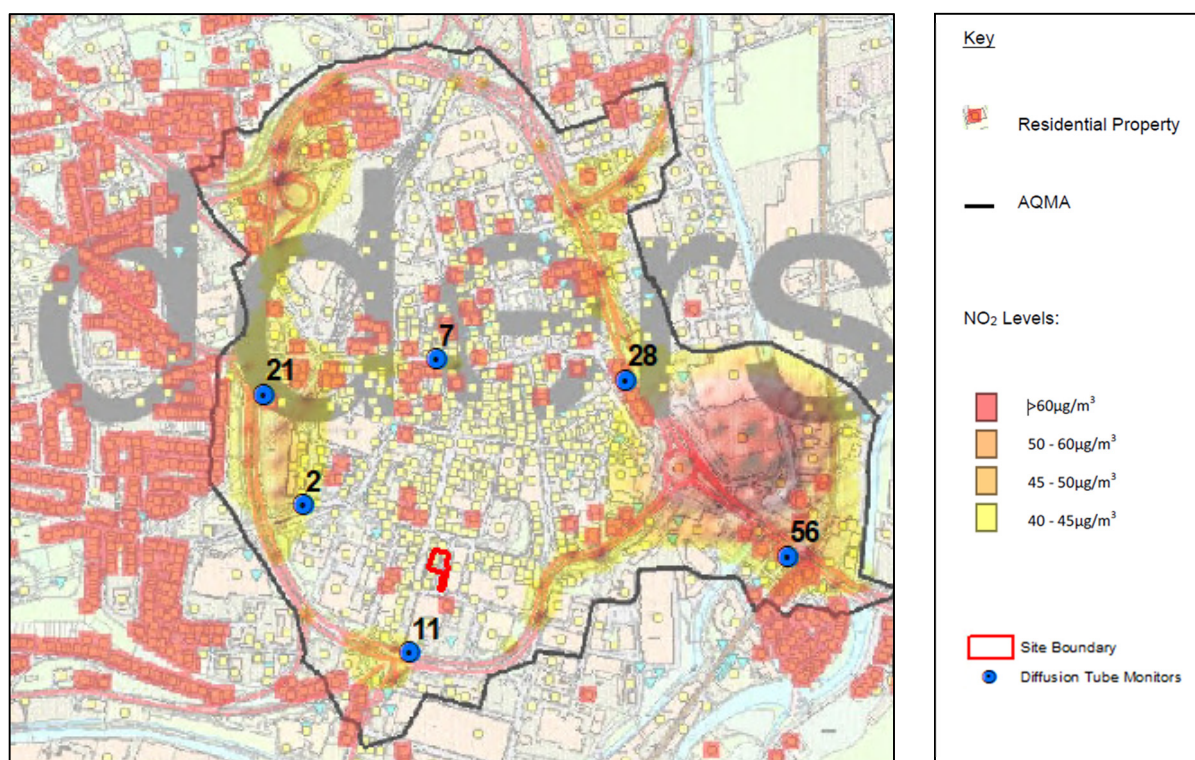
Sensitive residential receptors near the development were identified with reference to mapping data provided by Ordnance Survey and Kirklees Council's LAQM documents.

Sensitive residential receptors are located within 350 m of the red line boundary and within 50 m of the carriageway on the main approach routes to the site.

4.6 Other Local Authority Data

The latest revision of the Kirklees AQAP³ contains a Detailed Assessment of air quality within Huddersfield Town Centre. Map C2.6 illustrates 2015 Modelled data for AQMA No.9 and is reproduced in Figure 3, which also indicates the position of the development site in relation to the AQMA, local monitoring sites and residential receptors. The map indicates that NO₂ concentrations at the site are below 40 $\mu\text{g}/\text{m}^3$ NO₂.

Figure 3 Huddersfield Town Centre Air Quality Modelling Reproduced from Latest AQAP Revision



³ AQAP Currently in draft form. Consultation period continues until July 2019. See <https://www.kirklees.gov.uk/beta/crime-and-safety/air-quality-action-plan-consultation.aspx>. Accessed 25th June 2019.

5.0

Evaluation

5.0 Impact Evaluation

5.1 Construction Phase Impacts

5.1.1 Need for a Detailed Assessment

An assessment was undertaken as there are 'human receptors' within 350 m of the boundary of the site; and 50 m of the route used by construction vehicles on the public highway, up to 500 m from the site entrance.

5.1.2 Risk of Dust Impacts Assessment

Dust Emission Magnitude Analysis

The dust emission magnitude is based on the scale of the anticipated work and classified as Table 7 below:

Table 7 Determination of the potential dust emission magnitude

Stage	Relevant Definition	Highest Potential Dust Emission Magnitude
Demolition	1. Assume that no significant demolition works are required	N/A
Earthworks	2. Minimal earthworks required, and worse case estimated site area is still <2,500 m ² 3. Soil is freely draining/loamy 4. Formation of stockpile enclosures <4 m in height 5. <5 heavy earth moving vehicles active at any one-time	Small
Construction	6. Estimated total building volume less than 25,000 m ³ 7. Mainly internal works with some façade refurbishment	Small
Track out	8. <10 HDV (>3.5 tonnes) outward movements in any one day 9. Surface material with low potential for dust release 10. Unpaved road length < 50m	Small

The highest dust emission magnitude is likely to be Small.

Sensitivity of Areas Analysis

The sensitivity of the receptors and area has been defined for both dust soiling and human-health impact as shown in Table 8.

Table 8 Determination of the sensitivity of the surrounding area

Receptor Sensitivity	Relevant Definition	Sensitivity of the Receptors	Relevant Definition	Sensitivity of the Area
Dust Soiling for Earthworks, Construction, Trackout	Dwellings	High	1-10 receptors within 50 m of site and routes used by construction traffic	Low
Human-Health Effects of PM₁₀ for earthworks, construction, trackout	Dwellings	High	<24 µg/m ³ annual mean PM ₁₀ background concentration for 2017 and 2018 1-10 receptors within 50 m of site and routes used by construction traffic	Low

For the purposes of this assessment, ecological receptors are defined in accordance with the IAQM Guidance document and include RAMSAR sites, Special areas of conservation (SACs), potential SACs, candidate SACs, Special Protection Areas (SPAs), potential SPAs, Sites of Special Scientific Interest (SSSIs).

There are no ecological sensitive receptors within 50 m of the boundary of the site; and within 50 m of the route used by construction vehicles on the public highway, up to 50 m from the site entrance. Therefore, no further consideration of dust impact on ecological receptors has been undertaken.

5.1.3 Risk of Impact

The risk of dust impact to both dust soiling and human-health effects for each construction activities are summarised in Table 9.

Table 9 Risk of Impacts

Potential Impact (Sensitivity of the Area)	Dust Risk (Dust Emission Category)				
	Demolition	Earthworks (Small)	Construction (Small)	Trackout (Small)	Overall Risk
Dust Soiling (low for earthworks, construction and trackout)	n/a	Negligible	Negligible	Negligible	n/a
Human-health (Low)	n/a	Negligible	Negligible	Negligible	n/a
Overall Risk	n/a	Negligible	Negligible	Negligible	Negligible

The dust impact assessment has demonstrated that the risk of dust soiling without any mitigation is negligible for earthworks, construction and trackout.

The risk of adverse human-health effects of PM₁₀ without any mitigation is negligible for earthworks, construction and trackout.

The overall risk of impacts is **Negligible**.

5.2 Operation Phase

5.2.1 Human Exposure

Air quality conditions for future users of the proposed development have been considered below:

- 2015 Modelled data generated by Kirklees Council indicates air quality concentrations at the site are below $40\mu\text{g}/\text{m}^3$ NO_2 .
- Latest monitoring data for the area suggests that air quality concentrations at the site are likely to range between the NO_2 concentrations measured at sites 7 and 11, i.e. 35.4 to $36.5\mu\text{g}/\text{m}^3$ NO_2

As the annual mean nitrogen dioxide concentration is below $60\mu\text{g}/\text{m}^3$, this means that the short-term (1-hour) mean nitrogen dioxide concentration will meet the air quality objective threshold value (see Table 3 with explanatory note).

Defra modelled PM_{10} backgrounds for the site are in the order of $12\text{--}13\mu\text{g}/\text{m}^3$, therefore it is considered unlikely that these will impose any constraints with respect to exposure at the development of the site.

6.0

Mitigation

6.0 Mitigation

6.1 Construction

The primary aim of the dust risk assessment is to identify the appropriate site-specific mitigation measures that will be adopted to ensure there will be no significant effect on local amenity and public health.

Although the site has been identified as low risk with and potential impacts have been identified as negligible, the WYLES planning document recommends the adoption of best practice dust control measures. Full details of suitable mitigation measures are presented in Appendix D.

It is anticipated that the dust generation and harmful emissions from construction site activities will be further reduced with the correct implementation of the best practice methods identified.

6.2 Operation

The allocated parking provision of eight parking/student drop off bays falls below the threshold level required for electric vehicle charging points in the WYLES planning guidance document. However, other operation phase mitigation measures are set out in the supporting Transport Statement and include measures to promote walking, cycling, the use of public transport and initiatives to reduce vehicle use.

As air quality is unlikely to be unconstrained at the development site, no additional mitigation measures are required to protect future occupants of the development from poor air quality.

7.0

Conclusion

7.0 Conclusion

The assessment has demonstrated that air quality at the development site is likely to be suitable for the proposed development, and that the operation phase of the development will not give rise to significant air quality impacts. Following implementation of the best practise mitigation measures proposed within this report, it is concluded that there are no air quality constraints to the proposed development.

8.0

References

8.0 References

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9.0

Glossary

9.0 Glossary

Term/Acronym	Details
$\mu\text{g}/\text{m}^3$	Micrograms (one-millionth of a gram) per cubic metre of air
AADT	Annual average daily traffic
AQAL	Air Quality Assessment Level
AQAP	Air quality action plan
AQMA	Air quality management area. Areas where the air quality objectives are likely to be exceeded. Declared by way of an order issued under the Section 83(1) of the Environment Act 1995.
AQO	Air quality objective. Air quality targets to be achieved locally as set out in the Air Quality Regulations 2000 and subsequent Regulations. Objectives are expressed as pollution concentrations over certain exposure periods, which should be achieved by a specific target date. Some objectives are based on long term exposure (e.g. annual averages), with some based on short term objectives. Objectives only apply where a member of the public may be exposed to pollution over the relevant averaging time.
AQS	Air quality strategy
ASR	Annual status report
CURED	Calculator Using Realistic Emissions for Diesels
Defra	Department for Environment, Food and Rural Affairs
EA	Environment agency
Earthworks	The process of soil stripping, ground-levelling, excavation and landscaping.
EfT	Emission Factor Toolkit
EU	European union
Exceedance	Concentrations of a specified air pollutant greater than the appropriate Air Quality Objective.
GFA	Gross Floor Area
HDV	Heavy duty vehicle
IAQM	Institute of Air Quality Management
LA	Local authority
LAQM	Local air quality management
LAQM, TG	Local air quality management technical guidance
LDV	Light duty vehicle
LES	Low Emission Strategy
Limit Values / EU limit values	The maximum pollutant levels set out in the EU Daughter Directives on Air Quality. In some cases, the limit values are the same as the national air quality objective but may allow a longer period for achieving.
LT	Long-term averaging period (i.e. Annual mean)
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National planning policy framework
NRMM	Non-Road Mobile Machinery
OMP	Odour Management Plan
PM_{10}	The fraction of particulates in air of very small size (less than 10 micrometres).
$\text{PM}_{2.5}$	Fine particles in the (ambient) air 2.5 micrometres or less in size.
Ramsar/ Ramsar site	The Convention on Wetlands of International Importance, called the Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Ramsar sites are wetlands of international importance, designated under the Ramsar Convention.
SAC/ pSAC/ cSAC	Special area of conservation / potential SAC / candidate SAC
SPA / pSPA	Special protection area / potential special protection area

Term/Acronym	Details
SSSI	Site of special scientific interest
ST	Short-term averaging period (i.e. Daily, hourly, or 15-min means)
TC	Transport Consultant
TP	Travel Plan
Trackout	The transfer of dust or dirt on the local road network and then re-suspended by vehicles on the network.
TS	Transport Statement
WY	West Yorkshire

Appendices

Appendix A WYLES Recommended Standard Mitigation Measures for Scheme Sustainability – Type 1

Type 1 standard mitigation measures are:

- **Residential:**
1 charging point per unit (dwelling with dedicated parking) or 1 charging point per 10 spaces (unallocated parking)
- **Demolition/Construction**
Adherence to London Best Practice Guidance for all demolition and construction works

Appendix B IAQM Construction Assessment Methodology

Screening (Step 1)

As 'human receptors' were identified within 50 m of the boundary of the site; and within 50 m of the route(s) to be used by construction vehicles on the public highway, up to 500 m from the site entrance, a detailed risk assessment was undertaken

Dust Emission (Step 2A)

The potential dust emission magnitude for different activities have been defined based on the criteria listed in Table B1.

Table B1 Potential Dust Emission Magnitude Criteria

Stage	Description	Large	Medium	Small
Demolition	Definitions for demolition are:	1. Total building volume >50,000 m ³ 2. Potentially dusty construction material (e.g. concrete) 3. On-site crushing and screening 4. Demolition activities >20 m above ground level	5. Total building volume 20,000 m ³ – 50,000 m ³ 6. Potentially dusty construction material (e.g. concrete) 7. Demolition activities 10 – 20 m above ground level	8. Total building volume <20,000 m ³ 9. Construction material with low potential for dust release (e.g. metal cladding or timber) 10. Demolition activities <10 m above ground, demolition during wetter months
Earthworks	Earthworks will primarily involve excavating material, haulage, tipping, and stockpiling. This may also involve levelling the site and landscaping.	11. Total site area >10,000 m ² 12. Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) 13. >10 heavy earth moving vehicles active at any one-time formation of bunds >8 m in height 14. Total material moved >100,000 tonnes	15. Total site area 2,500 m ² – 10,000 m ² 16. Moderately dusty soil type (e.g. silt) 17. 5-10 heavy earth moving vehicles active at any one-time formation of bunds 4 m – 8 m in height 18. Total material moved 20,000 tonnes – 100,000 tonnes	19. Total site area <2,500 m ² 20. Soil type with large grain size (e.g. sand) 21. <5 heavy earth moving vehicles active at any one-time formation of bunds <4 m in height 22. Total material moved <20,000 tonnes, earthworks during wetter months
Construction	The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s) / infrastructure, method of construction, construction materials, and duration of build.	23. Total building volume >100,000 m ³ 24. On-site concrete batching and sandblasting	25. Total building volume 25,000 m ³ – 100,000 m ³ 26. Potentially dusty construction material (e.g. concrete) 27. On-site concrete batching	28. Total building volume <25,000 m ³ 29. Construction material with low potential for dust release (e.g. metal cladding or timber)

Stage	Description	Large	Medium	Small
Trackout	Factors which determine the dust emission magnitude are vehicle size, vehicle speed, vehicle numbers, geology, and duration. Only receptors within 50 m of the routes used by vehicles on the public highway and up to 500 m from the site entrances are considered to be at risk from the effects of dust.	30. >50 HDV (>3.5 tonnes) outward movements in any one day 31. Potentially dusty surface material (e.g. high clay content) 32. Unpaved road length >100 m	33. 10-50 HDV (>3.5 tonnes) outward movements in any one day 34. Moderately dusty surface material (e.g. high clay content) 35. Unpaved road length 50 m – 100 m	36. <10 HDV (3.5 tonnes) outward movements in any one day 37. Surface material with low potential for dust release 38. Unpaved road length <50 m

Sensitivity of the Area (Step 2B)

The sensitivity of the area takes account of several factors:

1. The specific sensitivities of receptors in the area;
2. The proximity and number of those receptors;
3. In the case of PM₁₀, the local background concentration; and
4. Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table B2 provides guidance on the sensitivity of different types of receptor.

Table B2 Sensitivities of People to Dust Soiling Effects, Health Effects of PM₁₀, and Sensitivities of Receptors to Ecological Effects

Description	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Sensitivities of People to Dust Soiling Effects	- Users can reasonably expect enjoyment of a high level of amenity - The appearance, aesthetics, or value of their property would be diminished by soiling - The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land - Indicative examples include dwellings, museums, and other culturally important collections, medium, and long-term car parks, and car showrooms	- Users would expect a to enjoy a reasonable level of amenity, but would not reasonably expect a to enjoy the same level of amenity as in their home - The appearance, aesthetics, or value of their property could be diminished by soiling - The people or property wouldn't reasonably be expected a to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land - Indicative examples include parks and places of work	- The enjoyment of amenity would not reasonably be expected; or - Property would not reasonably be expected a to be diminished in appearance, aesthetics, or value by soiling - There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land - Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short-term car parks, and roads
Sensitivities of People to the Health Effects of PM ₁₀	- Locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) - Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment	- Locations where the people exposed are workers d, and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). - Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM₁₀, as protection is covered by Health and Safety at Work legislation	- Locations where human exposure is transient. - Indicative examples include public footpaths, playing fields, parks, and shopping streets

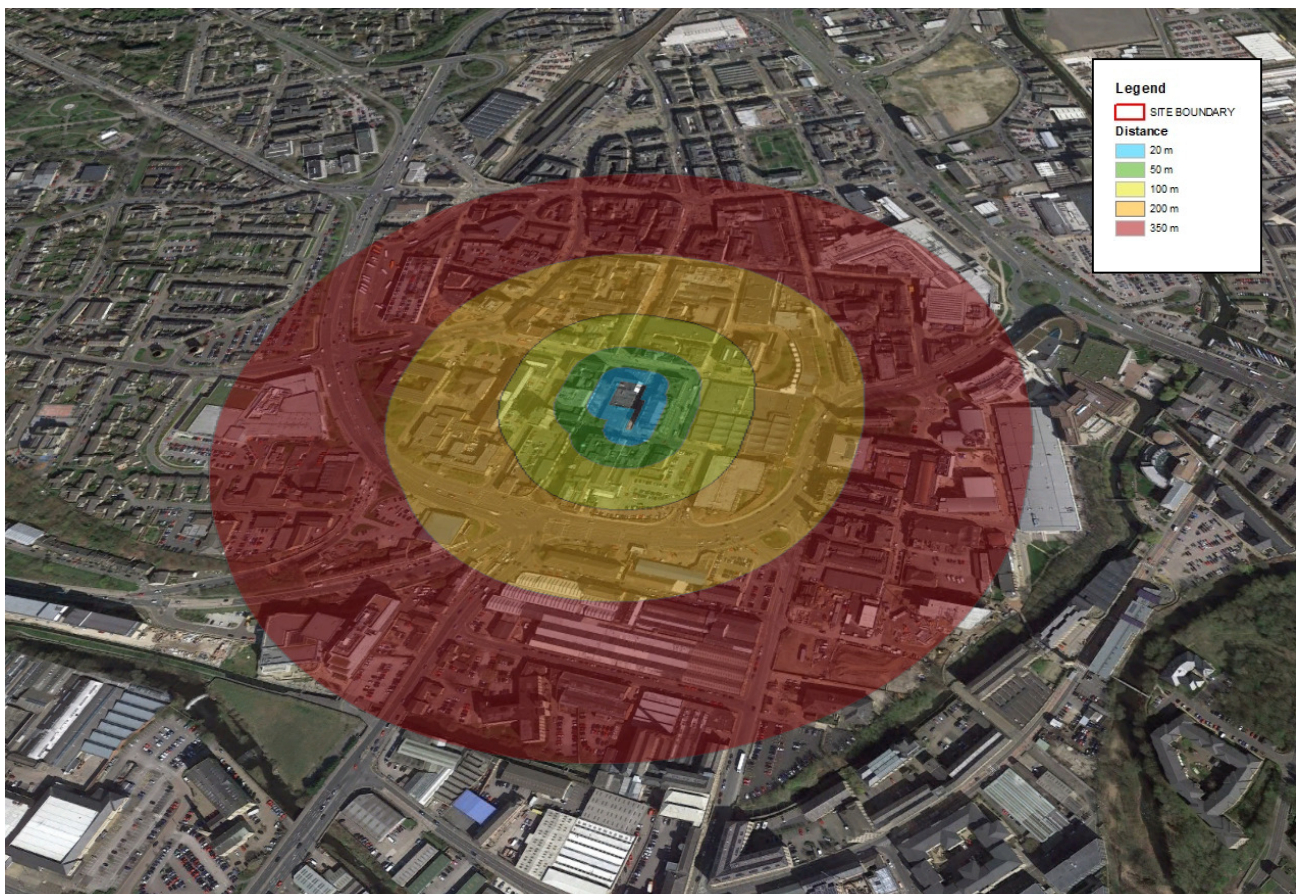
Description	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Sensitivities of Receptors to Ecological Effects	19. Locations with an international or National designation and the designated features may be affected by dust soiling 20. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain 21. Indicative examples include a Special Area of Conservation designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings	22. Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown 23. Locations with a National designation where the features may be affected by dust deposition 24. Indicative example is a Site of Special Scientific Interest with dust sensitive features	25. Locations with a local designation where the features may be affected by dust deposition. 26. Indicative example is a local Nature Reserve with dust sensitive features

Full details of the sensitivities of receptors are provided in the IAQM Guidance document.

Table B3, Table B4, and Table B5 show how the sensitivity of the area has been determined for dust soiling, human-health, and ecosystem impacts respectively.

The distance bandings applied to the site are illustrated in Figure 4.

Figure 4 Construction Dust Buffer Zones (Courtesy of Google Maps)



These tables take account of several factors which may influence the sensitivity of the area. The highest level of sensitivity from each table has been recorded.

Table B3 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table B4 Sensitivity of the Area to Human-Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration (µg/m ³)	Number of Receptors ^d	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<28	>10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

Table B5 Sensitivity of the Area to Ecological Impact

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

The highest level of sensitivity from each table has been recorded. Professional judgement has been used to determine alternative sensitivity categories with consideration of additional factors, such as any pre-existing screening between the source and the receptors, the season during which the works will take place, and duration of the potential impact.

Risk of Impact Definition

The dust emission magnitude (Step 2A) was combined with the sensitivity of the area (Step 2B) to determine the risk of impact with no mitigation applied. Table B6 – Table B9 provide the method of assigning the level of risk of each activity and used to determine the level of site-specific mitigation.

Table B6 Risk of Impact – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	High risk	Low risk	Low risk
Low	Low risk	Low risk	Negligible

Table B7 Risk of Impact – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table B8 Risk of Impact – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table B9 Risk of Impact – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	Medium risk	Low risk	Low risk
Low	Low risk	Low risk	Negligible

Appendix C Results of Screening Assessment

Table C1 Indicative Criteria for Requiring a Detailed Air Quality Assessment

The Development will	Indicative Criteria to Proceed to an Air Quality Assessment	Information Relevant to the Proposed Development
1. Cause a significant change in Light Duty Vehicle (LDV) traffic slows on local roads with relevant receptors.	IAQM Guidance states a change of LDV flows of: - More than 100 AADT within or adjacent to an Air Quality Management Area (AQMA) - More than 500 AADT elsewhere.	No increase in Total traffic flows is predicted
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors.	A Change of HDV flows of: - More than 25 AADT within or adjacent to an AQMA - More than 100 AADT elsewhere.	No increase in HDV flows is predicted
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA	No realignment of >5m proposed
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. Traffic lights, or roundabouts.	No new junctions proposed
5. Introduce or change a bus station.	Where bus flows will change by: - More than 25 AADT within or adjacent to an AQMA - More than 100 AADT elsewhere.	No bus station proposed
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).	No relevant receptors within 20m of development
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.	Typically, any combustion plant where the single or combined NO _x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion.	Final specifications for combustion plant to be confirmed.

Appendix D Mitigation Measures for Construction

Primary measures are those that will be implemented at all times; Secondary measures will be implemented as necessary (in agreement with the local authority), while n/a measures are not required for a given level of risk.

Table D.1 Construction Mitigation Measures- Site Management

Site Management	Low Risk	Medium Risk	High Risk
1. Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary.	Primary		
2. Display the head or regional office contact information.	Primary		
3. Record and respond to all dust and air quality pollutant emissions complaints.	Primary		
4. Make a complaint log available to the local authority.	Primary		
5. Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority.	Primary		
6. Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry, or windy conditions.	Primary		
7. Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.	Primary		
8. Develop and implement a stakeholder communications plan that includes community engagement before work commences on-site.	n/a	Primary	
9. Develop a dust management plan .	n/a	Primary	
10. Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.	n/a		Primary

Table D2 Construction Mitigation Measures- Preparing and Maintaining The Site

Preparing and Maintaining the Site	Low Risk	Medium Risk	High Risk
11. Plan site layout: machinery and dust causing activities will be located away from receptors.	Primary		
12. Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on-site.	Primary		
13. Avoid site runoff of water or mud.	Primary		
14. Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	Secondary	Primary	
15. Keep site fencing, barriers, and scaffolding clean using wet methods.	Secondary	Primary	
16. Remove materials from site as soon as possible.	Secondary	Primary	
17. Cover, seed, or fence stockpiles to prevent wind whipping.	Secondary	Primary	
18. Agree monitoring locations with the local authority.	n/a	Primary	
19. Where possible, commence baseline monitoring at least three months before phase begins.	n/a	Primary	
20. Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.	n/a	Primary	
21. Carry out regular dust soiling checks of buildings within 100 m of site boundary and cleaning to be provided.	n/a	Secondary	Primary

Preparing and Maintaining the Site	Low Risk	Medium Risk	High Risk
22. Install green walls, screens, or other green infrastructure to minimise the impact of dust and pollution.	n/a	Secondary	
23. Provide showers and ensure a change of shoes and clothes are required before going off-site to reduce transport of dust.	n/a		Secondary

Table D3 Construction Mitigation Measures- Operating Vehicle/Machinery and Sustainable Travel

Operating Vehicle/Machinery and Sustainable Travel	Low Risk	Medium Risk	High Risk
24. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone.	Primary		
25. Ensure all non-road mobile machinery (NRMM) comply with the standards set within the SPG.	Primary		
26. Ensure all vehicles switch off engines when stationary – no idling vehicles.	Primary		
27. Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment.	Primary		
28. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	n/a	Secondary	Primary
29. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	n/a	Primary	
30. Impose and signpost a maximum-speed-limit of 10 mph on surfaced haul routes and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority).	Secondary		Primary

Table D4 Construction Mitigation Measures- Operations

Operations	Low Risk	Medium Risk	High Risk
31. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable Dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	Primary		
32. Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water).	Primary		
33. Use enclosed chutes, conveyors, and covered skips.	Primary		
34. Minimise drop heights from conveyors, loading shovels, hoppers, and other loading, or handling equipment, and use fine water sprays on such equipment.	Primary		
35. Ensure equipment is readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	n/a	Primary	

Table D5 Construction Mitigation Measures- Waste Management Activities

Waste Management	Low Risk	Medium Risk	High Risk
36. Reuse and recycle waste to reduce dust from waste materials	Primary		
37. Avoid bonfires and burning of waste materials.	Primary		

Table D6 Construction Mitigation Measures- Earthworks Activities

Measurement Specific to Earthworks	Low Risk	Medium Risk	High Risk
38. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces.	n/a	Secondary	Primary
39. Use Hessian, mulches, or trackifiers where it is not possible to re-vegetate or cover with topsoil.	n/a	Secondary	Primary
40. Only remove secure covers in small areas during work and not all at once.	n/a	Secondary	Primary

Table D7 Construction Mitigation Measures- Construction Activities

Measurement Specific to Construction	Low Risk	Medium Risk	High Risk
41. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	Secondary	Primary	
42. Avoid scabbling (roughening of concrete surfaces) if possible	Secondary		Primary
43. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	n/a	Secondary	Primary
44. For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.	n/a	Secondary	

Table D8 Construction Mitigation Measures- Trackout Activities

Measures Specific To Trackout	Low Risk	Medium Risk	High Risk
45. Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site.	Secondary	Primary	
46. Avoid dry sweeping of large areas.	Secondary	Primary	
47. Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport.	Secondary	Primary	
48. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site).	Secondary	Primary	
49. Record all inspections of haul routes and any subsequent action in a site log book.	Secondary	Primary	
50. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned.	n/a	Primary	
51. Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;	n/a	Primary	
52. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size, and layout permits.	n/a	Primary	
53. Access gates to be located at least 10 m from receptors where possible.	n/a	Primary	
54. Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site.	n/a	Secondary	Primary

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