

PRIMROSE LANE RESIDENTIAL DEVELOPMENT, LIVERSEDGE

**Proposed Residential Development
Air Quality Assessment**

Prepared for: Jones Homes (Yorkshire) Limited

SLR Ref: 410.064882.00001
Version No: v1.0
November 2022

SLR 

BASIS OF REPORT

This document has been prepared by SLR Consulting Limited with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Jones Homes (Yorkshire) Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

CONTENTS

1.0	INTRODUCTION	4
1.1	Scope of Assessment.....	4
2.0	RELEVANT AIR QUALITY LEGISLATION AND GUIDANCE	5
2.1	Legislative Context	5
2.2	Clean Air Strategy.....	6
2.3	General Nuisance Legislation	6
2.4	Planning Policy	7
2.5	Assessment Guidance	9
3.0	ASSESSMENT METHODOLOGY	10
3.1	Construction Phase	10
3.2	Operational Phase.....	11
4.0	BASELINE ENVIRONMENT	12
4.1	Baseline Air Quality	12
5.0	CONSTRUCTION PHASE ASSESSMENT	16
5.1	Construction Dust Assessment	16
6.0	OPERATIONAL PHASE ASSESSMENT	20
6.1	Road Traffic Screening Assessment.....	20
6.2	Site Suitability Assessment.....	20
6.3	Summary.....	21
7.0	MITIGATION MEASURES	22
7.1	Construction Dust	22
7.2	Operational Phase.....	24
8.0	CONCLUSIONS	26
8.1	Construction Phase	26
8.2	Operational Phase.....	26

DOCUMENT REFERENCES

TABLES

Table 2-1 Relevant Ambient AQALs.....	5
Table 2-2 Human Health Relevant Exposure.....	6
Table 4-1 Local LAQM NO ₂ Passive Diffusion Tube Monitoring Sites: Details	12
Table 4-2 Local LAQM NO ₂ Passive Diffusion Tube Monitoring Sites: Results	13
Table 4-3 Defra Mapped Background Pollutant Concentrations	13
Table 4-4 PCM Modelled Annual Mean NO ₂ Concentrations	14
Table 5-1 Potential Dust Emission Magnitude	17
Table 5-2 Sensitivity of the Area	17
Table 5-3 Risk of Dust Impacts (Unmitigated).....	18
Table 6-1 Maximum Generated Road Traffic Flows on the Local Road Network	20
Table 7-1 Construction Dust Mitigation Measures	22

FIGURES

Figure 4-1 KC Monitoring Locations, PCM Road Link, and AQMA Location in Relation to the Site ...	15
Figure 5-1 Construction Dust Assessment Buffers	19

1.0 INTRODUCTION

SLR Consulting Ltd (SLR) has been commissioned by Jones Homes (Yorkshire) Limited to undertake an air quality assessment to appraise a planning application for a residential development of c.67 dwellings (the 'Proposed Development') at land at Primrose Lane, Liversedge (the 'Site').

The Site is located at the approximate National Grid Reference (NGR): x419700, y424115, and is bounded by:

- Primrose Lane to the west with agricultural land beyond;
- National Cycle Network NCN66 to the north; and
- Residential properties to the south and east.

1.1 Scope of Assessment

Pre-assessment consultation with the Environment Health Officer (EHO) at Kirklees Council (KC – the Council)¹ was attempted to agree upon the extent and methodology of the air quality assessment. The following scope of works, as proposed to KC has been undertaken in accordance with national and local guidance as well as established best practice:

- Baseline Evaluation;
- Construction Phase Assessment;
- Operational Phase Assessment; and
- Mitigation Measures.

¹ Consultation e-mail between SLR Consulting Ltd and Rebecca Muff (Environmental Health Officer) at KC, dated 8th November 2022

2.0 RELEVANT AIR QUALITY LEGISLATION AND GUIDANCE

2.1 Legislative Context

2.1.1 Air Quality Standards

The Air Quality Standards Regulations 2010² (AQSR) transpose both the EU Ambient Air Quality Directive (2008/50/EC)³, and the Fourth Daughter Directive (2004/107/EC)⁴ within UK legislation, in order to align and bring together in one statutory instrument the Government’s obligations. The AQSR includes Limit Values, Target Values, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment. Limit values are legally binding and are considered to apply everywhere with the exception of the carriageway and central reservation of roads and any location where the public do not have access (e.g. industrial sites). Compliance is regulated at a national level (based upon a series of zones and agglomerations).

In the interim period the UK has formally left the EU, however despite this, EU rules and regulations referred above have subsequently been written into UK law and are still relevant.

2.1.2 Air Quality Strategy

Irrespective of the above, the UK Government and the devolved administrations are required under the Environment Act 1995 to produce a national air quality strategy to improve air quality. The latest Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland was published in 2007⁵. The AQS provides the over-arching strategic framework for air quality management in the UK and contains national air quality standards and objectives established by the UK Government and Devolved Administrations for the protection of public health and the environment. There is no legal requirement to meet these objectives except where they mirror an equivalent legally binding Limit Value as prescribed within EU legislation, however compliance is regulated by local planning authorities.

The AQS objectives apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period – herein referred to as relevant exposure. Table 2-2 provides an indication of those locations.

The ambient air quality standards of relevance to human receptors in this assessment (collectively termed Air Quality Assessment Levels (AQALs) throughout this report) are provided in Table 2-1.

Table 2-1
Relevant Ambient AQALs

Pollutant	Standard (µg/m ³)	Measured As
Nitrogen Dioxide (NO ₂)	40	Annual mean
	200	1-hour mean (not to be exceeded on more than 18 occasions per annum)
Particles (PM ₁₀)	40	Annual mean
	50	24-hour mean (not to be exceeded on more than 35 occasions per annum)

² The Air Quality Standards Regulations (England) 2010, Statutory Instrument No 1001, The Stationary Office Limited.

³ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

⁴ Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004.

⁵ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Defra. July 2007.

Pollutant	Standard ($\mu\text{g}/\text{m}^3$)	Measured As
Particles (PM _{2.5})	25	Annual mean

Table 2-2
Human Health Relevant Exposure

AQAL Averaging Period	AQALs should apply at	AQALs should not apply at
Annual mean	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

2.1.3 Local Air Quality Management

As reinforced within the AQS, Part IV of the Environment Act 1995 induces a statutory duty for local authorities to undergo a process of Local Air Quality Management (LAQM). This requires local authorities to Review and Assess air quality within their boundaries to determine the likeliness of compliance, regularly and systematically.

Where any of the prescribed AQS objectives are not likely to be achieved, the authority must designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to prepare an Air Quality Action Plan (AQAP), which details measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the objective. AQMAs can give rise to potential constraints to development, or at least a higher degree of scrutiny to air quality assessment work. Local authorities therefore have formal powers to control air quality through a combination of LAQM and through application of wider planning policies.

2.2 Clean Air Strategy

The Clean Air Strategy (CAS)⁶, published in 2019, sets out the Government’s proposals aimed at delivering cleaner air in England, and also indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air.

2.3 General Nuisance Legislation

Part III of the Environmental Protection Act (EPA) 1990 (as amended) contains the main legislation on Statutory Nuisance and allows local authorities and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance.

Fractions of dust greater than 10 μm (i.e. greater than PM₁₀) in diameter typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the UK AQS. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

⁶ The Clean Air Strategy, Defra. January 2019.

2.4 Planning Policy

The following policies have been considered within this assessment.

2.4.1 National Policy

The 2021 update to the National Planning Policy Framework⁷ (NPPF) sets out planning policy for England. The NPPF states that the planning system should contribute to and enhance the natural and local environment, by preventing new development from contributing to or being adversely affected by unacceptable concentrations of air pollution, and development should, wherever possible, help to improve local environmental conditions such as air quality.

In specific relation to air quality policy, the document states:

Chapter 15 - Conserving and Enhancing the Natural Environment

“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.”

The NPPF is accompanied by web based supporting Planning Practice Guidance (PPG) which includes guiding principles on how planning can take account of the impacts of new development on air quality. In regard to air quality, the PPG states:

“The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with relevant Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified.”

“Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.”

The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating that *“Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions) [...] Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact”*.

⁷ National Planning Policy Framework (2021). Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

2.4.2 Local Policy

The Kirklees Local Plan: Strategy and Policies⁸ was adopted in February 2019 and sets out strategic planning policies and development principles for Kirklees until 2031. The following policies within the Local Plan relates to air quality:

“Policy LP21

Highways and access

[...] All proposals shall:

[...] c. be accompanied by a supporting Transport Assessment or Transport Statement where the development would generate significant trip generation, providing detail as to the impact on highway safety, air quality, noise and light restrictions [...];

Policy LP51

Protection and improvement of local air quality

1. Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air pollution which would have an unacceptable impact on the natural and built environment or to people.

2. Proposals that have the potential to increase local air pollution either individually or cumulatively must be accompanied by evidence to show that the impact of the development has been assessed in accordance with the relevant guidance. Development which has the potential to cause levels of local air pollution to increase must incorporate sustainable mitigation measures that reduce the level of this impact. If sustainable measures cannot be introduced the development will not be permitted.

3. Where the development introduces new receptors into Air Quality Management Areas or Areas of Concern or near other areas of relatively poor air quality, for example near roads or junctions, the development must incorporate sustainable mitigation measures that protect the new receptors from unacceptable levels of air pollution. Where sustainable mitigation measures cannot be introduced which prevent receptors from being exposed to unsafe levels of air pollution, development will not be permitted.

Policy LP52

Protection and improvement of environmental quality

Proposals which have the potential to increase pollution from noise, vibration, light, dust, odour, shadow flicker, chemicals and other forms of pollution or to increase pollution to soil or where environmentally sensitive development would be subject to significant levels of pollution, must be accompanied by evidence to show that the impacts have been evaluated and measures have been incorporated to prevent or reduce the pollution, so as to ensure it does not reduce the quality of life and well-being of people to an unacceptable level or have unacceptable impacts on the environment.

Such developments which cannot incorporate suitable and sustainable mitigation measures which reduce pollution levels to an acceptable level to protect the quality of life and well-being of people or protect the environment will not be permitted. [...]”

In addition, KC is currently in the process of reviewing its local Air Quality Strategy (2007)⁹ which will be published after the latest Air Quality Action Plan consultation has been completed.

⁸ Kirklees Council: Kirklees Local Plan Strategy and Policies (2019).

⁹ Kirklees Council: Kirklees Air Quality Strategy (2007).

2.5 Assessment Guidance

This assessment has been carried out in accordance with the following principles contained within the guidance documents below.

- Department for Environment Food and Rural Affairs (Defra): Local Air Quality Management Technical Guidance (LAQM.TG(22))¹⁰;
- Defra: COVID-19: Supplementary Guidance. Local Air Quality Management Reporting in 2021¹¹;
- Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM): Land-Use Planning and Development Control: Planning for Air Quality¹²;
- IAQM: Guidance on the Assessment Dust from Demolition and Construction¹³;
- IAQM: Use of 2020 and 2021 Monitoring Datasets, Position Statement¹⁴; and
- West Yorkshire Low Emissions Group: West Yorkshire Air Quality & Emissions Technical Planning Guidance¹⁵.

¹⁰ Local Air Quality Management Technical Guidance (22), Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland. August 2022.

¹¹ Defra and the Greater London Authority, COVID-19: Supplementary Guidance. Local Air Quality Management Reporting in 2021. April 2021.

¹² EPUK and IAQM, Land-Use Planning and Development Control: Planning for Air Quality, v1.2 2017.

¹³ IAQM, Guidance on the Assessment Dust from Demolition and Construction, v1.1 2016.

¹⁴ IAQM, Use of 2020 and 2021 Monitoring Datasets, Position Statement, Version 1.0, August 2021.

¹⁵ West Yorkshire Low Emissions Group: West Yorkshire Air Quality & Emissions Technical Planning Guidance.

3.0 ASSESSMENT METHODOLOGY

In accordance with the West Yorkshire's Air Quality & Emissions Technical Planning Guidance¹⁵, an air quality assessment is required as the Proposed Development meets one or more of the relevant criteria. With reference to the criteria contained within the guidance document, the Proposed Development is initially classified as 'Medium' given the following:

- 67 residential (C3 land use) dwellings are proposed;
- No additional trigger criteria for major developments are met.

3.1 Construction Phase

A construction dust assessment has been undertaken with reference to IAQM guidance. The assessment of risk is determined by considering the risk of dust effects arising from four activities in the absence of mitigation:

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

The assessment methodology considers three separate dust impacts with account being taken of the sensitivity of the area that may experience these effects:

- Annoyance due to dust soiling;
- The risk of health effects due to an increase in exposure to PM₁₀; and
- Harm to ecological receptors.

The first stage of the assessment involves a screening to determine if there are sensitive receptors within threshold distances of the Site activities associated with the construction phase of the scheme. A detailed assessment is required where a:

- Human receptor is located within 350m of the Site, and/or within 50m of routes used by construction vehicles, up to 500m from the Site entrance(s); and/or
- Ecological receptor is located within 50m of the Site, and/or within 50m of routes used by construction vehicles, up to 500m from the Site entrance(s).

The dust emission class (or magnitude) for each activity is determined on the basis of the guidance, indicative thresholds and professional judgement by a technically competent assessor. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the appropriate mitigation requirements, whereby through effective application, residual effects are considered to be 'not significant'.

Given the short-term nature of the construction phase and the comparatively low volume of vehicle movements that will likely arise (when compared to the operational phase, for which a full assessment has been undertaken), it is unlikely that significant air quality effects from development related road traffic emissions during the construction phase will arise. Such potential effects have therefore been scoped out from requiring detailed assessment based on their assumed insignificant impact.

3.2 Operational Phase

3.2.1 Road Traffic Screening Assessment

The assessment of air quality effects in relation to development-generated traffic during the operational phase has been undertaken qualitatively, in accordance with EPUK & IAQM guidance.

The EPUK & IAQM guidance provides a series of indicative screening criteria where, if exceeded, should consequently require a detailed assessment. If the Proposed Development is found not to exceed any of the relevant indicative criteria presented, then a detailed impact assessment is consequently not required. Effects are therefore believed to be insignificant.

Vehicle trips are expected to travel south along Darley Road (not within an AQMA) towards A649 Halifax Road. As such, the EPUK & IAQM screening thresholds of relevance to this assessment are as follows:

- Not within or adjacent to an AQMA:
 - A change of LDV flows of more than 500 AADT; and/or
 - A change of HDV flows of more than 100 AADT.

Traffic data used for the purposes of the screening assessment has been provided by Vectos – the appointed transport consultant for the scheme.

3.2.2 Site Suitability Assessment

A site suitability assessment is required to assess the likely exposure that future residents associated with the Proposed Development may experience, to ensure the Site is suitable for residential use. As per the EPUK & IAQM guidance, the site suitability assessment is required to consider:

- The background and future baseline air quality and whether this will be likely to approach or exceed an AQAL;
- The presence and location of an AQMA as an indicator of local hotspots where the AQALs may be exceeded;
- The presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular NO₂), that would cause unacceptably high exposure for users of the new development; and
- The presence of a source of odour and/or dust that may affect amenity for future occupants of the development.

A qualitative site suitability assessment has been undertaken, with reference to local monitoring data relative to the AQALs (detailed in Table 2-1), to determine whether further consideration is required.

4.0 BASELINE ENVIRONMENT

4.1 Baseline Air Quality

Monitoring data collected prior to the COVID-19 pandemic (i.e. pre-2020) has been used to characterise the baseline environment, as pollutant concentrations monitored during 2020 and 2021 are expected to be atypical, and not representative of the local environment and have therefore not been considered as per guidance produced by Defra and the IAQM.

4.1.1 LAQM Review and Assessment

KC, in fulfilment of statutory requirements, has conducted an on-going exercise to review and assess air quality within their administrative area. The latest publicly available LAQM report for KC (not impacted by the COVID-19 pandemic) at the time of writing is the 2020 Annual Status Report¹⁶ (ASR). The monitoring data published therein has therefore been used for the purposes of informing this assessment.

KC has declared nine AQMAs within their administrative boundary due to exceedances of the annual mean NO₂ or the 24-hour mean PM₁₀ AQALs. Two areas of concern were identified in 2007, seven further locations in 2016, and one in 2017. Scout Hill AQMA (AQMA 2) has since been revoked due to continuous compliance.

The nearest AQMA with respect to the Site refers to AQMA 7, which corresponds to a designated area of concern due to annual mean NO₂ exceedances in Liversedge. AQMA 7 is located approximately 1.1km east of the Site boundary and refers to the junction incorporating Huddersfield Road (A62), Bradford Road (A638), and Wakefield Road (A638).

4.1.2 Review of Air Quality Monitoring

Automatic Air Quality Monitoring

KC currently undertakes automatic monitoring of pollutants within their administrative area at two locations, with the nearest monitor located >4km southwest of the Site in a roadside location. Given the separation distance and anticipated differences in local environments, no automatic monitoring locations have been considered further.

Passive Diffusion Tube Monitoring

The details and results of the monitoring locations of relevance to the Site (i.e. within 1.4km of the Site) are presented in Table 4-1 and Table 4-2 respectively, whilst their locations are illustrated in Figure 4-1.

Table 4-1
Local LAQM NO₂ Passive Diffusion Tube Monitoring Sites: Details

Site ID	Site Type	NGR (m)		Height (m)	Within AQMA	Distance to Site (km)
		X	Y			
K33	Roadside	420727	423668	2	Yes	1.0
K34	Roadside	420845	423770	2	Yes	1.1
K35	Roadside	420853	423866	2	Yes	1.1
K48	Roadside	421039	423673	2	Yes	1.3

¹⁶ Kirklees Council, 2020 Air Quality Annual Status Report (2020).

Table 4-2
Local LAQM NO₂ Passive Diffusion Tube Monitoring Sites: Results

Site ID	2019 Data Capture %	Annual Mean NO ₂ Concentration (µg/m ³)				
		2015	2016	2017	2018	2019
K33	92	33.7	54.8	42.7	34.3	31.1
K34	100	33.2	54.2	39.5	38.4	33.6
K35	100	38.9	72.4	46.2	44.4	45.3
K48	100	43.8	64.7	47.3	36.1	36.1

As shown in Table 4-2, there have been exceedences of the annual mean NO₂ AQAL (40µg/m³) across the period assessed (2015-2019) at the four nearest locations to the Site (i.e. within 1.4km of the Site). The four sites are in roadside locations within AQMA 7 (Liversedge), where concentrations are expected to be elevated relative to those anticipated at future receptor locations associated with the Proposed Development. These conditions are not considered to be representative of baseline air quality at the Site.

The 2019 annual mean NO₂ concentration recorded at K33, the nearest passive diffusion tube in relation to the Site, is below the annual mean NO₂ AQAL. The 2019 annual mean NO₂ concentrations at the rest of the sites are also below the AQAL, with the exception of K35. Furthermore, three out of the four analysed monitors (K33, K34 & K48) have shown an overall downward trend since 2016, demonstrating local improvements in NO₂ concentrations at roadside locations, correlating somewhat to national projections.

The empirical relationship given in LAQM.TG(22) states that exceedences of the 1-hour mean AQAL for NO₂ is unlikely to occur where annual mean concentrations are <60µg/m³. This indicates that an exceedence of the 1-hour mean AQAL was unlikely to have occurred at two nearest passive diffusion tube locations (K33 & K34) for the period presented and unlikely to have occurred for the other two sites (K35 & K48) on that same period with the exception of the year 2016.

4.1.3 Defra Mapped Background Concentrations

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution which is routinely used to support LAQM requirements and air quality assessments. The data sets include annual average concentration estimates for NO₂, PM₁₀ and PM_{2.5} using a base year of 2018 (the year in which comparisons between modelled and monitoring are made).

Annual mean background concentrations of NO₂, PM₁₀ and PM_{2.5} have been obtained from the Defra published background maps (2018 base year), based on the 1km grid squares which cover the Site. The Defra mapped background concentrations for the base year (2019), and the earliest anticipated predicted Proposed Development opening year (2025) are presented in Table 4-3.

All of the mapped background concentrations presented are well below the respective annual mean AQALs.

Table 4-3
Defra Mapped Background Pollutant Concentrations

Grid Square (X,Y)	Year	Annual Mean Concentration (µg/m ³)		
		NO ₂	PM ₁₀	PM _{2.5}
419500, 424500	2019	15.3	12.0	8.2
	2025	12.4	11.1	7.6
419500, 423500	2019	14.7	11.8	8.0
	2025	11.9	11.0	7.5

Grid Square (X,Y)	Year	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)		
		NO ₂	PM ₁₀	PM _{2.5}
AQAL		40	40	25

4.1.4 Defra’s Pollutant Climate Mapping Model

The PCM model is a collection of models which provides base and future projections of annual mean pollutant concentrations across the UK. The PCM model provides NO₂ concentrations predicted at roadside locations for major roads in the UK. These modelled predictions relate to receptor locations situated 4m from the road at a height of 2m, and therefore exhibit roadside conditions, where concentrations are expected to decline with further distance from the road source – such as those anticipated at the Site by future occupants.

The latest dataset includes semi-empirical roadside annual average concentration estimates for NO₂ using a base year of 2018 (the year in which comparisons between modelled and monitoring are made).

The nearest PCM link to the Site is along the A649 Halifax Rd (Census ID: 802017364), located approximately 150m south of the Site boundary (see Figure 4-1). The 2018 (the latest year of ratified data) and 2025 (the predicted opening year of development) annual mean NO₂ concentrations predicted for this link are presented in Table 4-4. The predicted annual mean NO₂ concentration for 2018 and 2025 is ‘well below’ the AQAL.

Table 4-4
PCM Modelled Annual Mean NO₂ Concentrations

Road Link	Census ID	Predicted Annual Mean NO ₂ Concentration ($\mu\text{g}/\text{m}^3$)	
		2018	2025
A649 Halifax Road	802017364	24.3	17.1

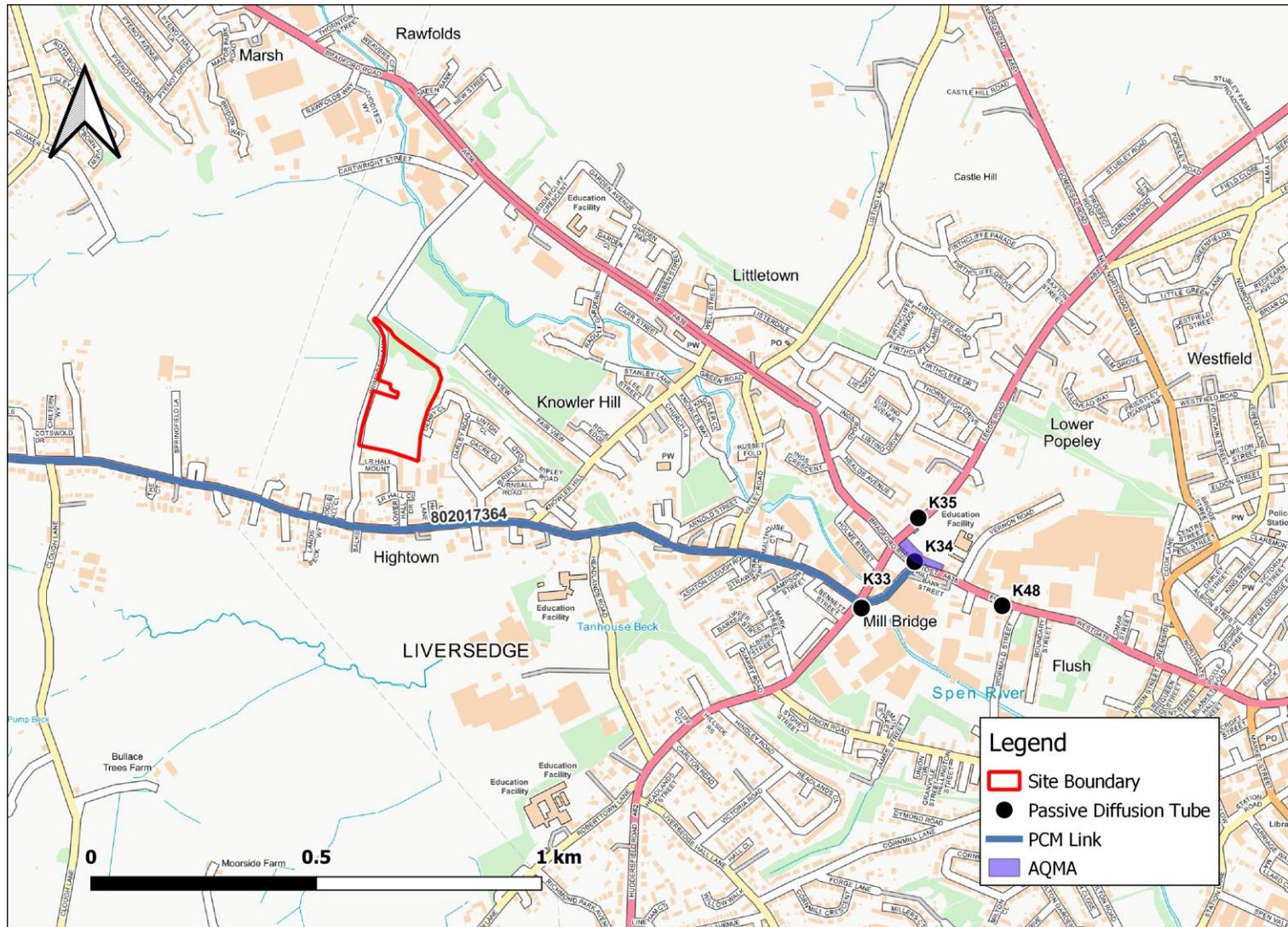


Figure 4-1
KC Monitoring Locations, PCM Road Link, and AQMA Location in Relation to the Site

5.0 CONSTRUCTION PHASE ASSESSMENT

This section presents the potential air quality impacts and effects associated with the construction of the Proposed Development.

5.1 Construction Dust Assessment

Where figures relating to area and volume of the Site, approximate number of construction vehicles or distances to receptors are given, these relate to thresholds as defined in the IAQM guidance to guide the assessor to define the dust emissions magnitude and sensitivity of the area.

5.1.1 Assessment Screening

There are 'human receptors' within 350m of the Site but no designated habitat sites within 50m of the Site boundary or within 50m of the roads anticipated to witness construction traffic movements up to 500m of the Site entrance. Therefore, an assessment of construction dust on human receptors only is required.

5.1.2 Potential Dust Emissions Magnitude

Demolition

The Site is currently comprised of agricultural fields with no structures that require demolition. As such, consideration of impacts associated with demolition activities have been scoped out of the assessment.

Earthworks

The proposals comprise the development of c.67 residential dwellings and associated infrastructure across a total Site area >10,000m². However, due to the typical phased nature of the construction of residential schemes, the total construction area at any given time is not expected to be >10,000m². Furthermore, the use of >10 heavy earth moving vehicles at any one time is unlikely. The dust emission magnitude for earthworks is therefore initially considered to be 'medium'.

Construction

Taking into account the number of proposed dwellings, the total building volume associated with the Proposed Development is predicted to be >100,000m³. However, due to the typical phased nature of the construction of residential schemes, the total building volume associated with the Proposed Development is expected to be between 25,000-100,000m³ at any given time. In addition, the proposed works are likely to include potentially dusty construction material (e.g. brickwork, concrete). The dust emission magnitude for construction is therefore initially considered to be 'medium'.

Trackout

Construction vehicles are expected to access the Site off Darley Road to the east of the Site and travel south towards the A649 Halifax Road. No details are available at the time of assessment on the number of additional HDV movements associated with construction works, however, given the scale and nature of works required, it is expected that outward HDV movements will be >10 but <50 at any given day. In addition, unpaved road lengths are expected to be between 50-100m. As such, the dust emission magnitude for trackout is initially considered to be 'medium'.

Summary

A summary of the potential dust emission magnitude for each of the activities is displayed in Table 5-1.

Table 5-1
Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Earthworks	Medium
Construction	Medium
Trackout	Medium

5.1.3 Sensitivity of the Area

Dust Soiling Impacts

Overall, there are 10-100 residential dwellings (high sensitivity receptors) within 20m of the Site boundary. In addition, there are 10-100 residential dwellings (high sensitivity receptors) within 20m roads anticipated to witness construction traffic up to 200m from the Site entrance (commensurate of a medium site¹⁷) – assuming construction traffic travels south along Darley Road towards the A649 Halifax Road.

The sensitivity of the area with respect to dust soiling effects on people and property in relation to earthworks, construction, and trackout is therefore considered to be ‘high’.

Human Health Impacts

The maximum 2019 mapped background PM₁₀ concentration (2018 base year) from the 1km² grid squares containing the Site is estimated to be 12.0µg/m³ (i.e. falls into the <24µg/m³ class).

Given the above information regarding the number of residential receptors within 20m of the Site and access roads up to 200m from the Site entrance¹⁷, the sensitivity of the area with respect to human health impacts in relation to earthworks, construction and trackout is therefore considered to be ‘low’.

Summary

A summary of the sensitivity of the area defined for each potential impact is displayed in Table 5-2, whereas the spatial densities of receptors discussed in relation to the Site boundary are illustrated in Figure 5-1.

Table 5-2
Sensitivity of the Area

Potential Impact	Sensitivity of Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High
Human Health	Low	Low	Low

5.1.4 Risk of Impacts (Unmitigated)

The outcome of the assessment of the potential ‘magnitude of dust emissions’, and the ‘sensitivity of the area’ are combined in Table 5-3 below to determine the risk of impact which is used to inform the selection of appropriate mitigation.

¹⁷ As per the IAQM’s ‘Guidance on the Assessment of Dust from Demolition and Construction’, without site-specific mitigation, trackout may occur along the public highway up to 500m from large sites, 200m from medium sites and 50m from small sites (determined by the calculated trackout dust emission magnitude), as measured from the site exit.

Table 5-3
Risk of Dust Impacts (Unmitigated)

Potential Impact	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk

5.1.5 Mitigation

Following the construction dust assessment, the Site is found to be at worst ‘medium risk’ in relation to dust soiling effects on people and property and ‘low risk’ in relation to human health impacts (Table 5-3). However, potential dust effects during the construction phase are considered to be temporary in nature and may only arise at particular times (i.e. certain activities and/or meteorological conditions).

Nonetheless, commensurate with the above designation of dust risk, mitigation measures as identified by IAQM guidance are required to ensure that any potential impacts arising from the construction phase of the Proposed Development are reduced and, where possible, completely removed. In accordance with IAQM guidance, providing effective mitigation measures are implemented, such as those outlined in Section 7.1, construction dust effects are considered to be ‘not significant’.



Figure 5-1
Construction Dust Assessment Buffers

6.0 OPERATIONAL PHASE ASSESSMENT

This section presents the potential air quality impacts and effects associated with the operation of the Proposed Development.

6.1 Road Traffic Screening Assessment

Table 6-1 details the maximum road traffic flows generated by the Proposed Development upon the local road network for screening. Traffic data has been provided by Vectos, the appointed transport consultant.

Table 6-1
Maximum Generated Road Traffic Flows on the Local Road Network

Road Link Name	AADT	
	LDVs	HDVs
Darley Road	301	3
<i>EPUK & IAQM Screening Criteria</i>	<i>500</i>	<i>100</i>

The maximum road traffic flows generated by the Proposed Development on the local road network are found to be below the relevant EPUK & IAQM screening thresholds. As such, road traffic impacts associated with the operation of the Site can be considered as having an insignificant effect on local air quality and no further assessment is required.

6.2 Site Suitability Assessment

With reference to information already discussed in Section 4.0, the following has been used to inform the suitability of the Site, relative to its proposed residential use:

- The 2019 annual mean NO₂ concentration recorded at the nearest monitoring locations are below the annual mean AQAL, with the exception of K35. Annual mean NO₂ concentrations at the Site are expected to be lower than concentrations recorded at the monitoring locations due their roadside location within AQMA 7 (Liversedge). These conditions are not considered to be representative of baseline air quality at the Site.
- Defra PCM annual mean NO₂ concentration modelled along the A649 Halifax Road (Census ID 802017364), located approximately 150m south of the Site boundary, was 24.3µg/m³ in 2018 and therefore ‘well below’ the annual mean NO₂ AQAL. Concentrations are predicted to reduce in future years (see Table 4-4 within Section 4.1.4), in recognition of the introduction of policy and cleaner vehicles, with concentrations in 2025 (the earliest anticipated opening year) predicted to be 17.1µg/m³ – ‘well below’ the annual mean NO₂ AQAL;
 - PCM modelled concentrations relate to receptor locations situated 4m from the road at a height of 2m and therefore are representative of roadside concentrations at ground level breathing height. Concentrations are expected to reduce with distance from source (i.e. road traffic emissions). The Site boundary is located 150m away from the A649 Halifax Road, further increasing the separation distance from source to locations of relevant exposure. As such, concentrations at residential receptors are likely to be lower than those predicted within the PCM model.
- Defra mapped background concentrations are ‘well below’ the relevant NO₂, PM₁₀ and PM_{2.5} AQALs for the 1km grid squares containing the Site in 2019 (base year) and 2025 (earliest anticipated opening year); and

- The Proposed Development is expected to generate road traffic volumes below the EPUK & IAQM screening criteria. Consequently, it is considered to have an insignificant impact on local air quality, including future occupants of the Proposed Development.

6.3 Summary

Overall, the findings of the site suitability assessment show the Site is suitable for the proposed residential use, and no further assessment is required. Effects associated with the likely exposure of future occupants in relation to NO₂, PM₁₀ and PM_{2.5} concentrations are considered to be 'not significant'.

7.0 MITIGATION MEASURES

This section presents any proportionate mitigation measures required during the construction and operational phases of the Proposed Development.

7.1 Construction Dust

As discussed in Section 5.0, construction impacts associated to the Proposed Development would result in the generation of dust and PM₁₀.

IAQM guidance outlines a number of Site-specific mitigation measures based on the assessed risk. The measures are grouped into those which are highly recommended and those which are desirable. With the effective application of the dust mitigation measures, as detailed in Table 7-1, residual effects will be ‘not significant’.

**Table 7-1
 Construction Dust Mitigation Measures**

Site Application	Mitigation Measures
Highly Recommended	
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 Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.
Construction	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.
Monitoring	Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
	Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.
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

Site Application	Mitigation Measures
	<p>dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.</p> <p>Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.</p> <p>Use enclosed chutes and conveyors and covered skips.</p> <p>Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.</p> <p>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.</p>
<p>Preparing and Maintaining the Site</p>	<p>Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.</p> <p>Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.</p> <p>Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.</p> <p>Avoid site runoff of water or mud.</p> <p>Keep site fencing, barriers and scaffolding clean using wet methods.</p> <p>Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.</p> <p>Cover, seed or fence stockpiles to prevent wind whipping.</p>
<p>Site Management</p>	<p>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.</p> <p>Make the complaints log available to the local authority when asked.</p> <p>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.</p> <p>Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport deliveries which might be using the same strategic road network routes.</p>
<p>Trackout</p>	<p>Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.</p> <p>Avoid dry sweeping of large areas.</p> <p>Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.</p> <p>Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.</p> <p>Record all inspections of haul routes and any subsequent action in a site log book.</p> <p>Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.</p> <p>Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).</p> <p>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.</p> <p>Access gates to be located at least 10m from receptors where possible.</p>

Site Application	Mitigation Measures
Waste Management Desirable	Avoid bonfires and burning of waste materials.
Desirable	
Construction	Avoid scabbling (roughening of concrete surfaces) if possible.
	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.
	For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
	Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable
	Only remove the cover in small areas during work and not all at once.
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary.
	With respect to operating vehicle/machinery and sustainable travel:
	Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads 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, where appropriate).
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

7.2 Operational Phase

In accordance with the EPUK & IAQM guidance, road traffic impacts associated with the operation of the Site can be considered as having an insignificant effect on local air quality. Furthermore, following a review of available air quality datasets, the Site is found to be suitable for its proposed residential use.

Based on the above outcomes, long-term scheme-specific mitigation measures in relation to operational effects are therefore not considered to be necessary.

Notwithstanding the above, in line with West Yorkshire’s Low Emissions Strategy (WYLES): Air Quality & Emissions Technical Planning Guidance¹⁵, proposals are encouraged to adopt good design principles to minimise emissions and impacts on air quality. Furthermore, proposals classified as ‘Medium’ are required to implement Type 1 and Type 2 mitigation measures as follows:

- One electric vehicle (EV) charging point per unit (dwelling with dedicated parking);
- Travel Plan including an agreed mechanism for discouraging high emission vehicle use and encouraging modal shift (i.e. public transport, cycling and walking), as well as uptake of low emission fuels and technologies;
- Improved pedestrian links to public transport stops;
- New or improved bus stop infrastructure including shelters, raised kerbing and information displays;

- Site layout designed to encourage walking, cycle paths to link to local cycle network; and
- Improved, convenient and segregated cycle paths to link local cycle network.

8.0 CONCLUSIONS

SLR Consulting has been commissioned to undertake an air quality assessment to appraise a planning application for a proposed residential development at Primrose Lane, Liversedge.

8.1 Construction Phase

A qualitative assessment of the potential dust impacts during the construction of the Proposed Development has been undertaken following IAQM guidance.

Following the construction dust assessment, the Site is found to be at worst 'medium risk' in relation to dust soiling effects on people and property, and 'low risk' to human health impacts. Providing effective mitigation measures are implemented, such as those outlined in Section 7.1 of this report, residual effects from dust emissions during the construction phase would be 'not significant'.

Given the short-term nature of the construction phase, there is predicted to be an insignificant effect on air quality from construction-generated vehicle emissions.

8.2 Operational Phase

The Proposed Development is predicted to generate road traffic volumes below the relevant EPUK & IAQM screening criteria on the local road network. As such, road traffic impacts associated with the operation of the Proposed Development can be considered as having insignificant effects on local air quality and no further assessment is required.

A qualitative site suitability assessment has been undertaken to determine the suitability of the Site for its proposed residential use with reference to local air quality datasets. The Site is considered suitable for the Proposed Development without the inclusion of scheme-specific mitigation measures. As such, effects associated with likely exposure of future occupants are considered to be 'not significant'.

Notwithstanding the above, the Proposed Development (classified as a 'Medium' proposal) is required to implement Type 1 and Type 2 mitigation measures in line with the WYLES guidance.

EUROPEAN OFFICES

United Kingdom

AYLESBURY

T: +44 (0)1844 337380

BELFAST

belfast@slrconsulting.com

BRADFORD-ON-AVON

T: +44 (0)1225 309400

BRISTOL

T: +44 (0)117 906 4280

CARDIFF

T: +44 (0)29 2049 1010

CHELMSFORD

T: +44 (0)1245 392170

EDINBURGH

T: +44 (0)131 335 6830

EXETER

T: +44 (0)1392 490152

GLASGOW

glasgow@slrconsulting.com

GUILDFORD

glasgow@slrconsulting.com

LONDON

T: +44 (0)203 805 6418

MAIDSTONE

T: +44 (0)1622 609242

MANCHESTER

T: +44 (0)161 872 7564

NEWCASTLE UPON TYNE

T: +44 (0)191 261 1966

NOTTINGHAM

T: +44 (0)115 964 7280

SHEFFIELD

T: +44 (0)114 245 5153

SHREWSBURY

T: +44 (0)1743 23 9250

STIRLING

T: +44 (0)1786 239900

WORCESTER

T: +44 (0)1905 751310

Ireland

DUBLIN

T: +353 (0)1 296 4667

France

GRENOBLE

T: +33 (0)6 23 37 14 14