MILLER GOODALL
ACOUSTICS AND AIR QUALITY

AIR QUALITY ASSESSMENT

on behalf of

BASILDON BOROUGH COUNCIL (ON BEHALF OF SEMPRA HOMES LTD)

for

CHAPEL GATE, BASILDON

REPORT DATE: 1 APRIL 2021

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Miller Goodall Ltd
Ground Floor
Ashworth House
Deakins Business Park
Blackburn Road
Egerton
Bolton
Lancashire
BL7 9RP

Tel: 01204 596166

www.millergoodall.co.uk

Company registration number 5201673

ANC | ACOUSTICS & NOISE CONSULTANTS

Summary

This air quality report is submitted in support of a planning application for a proposed residential development at Chapel Gate, Basildon.

This report provides a review of existing air quality in the vicinity of the proposed development and its suitability for the proposed use. It also provides a simple assessment of the impact of the proposed development on local air quality during both its construction and operational phases.

The assessment considered whether the proposed development could significantly change air quality during the construction phase. With the implementation of mitigation measures, the dust impacts from the construction are considered to have no residual effects when considered in accordance with IAQM guidance.

Concentrations of NO_2 and PM_{10} are likely to be below their respective long and short-term objectives at the proposed development site which is therefore considered suitable for residential use with regards to air quality. The proposed development is also expected to experience levels of $PM_{2.5}$ below the $PM_{2.5}$ target.

The traffic associated with the proposed development is not expected to have a significant impact on local air quality.

Therefore, there is no reason for this application to be refused on the grounds of air quality.

Prepared By	Melody Horan	Reviewed By	Lesley Goodall
Signed		Signed	
Date	15 March 2021	Date	15 March 2021

Record of changes

Version	Date	Change	Initials
1	15 March 2021	First issue	MH
2	1 April 2021	Change to existing site description and number of proposed dwellings	MH

Contents

1 Introduction

1.1 This air quality report is submitted in support of a planning application for residential development at Chapel Gate, Basildon. The site lies within the administrative boundary of Basildon Borough Council (BBC).

1.2 The report provides a review of the existing air quality in proximity to the proposed development site and assesses the potential impact of the proposed development on local air quality in accordance with Local Air Quality Management Technical Guidance[1].

1.3 Air pollution is generally dominated by emissions from road vehicles. The quantity and composition of vehicle emissions are dependent on the type of fuel used, engine type, size and efficiency, vehicle speeds and the type of exhaust emissions abatement equipment employed.

1.4 The main pollutants of health concern from road traffic exhaust releases are nitrogen dioxide (NO_2) and fine particulates – normally assessed as the fraction of airborne particles of mean aerodynamic diameter less than ten micrometres (PM_{10}) and less than 2.5 micrometres ($PM_{2.5}$), since these pollutants are most likely to approach their respective air quality objectives in proximity to major roads and in congested areas. This assessment has therefore focused on the impact of the proposed development on concentrations of NO_2, PM_{10} and $PM_{2.5}$.

2 Site Description

2.1 The site is located to the east of Basildon town centre and currently consists of a car park and an area of open space.

2.2 Laindon Link, B1007, runs along the northern site boundary, beyond which there are residential dwellings. The A176 and B1007 roundabout is located to the east of the proposed development site. The London, Tilbury and Southend Railway Line runs along the southern site boundary.

2.3 The site location is shown in **Appendix A**.

3 Proposed Development

3.1 The proposed development consists of 233 residential dwellings, 217 of which are apartments and 16 are houses. There will also be 167 car parking spaces associated with the proposed development site, 10 of the parking spaces are wheelchair spaces.

4 Policy Context

4.1 Air Quality Objectives

4.1.1 The standards and objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations 2002; the Air Quality

[1] Department for the Environment Food and Rural Affairs (2018) '*Local Air Quality Management Technical Guidance Document LAQM.TG (16)*', London: Defra.

Standards Regulations 2010 set out the combined Daughter Directive limit values and interim targets for Member State compliance. The UK left the EU on 31st January 2020 and is no longer a member state. However, the current framework of air quality legislation was converted into domestic law through the European Union (Withdrawal) Act 2018[2].

4.1.2 The current air quality standards and objectives (for the purpose of LAQM) are presented in **Table 1**. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health. Pollutant objectives, however, incorporate target dates and averaging periods which take into account economic considerations, practicability and technical feasibility.

Table 1: Air Quality Strategy Objectives (England) for the Purposes of Local Air Quality Management

Pollutant	Air Quality Objective		To be Achieved by
	Concentration	Measured As*	
Nitrogen dioxide (NO_2)	200 µg/m^3	1-hour mean not to be exceeded more than 18 times per year	31/12/2005
	40 µg/m^3	Annual mean	31/12/2005
Particles (PM_{10})	50 µg/m^3	24-hour mean not to be exceeded more than 35 per year	31/12/2004
	40 µg/m^3	Annual mean	31/12/2004
Particles ($PM_{2.5}$)	25 µg/m^3	Annual mean (target) (encouraged in Wales)	2020
	15% cut in annual mean (urban background exposure)		2010-2020

Note:*how the objectives are to be measured is set out in the UK Air Quality (England) Regulations (2000).

4.1.3 Where an air quality objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as Air Quality Management Areas (AQMAs) and take action to work towards meeting the objectives. Following the designation of an AQMA, local authorities are required to develop an Air Quality Action Plan (AQAP) to work towards meeting the objectives and to improve air quality locally.

4.1.4 Possible exceedances of air quality objectives are generally assessed in relation to those locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective.

5 Methodology

5.1 Data Sources

5.1.1 The air quality assessment of the proposed development was undertaken with reference to information from a number of sources, as detailed in **Table 2**.

[2] UK Parliament. (2018): http://www.legislation.gov.uk/ukpga/2018/16/contents/enacted

Table 2: Key Information Sources

Data Source	Reference
Basildon Borough Council (BBC)	BBC (September 2020) *2020 Air Quality Annual Status Report*
Department for Environment Food and Rural Affairs (Defra)	Defra (2018) *Local Air Quality Management Technical Guidance TG(16)*
Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM)	EPUK and IAQM (January 2017) *Land Use Planning and Development Control: Planning for Air Quality (v1.2)*
Defra's LAQM Support Tools	Local Air Quality Management 1 km x 1 km grid background pollutant maps
Institute of Air Quality Management (IAQM)	IAQM (2014) *Assessment of Dust from Demolition and Construction* (v1.1)
Inter-modal Transportation	Traffic Data

5.2 Consultation

5.2.1 Consultation in respect of the scope of this assessment and the methodology to be used was undertaken with Martin Howlett of BBC. Martin requested that the cumulative effects of the developments be considered[3]. In addition to the proposed development at Chapel Gate, three other sites within Basildon will be submitted to planning during a similar timeframe. The dispersion of traffic associated with the four Basildon sites has been reviewed and there are no roads that will be subjected to cumulative development traffic above the IAQM threshold. Martin has agreed to the simple air quality assessment[4].

5.3 Construction Dust Assessment

5.3.1 The IAQM provides guidance[5] on the assessment of air quality impacts arising from construction and demolition activities and has been used in this assessment. The IAQM methodology follows a risk assessment to determine the risk of potential dust impacts of the proposed development on nearby receptor locations during the construction phase and goes on to recommend mitigation measures which should be implemented to reduce the risk of any impact. The methodology for the assessment is shown in **Appendix B.** The study area in relation to construction dust and the buffer zones of <20 m, 20 m – 50 m and 50 – 100 m from the site are shown in **Appendix C**.

[3] Email Miller Goodall Ltd. to Martin Howlett (BBC) 19 January 2021. Emails Martin Howlett (BBC) to Miller Goodall Ltd. 19 January 2021.

[4] Emails Martin Howlett (BBC) to Miller Goodall Ltd. 10 March 2021.

[5] IAQM "Assessment of dust from demolition and construction" v1.1 2014

5.4 Air Quality Assessment

5.4.1 A simple assessment of air quality in terms of the impact of the proposed development on concentrations of NO_2, PM_{10} and $PM_{2.5}$, which relies on already published information and without quantification of impacts, has been completed using sources such as the Local Authority's monitoring network and the Defra LAQM support tools.

6 Baseline Air Quality

6.1 Introduction

6.1.1 Baseline air quality at the proposed development has been established by examining monitoring data produced by BBC and background concentration maps provided by Defra for the grid squares covering the proposed development.

6.1.2 BBC does not have any declared AQMAs.

6.2 Air Quality Monitoring

Nitrogen Dioxide (NO_2)

6.2.1 BBC does not undertake any automatic pollution monitoring. BBC undertake diffusion tube monitoring of NO_2 across its area. There are four diffusion tubes located within 1.0 km of the proposed development site. The results from the diffusion tubes are shown in **Table 3**; the locations of diffusion tubes are shown in **Appendix A**.

Table 3: Annual Mean NO_2 Concentrations Monitored by the LA within the Study Area

Site ID	Location		Annual Mean NO_2 Concentrations (µg/m^3)		
			2017	2018	2019
BA008 (Roadside)	569845	188709	24.92	24.37	22.68
BA009 (Kerbside)	569754	188814	24.53	23.93	23.68
BA010 (Kerbside)	569774	188870	34.09	28.13	29.54
BA017 (Urban Background)	570844	188902	30.22	27.42	25.45
Annual Mean NO_2 air quality objective				40 µg/m^3	

6.2.2 The monitoring results in **Table 3** indicate that annual mean concentrations of NO_2 have been below the NO_2 annual mean objective at these monitoring locations during the monitoring period shown.

6.2.3 The results indicate that the short-term objective for NO_2 is unlikely to be exceeded at the monitoring sites as annual mean concentrations are less than 60 µg/m^3 [1].

Particulate Matter (PM_{10})

6.2.4 BBC does not undertake PM_{10} monitoring.

Particulate Matter ($PM_{2.5}$)

6.2.5 BBC does not undertake $PM_{2.5}$ monitoring.

6.3 Defra Pollution Climate Mapping

6.3.1 Screenshots from the Defra national Pollution Climate Mapping (PCM) website[6] are shown in **Appendix D**. Modelling was not conducted along Laindon Link (B1007). However, it was completed along the A176, as well as the A176 and B1007 roundabout. The screenshots indicate that the roadside levels of NO_2, PM_{10} and $PM_{2.5}$ along the A176 and nearby roundabout are well below the air quality objectives for NO_2 and PM_{10} as well as the $PM_{2.5}$ target.

6.4 Background Concentrations

6.4.1 There is one NO_2 background monitoring location within the study area. Background concentrations of NO_2 and PM_{10} were also obtained from the background concentration maps provided by Defra for the grid squares covering the proposed development and receptor locations[7]. These are shown in **Table 4** below.

Table 4: Background Pollutant Concentrations Obtained for the 1km x 1km Grid Squares Covering the Site and Receptor Locations*

Grid Square	Pollutant	2019 ($\mu g/m^3$)	2022 ($\mu g/m^3$)
569500, 188500 (site)	NO_2	16.00	14.28
	PM_{10}	15.64	14.95
	$PM_{2.5}$	10.55	10.03

** Background concentrations obtained from the latest 2018 based background maps*

7 Construction Dust Impact Risk Assessment

7.1 Step 1 – The Need for a Detailed Assessment

7.1.1 The site boundary is within 350 m of receptors. In addition, there are receptors within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance. Therefore, a detailed assessment of the construction phase of the proposed development was undertaken. Ecological receptors have been scoped out of the construction dust impact risk assessment. Therefore, the detailed assessment has not addressed ecological receptors.

[6] https://uk-air.defra.gov.uk/data/gis-mapping/

[7] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

7.2 Step 2 – Assess the Risk of Dust Impacts

Step 2A Dust Emission Magnitude

7.2.1 The potential dust emission magnitude in relation to the proposed development has been determined using the criteria detailed in **Table 1** in **Appendix B**:

- Demolition: The total building volume to be constructed is <20,000 m^3. The dust emission magnitude for demolition is, therefore, considered to be **small**.
- Earthworks: The total site area is >10,000 m^2. The dust emission magnitude for earthworks is, therefore, considered to be **large**.
- Construction: The total building volume to be constructed is 25,000 m^3 – 100,000 m^3. The dust emission magnitude for construction is, therefore, considered to be **medium**.
- Trackout: It is conservatively assumed that there are likely to be 10 - 50 HDV outward movements in any one day. The dust emission magnitude for trackout is, therefore, considered to be **medium**.

7.2.2 The scale and nature of works onsite were considered to determine the potential dust emission magnitude for demolition, construction, earthworks and trackout activities as outlined in **Table 5**.

Table 5: Dust Emission Magnitudes for Each Activity

Activity	Dust Emission Magnitudes	Justification
Demolition	Small	• total building volume to be demolished is <20,000 m^3
Earthworks	Large	• the site area is >10,000 m^2
Construction	Medium	• total building volume to be constructed is 25,000 m^3 – 100,000 m^3
Trackout	Small	• there are likely to be 10 - 50 HDV outward movements in any one day

Step 2B Sensitivity of the Receptors to Dust Soiling and Health Effects

7.2.3 Human receptors are located in residential houses between 20 - 50 m from construction, demolition and earthworks and 20 m of road edges used by traffic associated with the site construction. Following the criteria in **Table 2** in **Appendix B** and the IAQM guidance, the sensitivity of human receptors to the effects of dust soiling and health effects from construction, demolition, earthwork activities, and from trackout is therefore likely to be **high**.

Step 2B Sensitivity of the Area to Dust Soiling

7.2.4 The sensitivity of the area to dust soiling effects has been determined using the criteria detailed in **Table 3** in **Appendix B:**

- Demolition - sensitivity is considered to be **medium** as demolition activities take place between 20 m - 50 m of 10 - 100 highly sensitivity receptors;
- Earthworks - sensitivity is considered to be **medium** as earthworks activities take place between 20 m - 50 m of 10 - 100 highly sensitivity receptors;
- Construction - sensitivity is considered to be **medium** as construction activities take place between 20 m - 50 m of 10 - 100 highly sensitivity receptors; and

- Trackout activities – sensitivity is considered to be **high** as there are 10 - 100 highly sensitivity receptors within 20 m of roads which relevant vehicles are likely to use that are up to 200 m from the site.

Step 2B Sensitivity of People to the Health Effects of PM_{10}

7.2.5 The background PM_{10} concentrations are shown in **Table 4**. Therefore, local levels of PM_{10} are likely to be <24 µg/m^3, during the construction phase.

7.2.6 Using this information and **Table 4** in **Appendix B**, the sensitivity of human receptors to health impacts from dust and PM_{10} for each activity were defined as:

- Demolition - sensitivity is considered to be **low** as demolition activities take place between 20 m - 50 m of 10 - 100 highly sensitivity receptors and the background PM_{10} concentration is predicted to be <24 µg/m^3;
- Earthworks - sensitivity is considered to be **low** as earthworks activities take place between 20 m - 50 m of 10 - 100 highly sensitivity receptors and the background PM_{10} concentration is predicted to be <24 µg/m^3;
- Construction - sensitivity is considered to be **low** as construction activities take place between 20 m - 50 m of 10 - 100 highly sensitivity receptors and the background PM_{10} concentration is predicted to be <24 µg/m^3; and
- Trackout activities – sensitivity is considered to be **low** as there are 10 - 100 highly sensitivity receptors within 20 m of roads which relevant vehicles are likely to use that are up to 200 m from the site, and the background PM_{10} concentration is predicted to be <24 µg/m^3.

7.2.7 The sensitivity of the area to dust soiling and human health in each activity is summarised **Table 6**.

Table 6: Outcome of Defining the Sensitivity of the Area

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

Step 2C Risk of Impacts

7.2.8 The dust emission magnitude and sensitivity of the area were combined and the risk of impacts determined using the criteria detailed in **Table 6** to **Table 8** in **Appendix B.**

- Demolition – is considered to be **low** risk for dust soiling and **negligible** risk for human health;
- Earthworks – is considered to be **medium** risk for dust soiling and **low** risk for human health;
- Construction – is considered to be **medium** risk for dust soiling and **low** risk for human health; and
- Trackout activities – is considered to be **medium** risk for dust soiling and **low** risk for human health;

7.2.9 A summary of the risks, before mitigation measures are applied, for dust soiling and human health are shown in **Table 7**.

Table 7: Risk of Dust Impacts

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

7.3 Step 3 – Site-Specific Mitigation

7.3.1 Step 3 of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to the site risk for each activity. Good practice mitigation measures highly recommended for the proposed development taken from the IAQM guidance are detailed below.

7.3.2 The general mitigation measures (for site management, preparing and maintaining the site, operating vehicle/machinery, operations and waste management), are appropriate for a site with a 'medium risk' classification (in this instance the site is classified as "medium" risk due to earthworks, construction and trackout)[8]. Mitigation measures specific to demolition, earthworks, construction and trackout are proposed based on the risk classifications in **Table 7**. Recommended mitigation measures are shown in **Appendix E.**

7.4 Step 4 – Determine Significant Effects

7.4.1 The characteristics of the site and the surrounding area suggest that mitigation would not be impracticable or ineffective. With the implementation of the above mitigation measures, therefore, the residual impacts from the construction are considered to be not significant, in accordance with IAQM guidance.

8 Effect of Air Quality on the Proposed Development

8.1 The background concentrations in **Table 3** and **Table 4** show that background concentrations of NO_2 and PM_{10} are well below health-based air quality objectives of 40 µg/m^3 for both pollutants as well as the $PM_{2.5}$ target. However, it is likely that the site is experiencing higher concentrations due to its proximity to the road network.

8.2 All of the diffusion tubes within 1 km of the proposed development site have been below the annual mean objective since 2017. The nearby roadside and kerbside diffusion tubes are located along the A176. Table A2 of the BBC (2020) 2020 Air Quality Annual Status Report shows that all of the monitoring within BBC has been below the annual mean objective since 2015.

8.3 The proposed development site is located on the corner of the B1007 and the A176, adjacent to a roundabout. Therefore, the nearby monitoring is not representative of the conditions at the proposed development site.

[8] For those mitigation measures that are general, the highest risk category should be applied. For example, if the site is medium risk for earthworks and construction, but a high risk for demolition and track-out, the general measures applicable to a high risk site should be applied.

8.4 The screenshots from the Defra PCM website, shown in **Appendix D**, indicate that the levels of NO_2, PM_{10} and $PM_{2.5}$ along the A176 and roundabout adjacent to the site are well below the air quality objectives for NO_2 and PM_{10} as well as the $PM_{2.5}$ target.

8.5 The London, Tilbury and Southend Railway Line runs along the southern site boundary. However, the railway line is not identified within LAQM TG(16) as a relevant railway line. The relevant railway lines listed within LAQMTG(16) are those considered to have heavy traffic of diesel trains. The proposed development is not located within 30 m of any of the identified TG(16) lines.

8.6 The evidence from existing information sources is that the proposed development site is likely to experience levels of NO_2, PM_{10} below the annual mean and short-term objectives as well as the $PM_{2.5}$ target. Therefore, the proposed development site is suitable for residential use.

9 Impact of the Proposed Development on Existing Air Quality

9.1 The site currently consists of a car park and an area of open space. However, it is not currently in active use. The Local Highways Authority (LHA) agree that it could be re-used without the need for planning consent. On that basis, the LHA has agreed that the peak hour traffic movements, which are the critical periods from the perspective of highway network congestion, would likely attract fewer traffic movements for the residential compared to the previous car park, which was in use for commuter parking (i.e., long stay). The car park could also be used for short-term stay and during weekends which would further increase traffic associated with its use.

9.2 The exact AADT associated with the car park cannot be estimated. However, the LHA has agreed with the transport consultant that the proposal would generate no more traffic than the former use.

9.3 The traffic associated with the proposed development is approximately 582 AADT. As the site is for residential use the HDV% is expected to be minimal. Although the overall traffic associated with the proposed development is above the IAQM threshold, upon exiting the site it is expected to disperse and consequently be below the threshold. Furthermore, the proposed development is not expected to cause an increase in traffic above the IAQM threshold when the existing use of the site as a car park is considered.

9.4 In addition to the proposed development at Chapel Gate, three other sites within Basildon will be submitted to planning during a similar timeframe. The dispersion of traffic associated with the four Basildon sites has been reviewed and there are no roads that will be subjected to cumulative development traffic above the IAQM threshold.

9.5 As the proposed development is located outside an AQMA and is not expected to introduce an increase in AADT above 500 LDV nor 100 HDV AADT, IAQM guidance[9] indicates that the impact of road traffic associated with the proposed development is likely to have an insignificant impact on local air quality.

9.6 In terms of electric vehicle charging provision, the proposed development is proposing 40% active charging point, 10% passive and 50% ducted.

[9] EPUK and IAQM (January 2017) *Land Use Planning and Development Control: Planning for Air Quality (v1.2)*

10 Summary of Impacts and Conclusion

10.1 The assessment considered whether the proposed development could significantly change air quality during the construction and operational phases.

10.2 With the implementation of mitigation measures, the dust impacts from the construction are considered to have no residual effects in accordance with IAQM guidance.

10.3 Concentrations of NO_2 and PM_{10} are likely to be below their respective long-term and short-term objectives at the proposed development site which is therefore considered suitable for residential use with regards to air quality. The proposed development is also expected to experience levels of $PM_{2.5}$ below the $PM_{2.5}$ target.

10.4 The traffic associated with the proposed development is not expected to have a significant impact on local air quality when considered in accordance with IAQM Guidance[9].

10.5 Therefore, there is no reason for this application to be refused on the grounds of air quality.

APPENDICES

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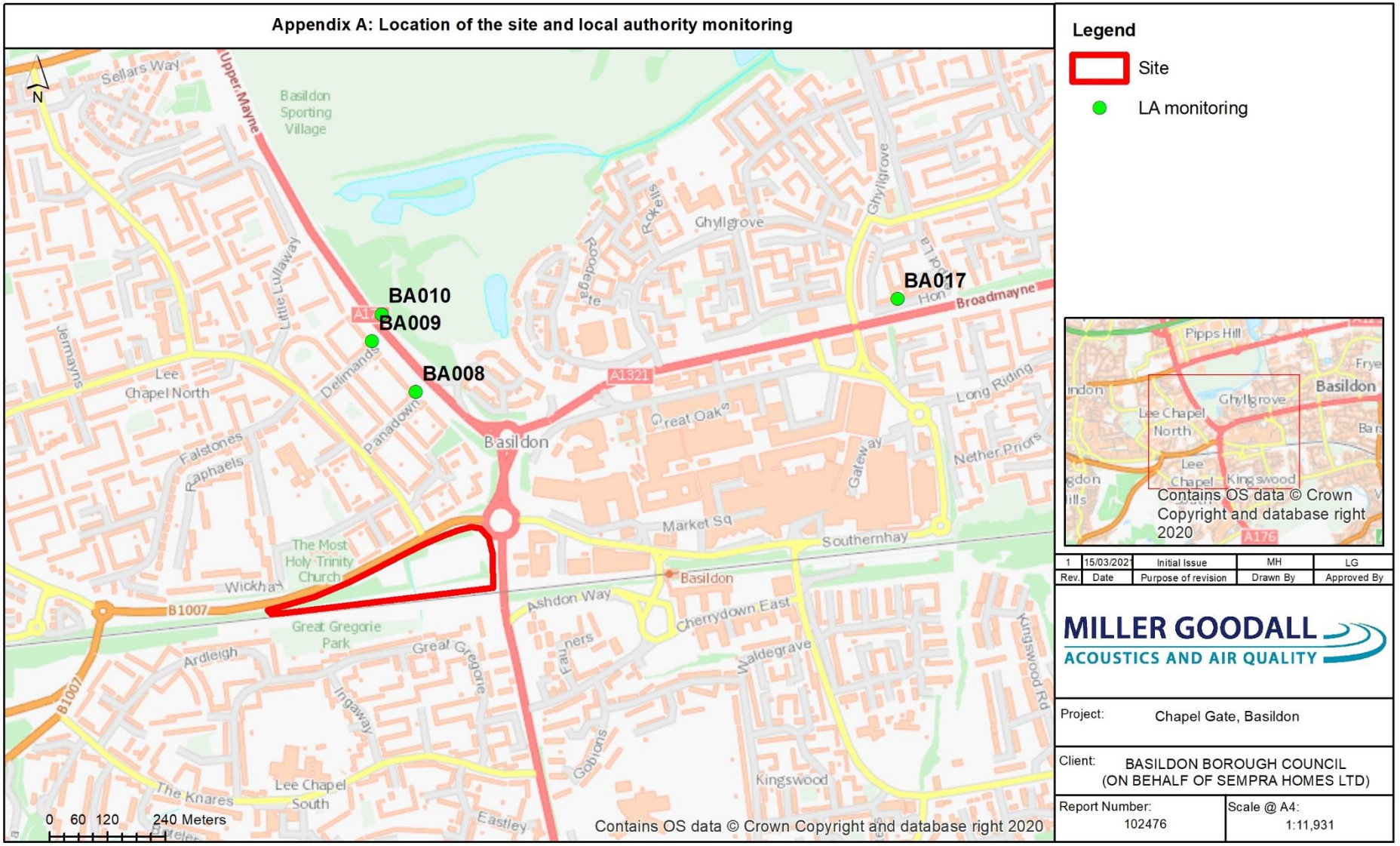
Appendix A: Location of the site and local authority monitoring



Rev.	Date	Purpose of revision	Drawn By	Approved By
1	15/03/2021	Initial Issue	MH	LG

MILLER GOODALL
ACOUSTICS AND AIR QUALITY

Project:	Chapel Gate, Basildon
Client:	BASILDON BOROUGH COUNCIL (ON BEHALF OF SEMPRA HOMES LTD)
Report Number: 102476	Scale @ A4: 1:11,931

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Appendix B: Dust Risk Assessment Methodology

The following section outlines criteria developed by the IAQM for the assessment of air quality impacts arising from construction and demolition activities[5]. The assessment procedure is divided into four steps and is summarised below:

Step 1: Screen the Need for a Detailed Assessment

An assessment will normally be required where there are human receptors within 350 m of the site boundary and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s). Ecological receptors within 50 m of the site boundary or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), are also identified at this stage. An ecological receptor refers to any sensitive habitat affected by dust soiling. For locations with a statutory designation, such as a Site of Specific Scientific Interest (SSSI), Special Area of Conservation (SACs) and Special Protection Areas (SPAs), consideration should be given as to whether the particular site is sensitive to dust. Some non-statutory sites may also be considered if appropriate.

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is 'negligible' and any effects will not be significant.

Step 2: Assess the Risk of Dust Impacts

In step two, a site is allocated to a risk category on the basis of the scale and nature of the works (Step 2A) and the sensitivity of the area to dust impacts (Step 2B). These two factors are combined in Step 2C to determine the risk of dust impacts before the implementation of mitigation measures. The assigned risk categories may be different for each of the construction activities outlined by the IAQM (construction, demolition, earthworks and trackout). A site can be divided into zones, for example on a large site where there are differing distances to the nearest receptors.

Step 2A: Define the Potential Dust Emission Magnitude

Dust emission magnitude is based on the scale of the anticipated works and is classified as Small, Medium or Large. The IAQM guidance recommends that the dust emission magnitude is determined separately for demolition, earthworks, construction and trackout. **Table 1** describes the potential dust emission class criteria for each outlined activity.

Table 1: Criteria Used in the Determination of Dust Emission Magnitude

Activity	Criteria used to Determine Dust Emission Magnitude		
	Small	Medium	Large
Demolition	Total building volume <20,000 m^3, construction materials with low potential for dust release.	Total building volume 20,000 m^3 – 50,000 m^3, potential dusty construction material.	Total building volume >50,000 m^3, potentially dusty construction material.
Earthworks	Total site area <2,500 m^2, soil type with large grain	Total site area 2,500 – 10,000 m^2, moderately dusty soil type	Total site area >10,000 m^2, potentially dusty soil type
Construction	Total building volume <25,000 m^3.	Total building volume 25,000 – 100,000 m^3.	Total building volume >100,000 m^3.
Trackout	<10 outward HDV trips in any one day. Unpaved road length <50 m.	10-50 outward HDV trips in any one day. Unpaved road length 50-100 m.	>50 outward HDV trips in any one day. Unpaved road length >100 m.

Step 2B: Define the Sensitivity of the Area

The sensitivity of the area takes into account the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of receptors;
- the local background PM_{10} concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of windblown dust.

The criteria detailed in **Table 2** is used to determine the sensitivity of the receptor in relation to dust soiling, health effects and ecological effects.

Table 2: Criteria for Determining Sensitivity of Receptors

Sensitivity of Receptor	Criteria for Determining Sensitivity		
	Dust Soiling Effects	Health Effects of PM_{10}	Ecological Sites
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms	Residential properties, hospitals, schools and residential care homes	International or national designation *and* the features may be affected by dust soiling
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM_{10}	Presence of an important plant species where dust sensitivity is uncertain or locations with a national designation with features that may be affected by dust deposition
Low	Playing fields, farmland, footpaths, short-term car parks and roads	Public footpaths, playing fields, parks and shopping streets	Local designation where features may be affected by dust deposition

Table 3 and **Table 4** are then used to define the sensitivity of the area to dust soiling and human health effects. This should be derived for each of construction, demolition, earthworks and trackout.

Table 3: Sensitivity of the Area to Dust Soiling Effects on People and Property.

Receptor Sensitivity	Number of Receptors	Distance from 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

*distances considered are to the dust source

Table 4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentrations	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

The sensitivity of the area is then summarised.

Step 2C Define the Risks of Impacts

The dust emission magnitude from **Table 1** and sensitivity of the area and receptors from **Table 2**, **Table 3** and **Table 4** are combined, and the risk of impacts from each activity (demolition, earthworks, construction and trackout) before mitigation is applied, is determined using the criteria detailed in **Table 5** to **Table 8.**

Table 5: Risk of Dust Impacts - Demolition

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 6: Risk of Dust Impacts- Earthworks

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 7: Risk of Dust Impacts- Construction

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 8: Risk of Dust Impacts- Trackout

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Step 3 Determine Site Specific Mitigation

Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the site is a low, medium or high risk site.

Step 4 Determine Significance of Residual Effects

At step four the significance of residual effects is assessed. For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

There may be cases where, for example, there is inadequate access to water for dust suppression to be effective, and even with other mitigation measures in place there may be a significant effect. Therefore, it is important to consider the specific characteristics of the site and the surrounding area to ensure that a conclusion of no significant effect is robust.

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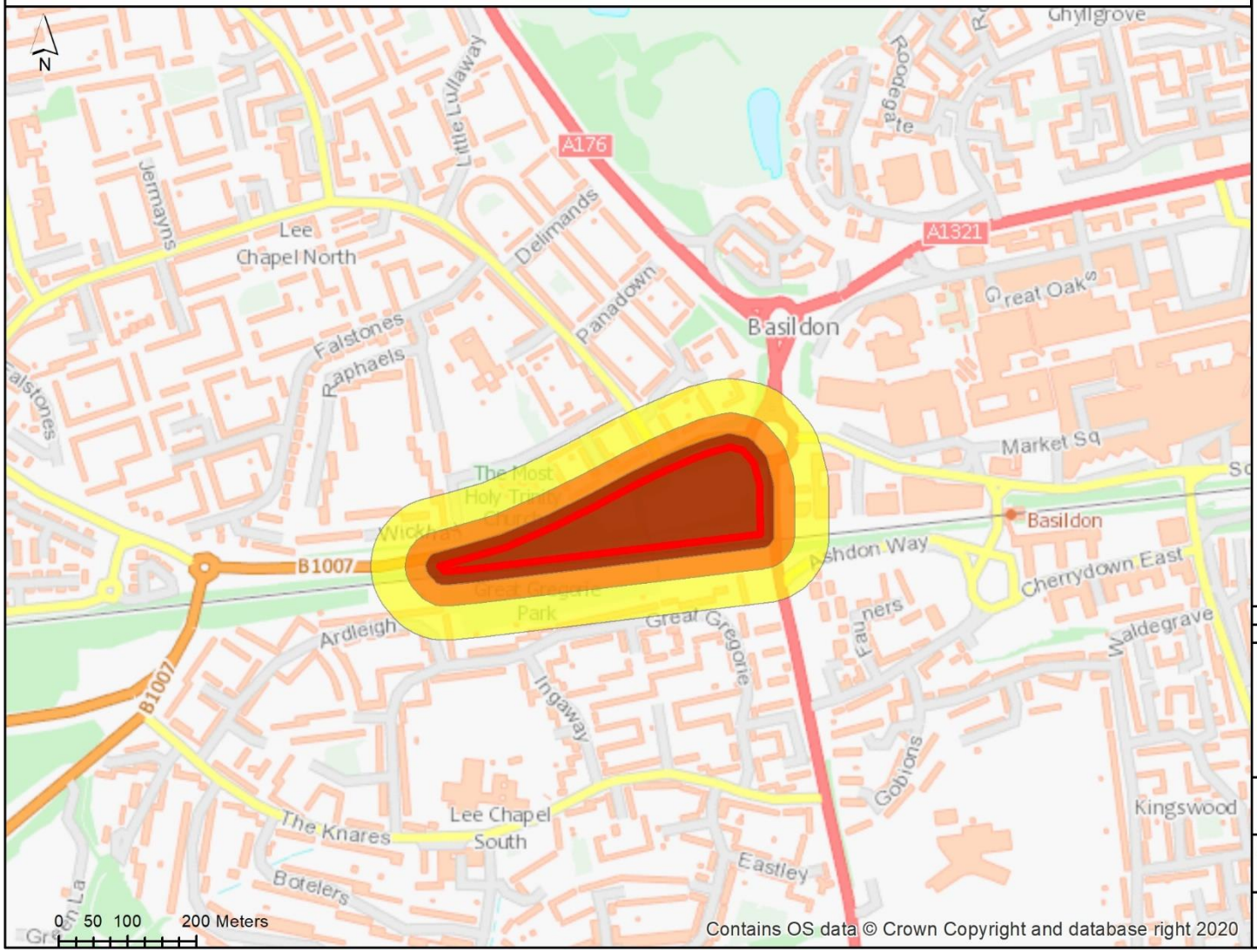
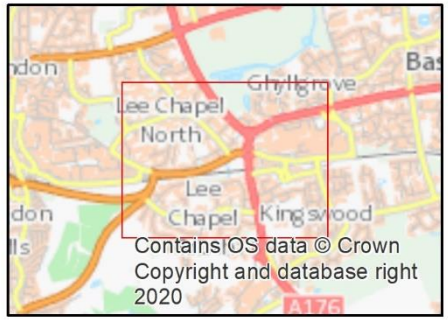
Appendix C: Construction Dust Buffer Zones



Legend

- Site
- <20 m
- 20 m - 50 m
- 50 m - 100 m



Rev.	Date	Purpose of revision	Drawn By	Approved By
1	15/03/2021	Initial Issue	MH	LG

MILLER GOODALL
ACOUSTICS AND AIR QUALITY

Project:	Chapel Gate, Basildon
Client:	BASILDON BOROUGH COUNCIL (ON BEHALF OF SEMPRA HOMES LTD)
Report Number: 102476	Scale @ A4: 1:9,942

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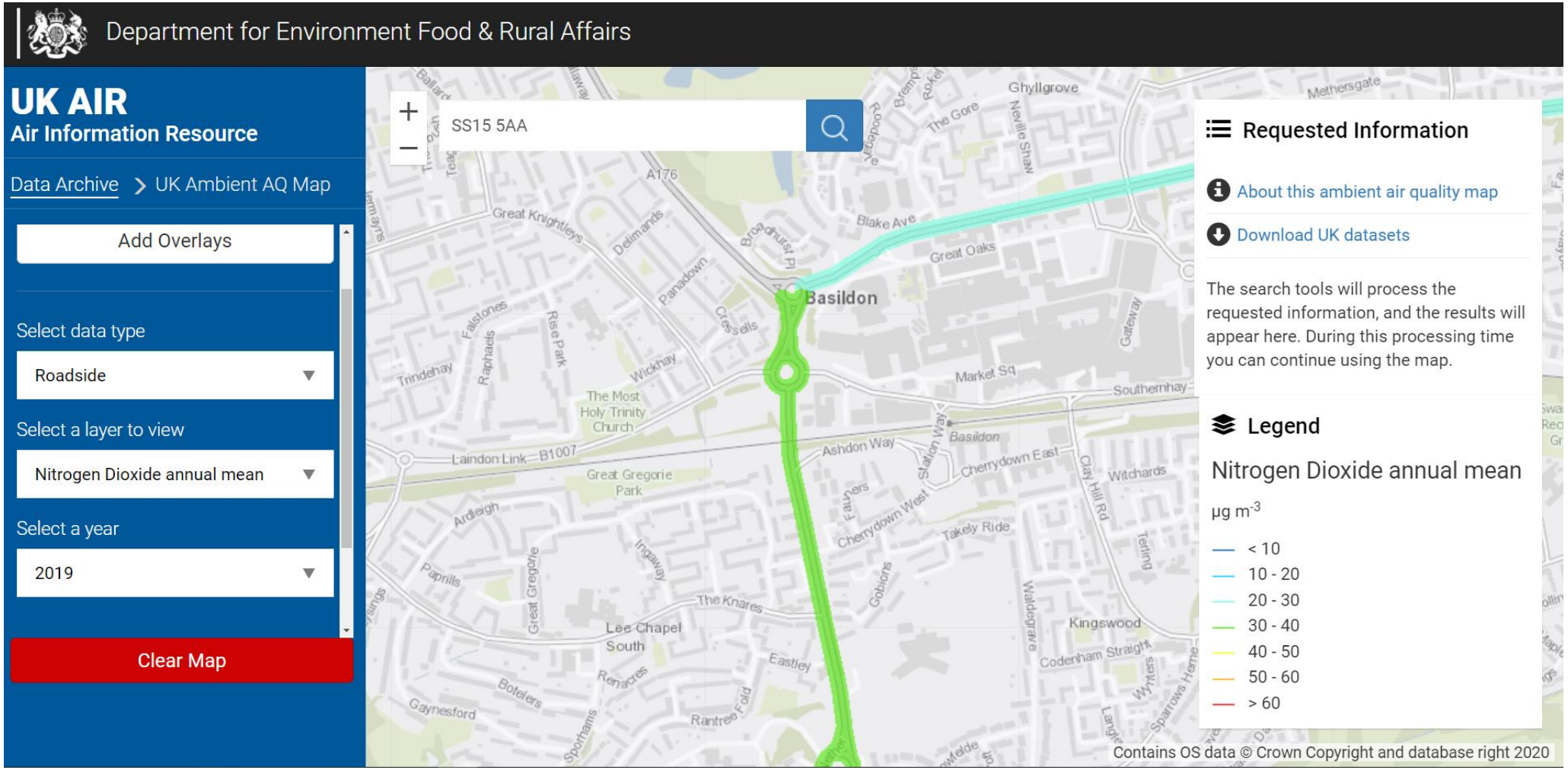
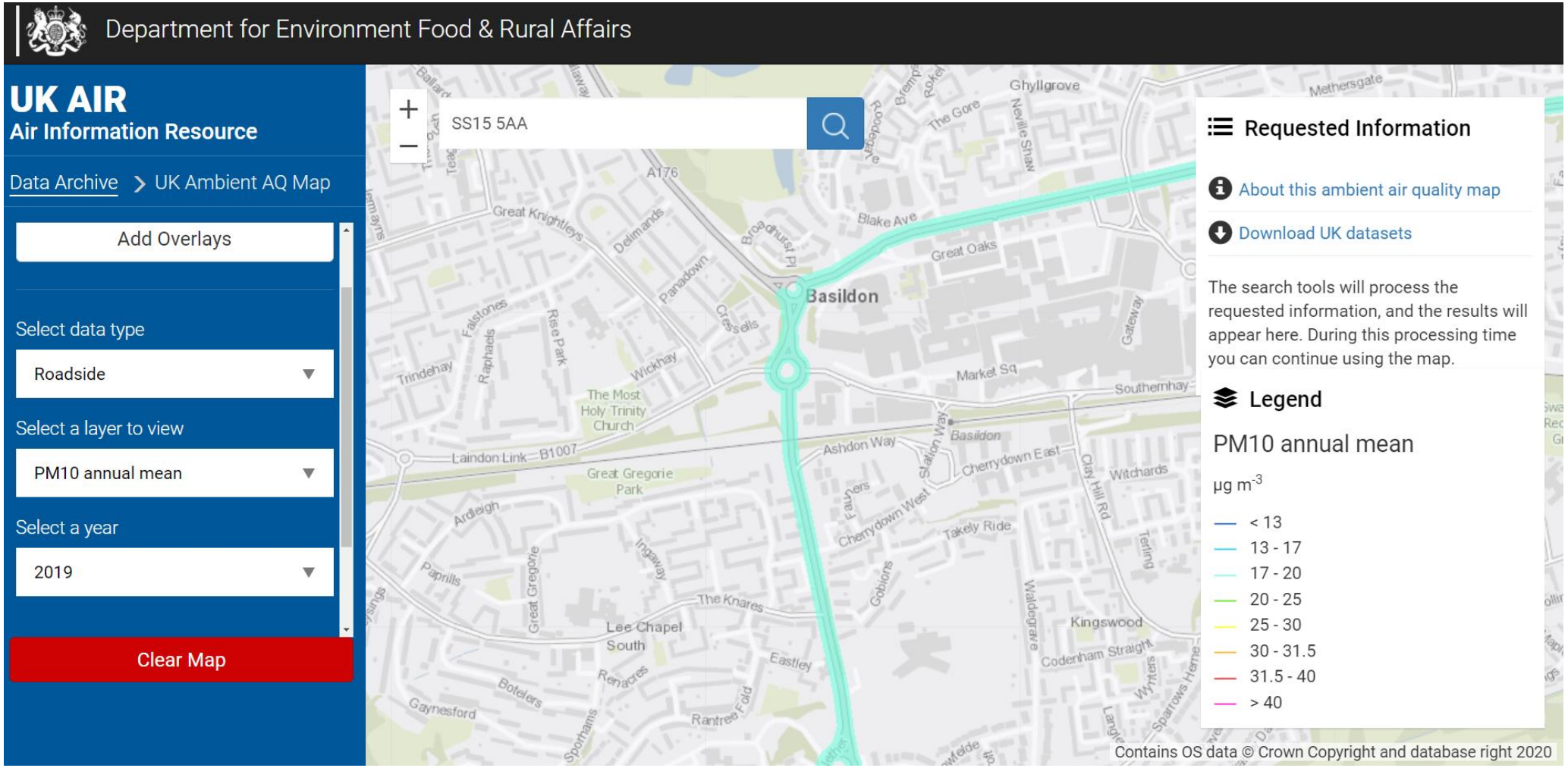
Appendix D: Screenshots from Defra PCM Map




Department for Environment Food & Rural Affairs
UK AIR
Air Information Resource
Data Archive
UK Ambient AQ Map
Add Overlays
Select data type
Roadside
Select a layer to view
PM10 annual mean
Select a year
2019
Clear Map
SS15 5AA
Requested Information
About this ambient air quality map
Download UK datasets
The search tools will process the requested information, and the results will appear here. During this processing time you can continue using the map.
Legend
PM10 annual mean
µg m-3
< 13
13 - 17
17 - 20
20 - 25
25 - 30
30 - 31.5
31.5 - 40
> 40
Basildon
A176
Blake Ave
Great Oaks
Market Sq
Southernhay
Ashdon Way
Laindon Link B1007
Cherrydown East
Cherrydown West
Takely Ride
Lee Chapel South
The Knares
Kingswood
Codenham Straight
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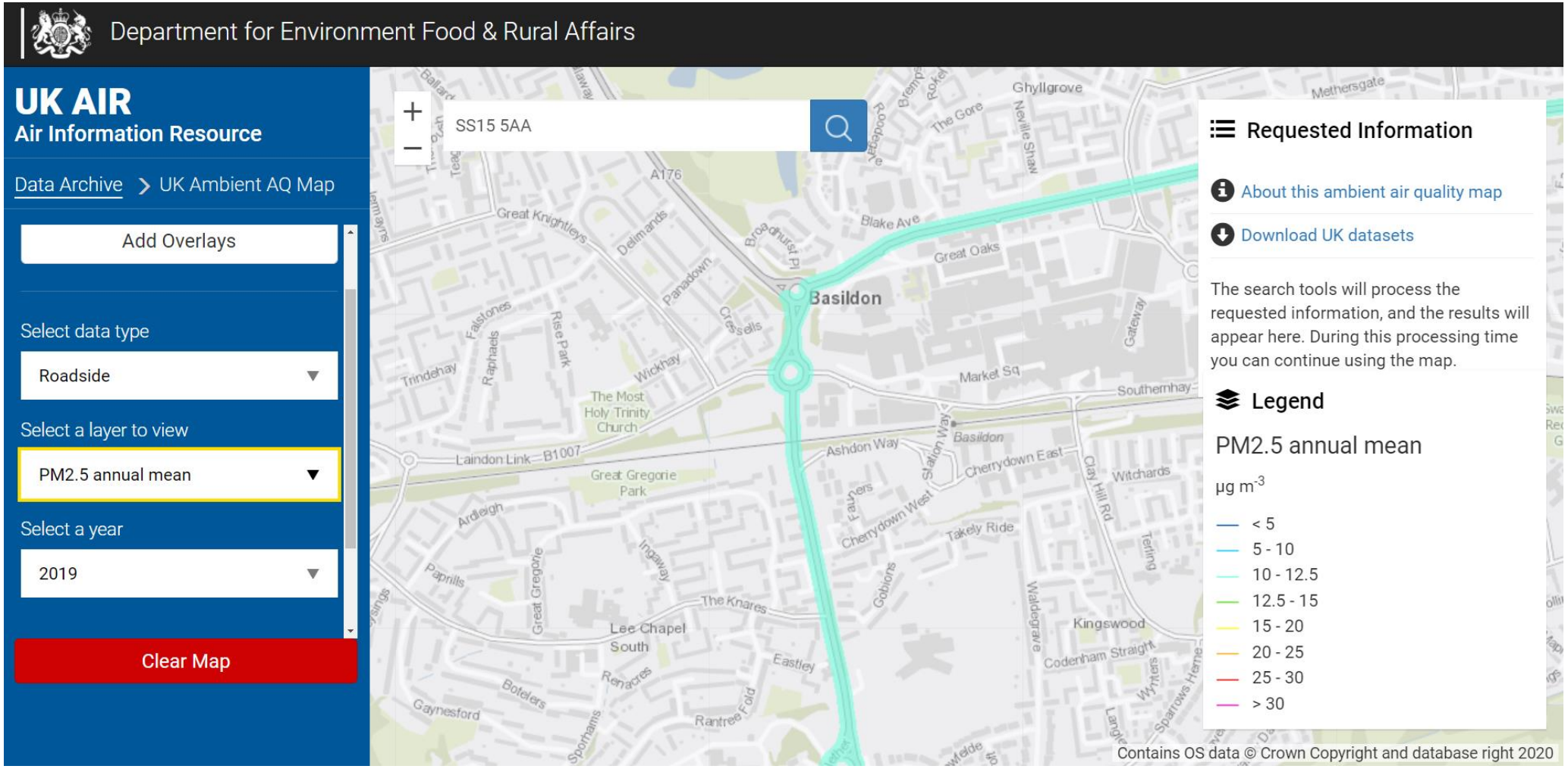
Department for Environment Food & Rural Affairs
UK AIR
Air Information Resource
Data Archive > UK Ambient AQ Map
Add Overlays
Select data type
Roadside
Select a layer to view
PM2.5 annual mean
Select a year
2019
Clear Map
SS15 5AA
Requested Information
About this ambient air quality map
Download UK datasets
The search tools will process the requested information, and the results will appear here. During this processing time you can continue using the map.
Legend
PM2.5 annual mean
µg m-3
< 5
5 - 10
10 - 12.5
12.5 - 15
15 - 20
20 - 25
25 - 30
> 30
Basildon
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Appendix E: Dust Assessment Mitigation

xx Highly Recommended **x Desirable**

Measures relevant for earthworks, construction and trackout.

Mitigation Measure	Medium Risk
Communications	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	xx
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.	xx
Display the head or regional office contact information.	xx
Develop and implement a Dust Management Plan (DMP).	xx
Site management	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	xx
Make the complaints log available to the local authority when asked.	xx
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.	xx
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 window sills within 100 m of site boundary, with cleaning to be provided if necessary.	x
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.	xx
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.	xx
If requested by the Local Authority: 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.	xx
Preparing and maintaining the site	
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	xx
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	xx

Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.	xx
Avoid site runoff of water or mud.	xx
Keep site fencing, barriers and scaffolding clean using wet methods.	xx
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.	xx
Cover, seed or fence stockpiles to prevent wind whipping.	xx
Operating vehicle/machinery and sustainable travel	
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.	xx
Ensure all vehicles switch off engines when stationary - no idling vehicles.	xx
Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	xx
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph 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).	x
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	xx
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	x
Operations	
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.	xx
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	xx
Use enclosed chutes and conveyors and covered skips.	xx
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	xx
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.	xx
Waste management	
Avoid bonfires and burning of waste materials.	xx

Measures specific to demolition

Mitigation Measure	Low Risk
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	x

Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	xx
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	xx
Bag and remove any biological debris or damp down such material before demolition.	xx

Measures specific to earthworks.

Mitigation Measure	Medium Risk
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	x
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	x
Only remove the cover in small areas during work and not all at once.	x

Measures specific to construction.

Mitigation Measure	Medium Risk
Avoid scabbling (roughening of concrete surfaces) if possible.	x
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.	xx
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.	x
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.	x

Measures specific to trackout.

Mitigation Measure	Medium Risk
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.	xx
Avoid dry sweeping of large areas.	xx

Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	xx
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable	xx
Record all inspections of haul routes and any subsequent action in a site log book.	xx
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	xx
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	xx
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.	xx
Access gates to be located at least 10 m from receptors where possible.	xx

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Glossary of Terms

AADT Annual Average Daily Traffic flow

Air Quality Standard Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health and the environment

Air Quality Objective Pollutant Objectives incorporate future dates by which a standard is to be achieved, taking into account economic considerations, practicability and technical feasibility

Annual Mean A mean pollutant concentration value in air which is calculated on a yearly basis, yielding one annual mean per calendar year. In the UK air quality regulations, the annual mean for a particular substance at a particular location for a particular calendar year is:

(a) in the case of lead, the mean of the daily levels for that year;

(b) in the case of nitrogen dioxide, the mean of the hourly means for that year;

(c) in the case of PM_{10}, the mean of the 24-hour means for that year.

Annoyance (Dust) Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to be a legal nuisance.

AQAP Air Quality Action Plan

AQEG Air Quality Expert Group

AQMA Air Quality Management Area

AQMP Air Quality Management Plan

AQO Air Quality Objective

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

Background Concentrations The term used to describe pollutant concentrations which exist in the ambient atmosphere, excluding local pollution sources such as roads and stacks

CO Carbon monoxide

Construction Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.

Construction Impact Assessment An assessment of the impacts of demolition, earthworks, construction and trackout. In this Guidance, specifically the air quality impacts.

Defra Department for Environment, Food and Rural Affairs

Demolition Any activity involved with the removal of an existing structure (or structures). This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time.

Deposited Dust that is no longer in the air and which has settled onto a surface. Deposited dust is also sometimes called amenity dust or nuisance dust, with the term nuisance applied in the general sense rather than the specific legal definition.

DMRB Design Manual for Roads and Bridges

DMP Dust Management Plan; a document that describes the site-specific methods to be used to control dust emissions.

Dust Solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. The terms dust and particulate matter (PM) are often used interchangeably, although in some contexts one term tends to be used in preference to the other. In this guidance the term 'dust' has been used to include the particles that give rise to soiling, and to other human health and ecological effects. Note: this is different to the definition given in BS 6069, where dust refers to particles up to 75 µm in diameter.

Earthworks Covers the processes of soil-stripping, ground-levelling, excavation and landscaping.

Effects The consequences of the changes in airborne concentration and/or dust deposition for a receptor. These might manifest as annoyance due to soiling, increased morbidity or morality due to exposure to PM_{10} or $PM_{2.5}$ or plant dieback due to reduced photosynthesis. The term 'significant effect' has a specific meaning in EIA regulations. The opposite is an insignificant effect. In the context of construction impacts any effect will usually be adverse, however, professional judgement is required to determine whether this adverse effect is significant based in the evidence presented.

EPAQS Expert Panel on Air Quality Standards

EPUK Environmental Protection UK

HDV Heavy Duty Vehicle

Impacts The changes in airborne concentrations and/or dust deposition. A scheme can have an 'impact' on airborne dust without having any 'effects', for instance if there are no receptors to experience the impact.

LAQM Local Air Quality Management

LDF Local Development Framework

LDV Light Duty Vehicle

Mg/m^3 Microgrammes (of pollutant) per cubic metre of air. A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m^3 means that one cubic metre of air contains one microgramme (millionth of a gramme) of pollutant

NO_2 Nitrogen Dioxide

NOx A collective term used to represent the mixture of nitrogen oxides in the atmosphere, as nitric oxide (NO) and nitrogen dioxide (NO_2)

NPPF National Planning Policy Framework

Nuisance The term nuisance dust is often used in a general sense when describing amenity dust. However, this term also has specific meanings in environmental law:

Statutory nuisance, as defined in S79(1) of the Environmental Protection Act 1990 (as amended from time to time).

Private nuisance, arising from substantial interference with a person's enjoyment and us of his land.

Public nuisance, arising from and act or omission that obstructs, damages or inconveniences the right of the community.

Each of these applying in so far as the nuisance relates to the unacceptable effects of emissions. It is recognised that a significant loss of amenity may occur at lower levels of emission than would constitute a statutory nuisance.

Note: as nuisance has a specific meaning in environmental law, and to avoid confusion, it is recommended that the term is not used in a more general sense.

$PM_{2.5}$ The fraction of particles with a mean aerodynamic diameter equal to, or less than, 2.5 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of $PM_{2.5}$, EN 14907, with a 50% efficiency cut-off at 2.5 µm aerodynamic diameter

PM_{10} The fraction of particles with a mean aerodynamic diameter equal to, or less than, 10 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of PM_{10}, EN 12341, with a 50% efficiency cut-off at 10 µm aerodynamic diameter

RSS Regional Spatial Strategy

Running Annual Mean A mean pollutant concentration value in air which is calculated on an hourly basis, yielding one running annual mean per hour. The running annual mean for a particular substance at a particular location for a particular hour is the mean of the hourly levels for that substance at that location for that hour and the preceding 8759 hours

Trackout The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.

VoGC Vale of Glamorgan Council


MILLER GOODALL
ACOUSTICS AND AIR QUALITY