

Barratt London

NIMR, Mill Hill

Air Quality Monitoring Report 6

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Contents

1.0	Introduction	4
2.0	Policy and Legislative Context	5
3.0	Assessment Criteria	7
4.0	Particulate Matter Survey	12
5.0	Discussion and Summary	25

1.0 Introduction

An air quality monitoring survey is being undertaken to determine levels of PM₁₀, PM_{2.5} and PM₁ experienced as a result of the works undertaken at two locations at the former NIMR site, Mill Hill, Barnet: Phase 1 Monitoring Location 1A and Phase 1 Monitoring Location 1B. The monitoring locations are displayed in Figure 1. The purpose of this report is to review these levels against criteria determined from appropriate guidance to minimise disruption to nearby sensitive receptors as a result of the works.

This report relates to measurements made between 1st February 2018 and 31st July 2018.

2.0 Policy and Legislative Context

2.1 Documents Consulted

The following documents were consulted during the undertaking of this assessment:

Legislation and Best Practice Guidance

- The Air Quality Standards (Amendment) Regulations 2016;
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007;
- The Environment Act, 1995;
- Local Air Quality Management Technical Guidance LAQM.TG(16), DEFRA, 2018;
- Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites, IAQM, 2012.

2.2 Air Quality Legislative Framework

European Legislation

European air quality legislation is consolidated under Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidates previous legislation which was designed to deal with specific pollutants in a consistent manner and provides new air quality objectives for fine particulates, and includes:

- **Directive 1999/30/EC** – the First Air Quality "Daughter" Directive – sets ambient air limit values for nitrogen dioxide and oxides of nitrogen, sulphur dioxide, lead and particulate matter;
- **Directive 2000/69/EC** – the Second Air Quality "Daughter" Directive – sets ambient air limit values for benzene and carbon monoxide; and,
- **Directive 2002/3/EC** – the Third Air Quality "Daughter" Directive – seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

The fourth daughter Directive was not included within the consolidation and is described as:

- **Directive 2004/107/EC** – sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to

as low as reasonably achievable.

UK Legislation

The Air Quality Standards (Amendments) Regulations 2016 seek to simplify air quality regulation and provide a new transposition of the Air Quality Framework Directive, First, Second and Third Daughter Directives and also transpose the Fourth Daughter Directive within the UK. The Air Quality Limit Values are transposed into the updated Regulations as Air Quality Standards, with attainment dates in line with the European Directives. SI 2010 No. 1001, Part 7 Regulation 31 extends powers, under Section 85(5) of the Environment Act (1995), for the Secretary of State to give directions to Local Authorities (LAs) for the implementation of these Directives.

The UK Air Quality Strategy is the method for implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland and provides a framework for improving air quality and protecting human health from the effects of pollution.

For each nominated pollutant, the Air Quality Strategy sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved; the combined standard and target date is referred to as the Air Quality Objective (AQO) for that pollutant. Adopted national standards are based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and have been translated into a set of Statutory Objectives within the Air Quality (England) Regulations (2000) SI 928, and subsequent amendments.

The AQOs for pollutants included within the Air Quality Strategy and assessed as part of the scope of this report are presented in Table 2.1 along with European Commission (EC) Directive Limits and World Health Organisation (WHO) Guidelines.

Table 2.1 Air Quality Standards, Objectives, Limit and Target Values

Pollutant	Applies	Objective	Concentration Measured as ¹⁰	Date to be achieved and maintained thereafter	European Obligations	Date to be achieved and maintained thereafter	New or existing
PM ₁₀	UK	50µg/m ³ by end of 2004 (max 35 exceedances a year)	24-hour mean	1 st January 2005	50µg/m ³ by end of 2004 (max 35 exceedances a year)	1 st January 2005	Retain Existing
	UK	40µg/m ³ by end of 2004	Annual mean	1 st January 2005	40µg/m ³	1 st January 2005	
PM _{2.5}	UK	25µg/m ³	Annual Mean	31 st December 2010	25µg/m ³	1 st January 2010	Retain Existing

There are currently no UK or EU objectives for PM₁.

3.0 Assessment Criteria

3.1 Background Concentrations

Background concentrations as used within the prediction calculations were referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the development site. In November 2017, DEFRA issued revised 2015 based background maps for PM₁₀ and PM_{2.5} which incorporate updates to the input data used for modelling. 2018 background maps have been utilised to assess the significance of monitored levels. The updated mapped background concentrations used in the assessment are summarised in Table 3.1.

Table 3.1 Published Background Air Quality Levels (µg/m³)

UK NGR(m)		2018	
X	Y	PM ₁₀	PM _{2.5}
522500	192500	14.4	9.5
523500	192500	14.3	9.4
522500	193500	14.1	9.3
523500	193500	13.9	9.2

London Air's annual mean pollution map uses a detailed model to show a prediction of PM₁₀ and PM_{2.5} annual averages across the whole of Greater London. The latest accurate model is available for the year of 2013. The detailed annual mean pollution maps are displayed in Figures 3.1 and Figure 3.2.

Figure 3.1 Modelled Annual Mean PM₁₀ Air Pollution (based on measurements made during 2013)

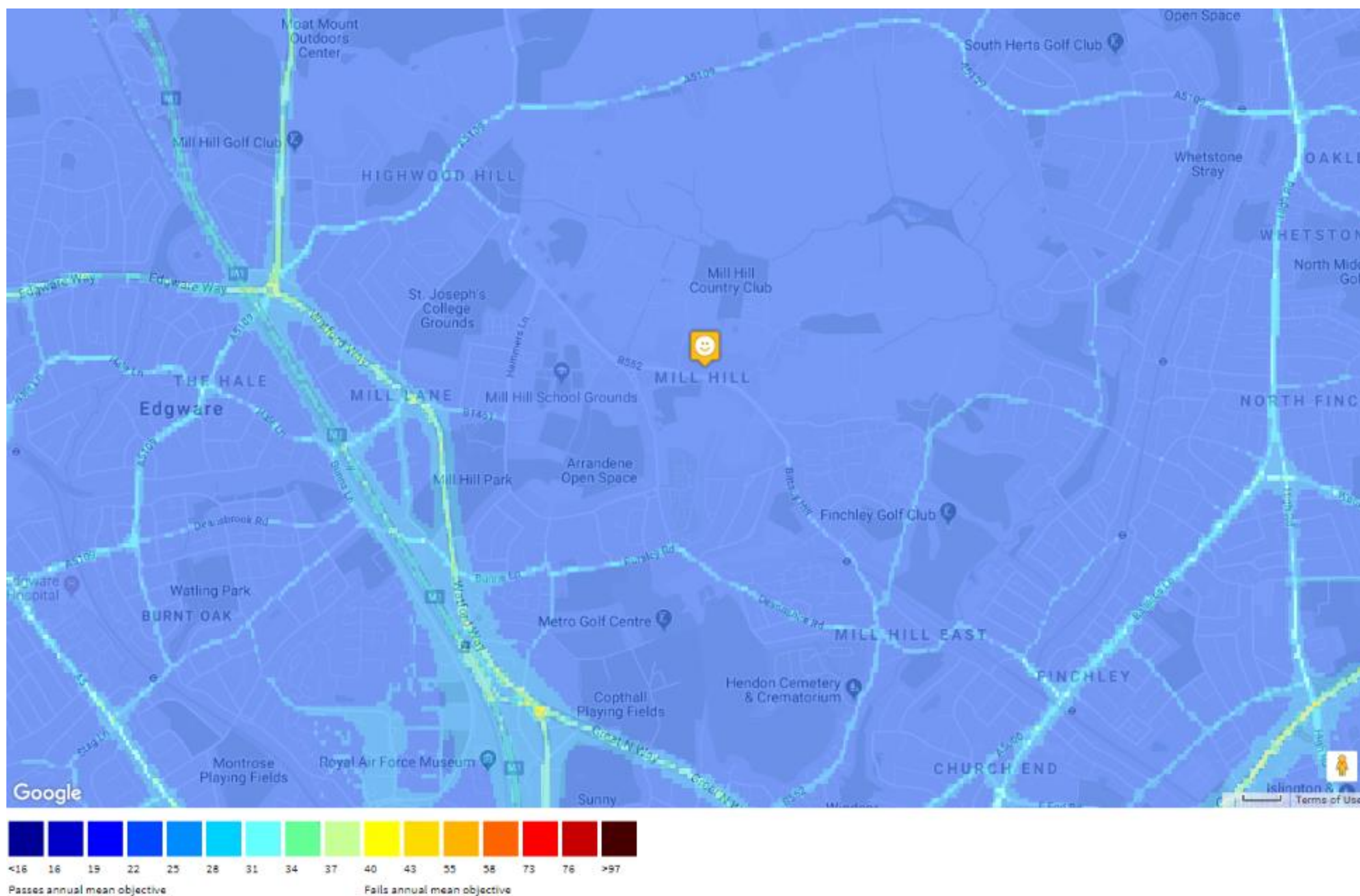
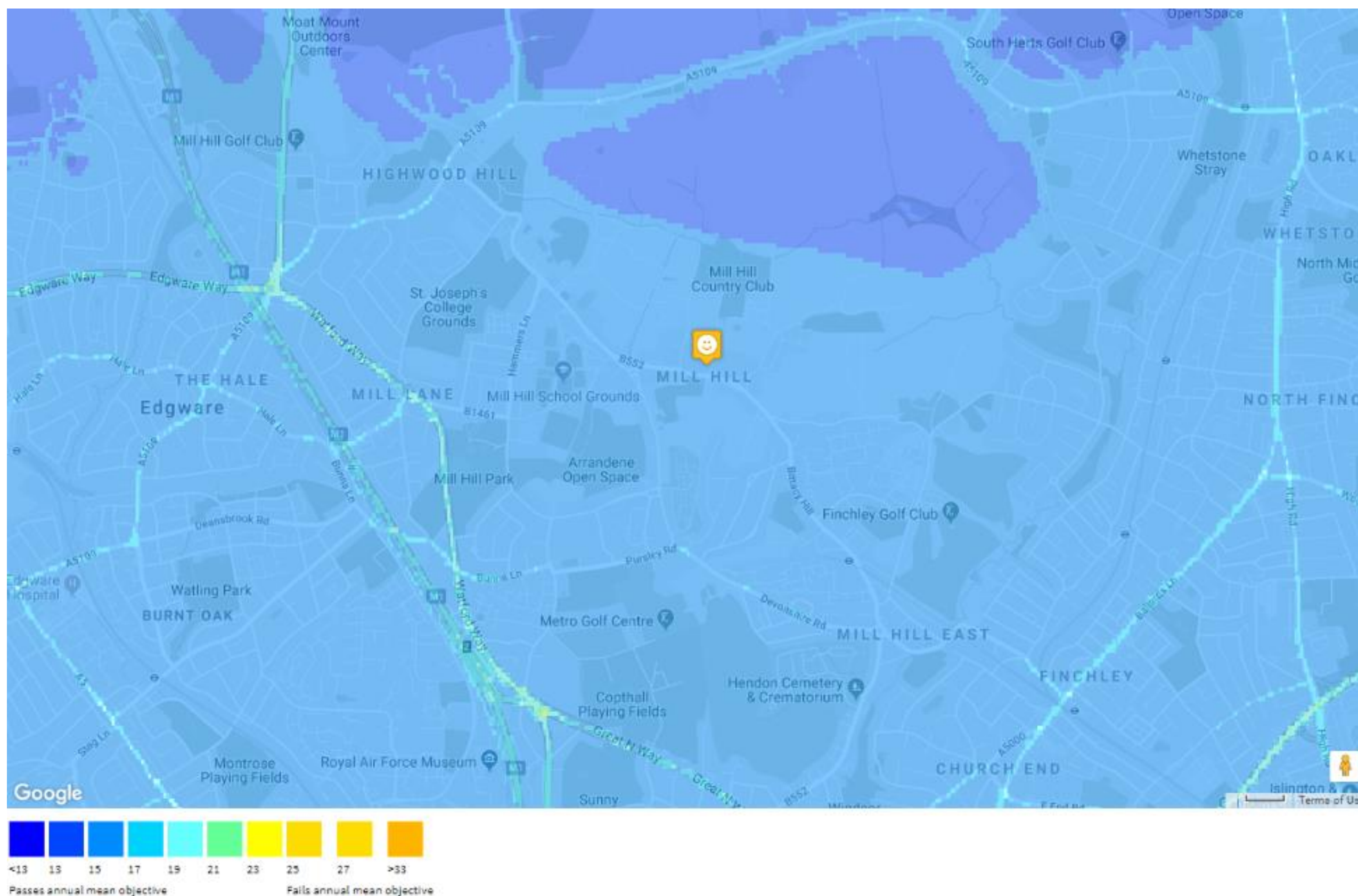


Figure 3.2 Modelled Annual Mean PM_{2.5} Air Pollution (based on measurements made during 2013)



3.2 Pollutant Sources

The main emissions during demolition are likely to be dust and particulate matter generated during earth moving (particularly during dry months) or from demolition materials. The main potential effects of dust and particulate matter are:

- Visual - dust plume, reduced visibility, coating and soiling of surfaces leading to annoyance, loss of amenity, the need to clean surfaces;
- Physical and/or chemical contamination and corrosion of artefacts;
- Coating of vegetation and soil contamination; and,
- Health effects due to inhalation e.g. asthma or irritation of the eyes.

A number of other factors such as the amount of precipitation and other meteorological conditions will also greatly influence the amount of particulate matter generated.

Demolition activities can give rise to short-term elevated dust/PM₁₀ concentrations in neighbouring areas. This may arise from vehicle movements, soiling of the public highway, demolition or windblown stockpiles.

3.3 Particulate Matter

The UK Air Quality Standards seek to control the health implications of respirable PM₁₀ and PM_{2.5}. However, the majority of particles released from construction will be greater than this in size.

Demolition works on site have the potential to elevate localised PM₁₀ and PM_{2.5} concentrations in the area. On this basis, mitigation measures should still be taken to minimise these emissions as part of good site practice.

Particulate matter is made up of a collection of solid and/or liquids materials of various sizes. The particles are released into the atmosphere by numerous sources with the major sources being created by road transport. Emissions of dust can also generate high concentrations of particulate matter.

Particulate matter requires monitoring due to the impacts on human health that large amount of exposure can cause.

3.4 Criteria

3.4.1 15-Minute Monitoring Criteria

An assessment using the traffic light approach based on sections 5.3.2 and the IAQM document 'Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites (2012)' is

considered appropriate and is proposed in Table 3.2 below. Given the proximity (within 7m) of nearby receptors and the possibility for exposure to PM₁₀ the following criteria is proposed.

Table 3.2 Traffic Light Criteria

Alert level	Time Period	Maximum Permissible 15-minute average (µg/m ³)
Red (<i>at this level all works to cease immediately, investigate cause of exceedance and use alternative methods where appropriate</i>)	15-minute average	>250 µg/m ³
Amber (<i>continual monitoring and investigation of alternative methods where appropriate</i>)	Two consecutive 15-minute averages	>100 µg/m ³
Green (<i>early warning/ no action required</i>)	15-minute average	>100 µg/m ³

The below criteria have been adopted for PM_{2.5} levels at the boundary of the site.

Table 3.3 PM_{2.5} Level Criteria – Levels at Boundary

Monitoring Levels	Time Period	PM _{2.5} exceedance limits at monitoring locations
Red (<i>at this level all works to cease immediately, investigate cause of exceedance and use alternative methods</i>)	15-minute average	>48 µg/m ³
Amber (<i>continual monitoring and investigation of alternative methods where appropriate</i>)	Two consecutive 15-minute averages	>38 µg/m ³
Green (<i>no action required</i>)	15-minute average	>38 µg/m ³

3.4.2 24hr Monitoring Criteria

In addition to the above detailed 15-minute traffic light criteria, WYG have devised an additional 24-hour criterion to determine whether particulate matter onsite is being distributed in the same pattern as particulate matter monitored at the nearest urban background site. This criteria is non-statutory and has been devised to be utilised as a general guidance to inform overall dust management at the site to identify peak episodes with regards to particulate matter.

Table 3.3 24-hour Traffic Light Criteria

Alert level	Time Period	Percentage Difference from Monitored Background Concentration (%)
Red	24-hours	>+100
Amber	24-hours	+50 to +100
Green	24-hours	< +50

4.0 Particulate Matter Survey

4.1 Air Quality Monitoring Methodology

Particulate Matter monitoring was undertaken at each of the monitoring locations as identified in Figure 1. Particulate Matter monitoring was undertaken using two AQ Mesh Pods which are small battery-operated monitoring devices. These devices record levels of PM₁₀, PM_{2.5} and PM₁ constantly in 15-minute intervals.

The monitored results were compared to both urban background monitored values of PM₁₀ and PM_{2.5} monitored by London Air (www.londonair.org.uk). The urban background values were monitored at the Kensington & Chelsea – North Ken (FIDAS) AURN from months February to May. Camden – Bloomsbury AURN has been used in the month of June. A different urban background monitoring site has been used for the month of June due to data from the previous site, Kensington & Chelsea – North Ken (FIDAS) AURN, being inaccessible. Data at monitoring site Kensington & Chelsea – North Ken (FIDAS) AURN is now accessible and has been used for the month of July.

Detailed results of exceedances of the 'red' limit are outlined in Appendix A.

4.1.1 Particulate Matter Results

The results of the Particulate Matter Monitoring Survey are presented in the tables below.



Phase 1 Monitoring Location 1A Results

15-Minute Criteria Analysis

The on-site monitoring results have been further analysed to determine any exceedances of the 15-minute traffic criteria outlined in Section 3. These have been split into the number of exceedances within and outside of site working hours as highlighted below in Table 4.1.

Table 4.1 Exceedances of 15 minute Absolute Level Criteria for PM₁₀

Date	Exceedances of 'Green' Criteria	Exceedances of 'Amber' Criteria	Exceedances of 'Red' Criteria
July 2018			
01/07/2018	0	0	0
02/07/2018	0	0	0
03/07/2018	12	11	4
04/07/2018	0	0	0
05/07/2018	0	0	0
06/07/2018	0	0	0
07/07/2018	0	0	0
08/07/2018	0	0	0
09/07/2018	0	0	0
10/07/2018	0	0	0
11/07/2018	0	0	0
12/07/2018	0	0	0
13/07/2018	0	0	0
14/07/2018	0	0	0
15/07/2018	0	0	0
16/07/2018	0	0	0
17/07/2018	Data Unavailable		
18/07/2018			
19/07/2018			
20/07/2018			
21/07/2018			
22/07/2018			
23/07/2018			
24/07/2018			
25/07/2018	1	0	0
26/07/2018	0	0	0
27/07/2018	0	0	0
28/07/2018	0	0	0
29/07/2018	0	0	0
30/07/2018	0	0	0
31/07/2018	0	0	0
*recorded outside working hours			



The on-site monitoring results have been further analysed to determine any exceedances of the 15-minute traffic criteria outlined in Section 3. These have been split into the number of exceedances within and outside of site working hours as highlighted below in Table 4.2.

Table 4.2 Exceedances of 15-minute Absolute Level Criteria for PM_{2.5}

Date	Exceedance of 'Green' Criteria	Exceedance of 'Amber' Criteria	Exceedance of 'Red' Criteria
July 2018			
01/07/2018	0	0	0
02/07/2018	0	0	0
03/07/2018	0	0	0
04/07/2018	0	0	0
05/07/2018	0	0	0
06/07/2018	0	0	0
07/07/2018	0	0	0
08/07/2018	0	0	0
09/07/2018	0	0	0
10/07/2018	0	0	0
11/07/2018	0	0	0
12/07/2018	0	0	0
13/07/2018	0	0	0
14/07/2018	0	0	0
15/07/2018	0	0	0
16/07/2018	0	0	0
17/07/2018	Data Unavailable		
18/07/2018			
19/07/2018			
20/07/2018			
21/07/2018			
22/07/2018			
23/07/2018			
24/07/2018			
25/07/2018	0	0	0
26/07/2018	0	0	0
27/07/2018	0	0	0
28/07/2018	0	0	0
29/07/2018	0	0	0
30/07/2018	0	0	0
31/07/2018	0	0	0

Daily Average Analysis

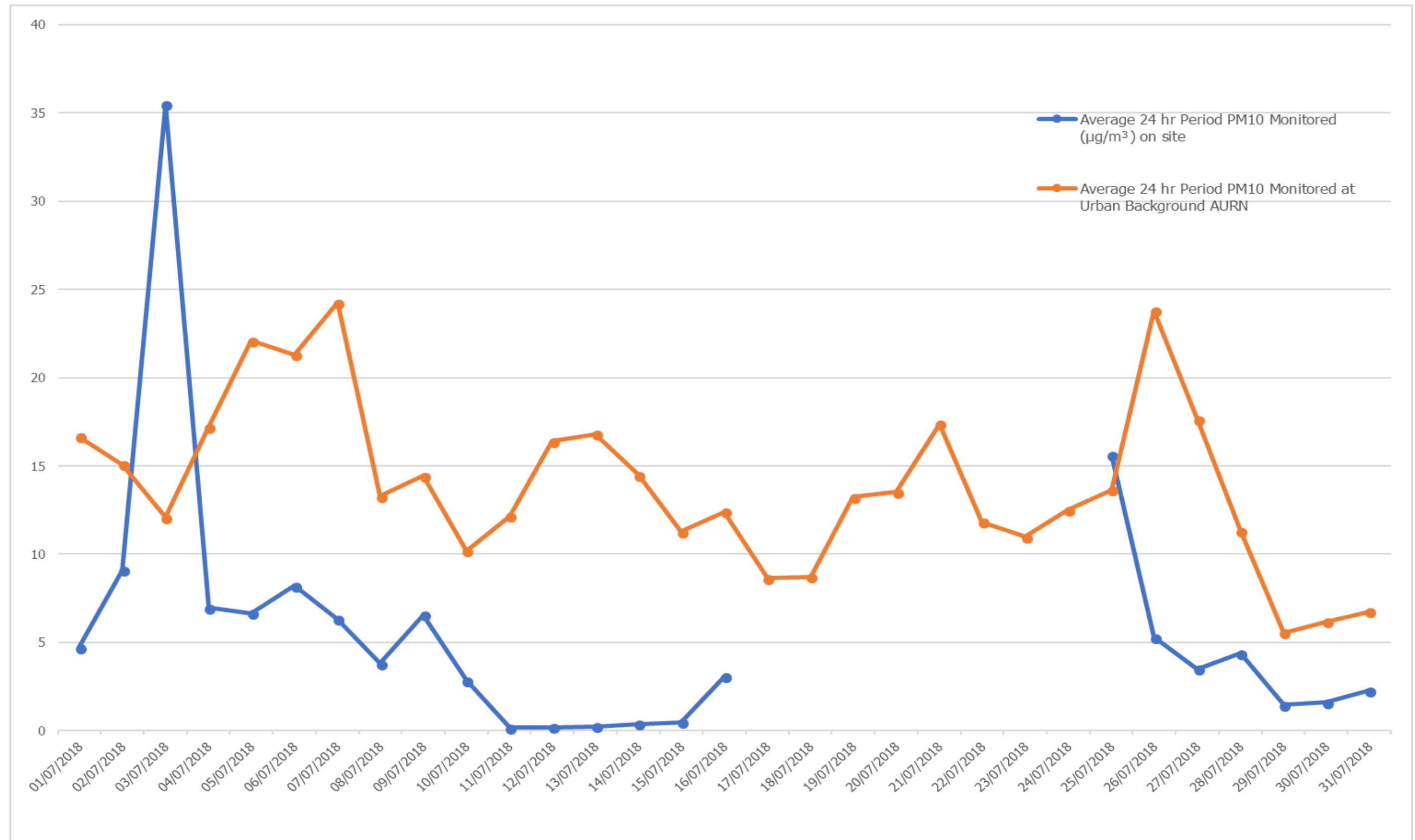
Table 4.3 below shows the monitored PM₁₀ on the site compared to the closest Urban Background monitoring stations operated by the council to assess whether the PM₁₀ on site is being distributed in a pattern similar to the local area and to identify any anomalous results.



Table 4.3 PM₁₀ 24-hour monitoring results compared with background levels

Date	Average 24 hr Period PM ₁₀ Monitored (µg/m ³) on site	Average 24 hr Period PM ₁₀ Monitored at Urban Background AURN	Difference Between 24 hr Monitored Background and On Site PM ₁₀ (%)
July 2018			
01/07/2018	4.71	16.67	-72
02/07/2018	9.10	15.08	-40
03/07/2018	35.47	12.09	193
04/07/2018	6.97	17.21	-60
05/07/2018	6.67	22.11	-70
06/07/2018	8.21	21.31	-61
07/07/2018	6.33	24.25	-74
08/07/2018	3.81	13.29	-71
09/07/2018	6.56	14.45	-55
10/07/2018	2.86	10.20	-72
11/07/2018	0.17	12.16	-99
12/07/2018	0.20	16.40	-99
13/07/2018	0.24	16.82	-99
14/07/2018	0.38	14.50	-97
15/07/2018	0.47	11.28	-96
16/07/2018	3.08	12.41	-75
17/07/2018	Data Unavailable	8.65	Data Unavailable
18/07/2018	Data Unavailable	8.73	Data Unavailable
19/07/2018	Data Unavailable	13.24	Data Unavailable
20/07/2018	Data Unavailable	13.53	Data Unavailable
21/07/2018	Data Unavailable	17.38	Data Unavailable
22/07/2018	Data Unavailable	11.84	Data Unavailable
23/07/2018	Data Unavailable	10.99	Data Unavailable
24/07/2018	Data Unavailable	12.52	Data Unavailable
25/07/2018	15.60	13.66	14
26/07/2018	5.29	23.79	-78
27/07/2018	3.50	17.65	-80
28/07/2018	4.38	11.34	-61
29/07/2018	1.46	5.56	-74
30/07/2018	1.60	6.18	-74
31/07/2018	2.29	6.77	-66

Figure 4.1 Comparison of On Site Monitored PM₁₀ at Phase 1 Monitoring Location 1A and Off Site Monitoring





As shown above, monitoring trends on site generally match trends at surrounding background monitoring sites.

Table 4.4 below shows the monitored PM_{2.5} on the site compared to the closest Urban Background and Roadside monitoring stations operated by the council to assess whether the PM_{2.5} on site is being distributed in a pattern similar to the local area and to identify any anomalous results.

Table 4.4 PM_{2.5} Results 24-hour monitoring results compared with background levels

Date	Average 24 hr Period PM _{2.5} Monitored (µg/m ³) on site	Average 24 hr Period PM _{2.5} Monitored at Urban Background AURN	Difference Between 24 hr Monitored Background and On Site PM ₁₀ (%)
July 2018			
01/07/2018	0.95	6.86	-86
02/07/2018	0.94	4.24	-78
03/07/2018	2.87	4.28	-33
04/07/2018	1.78	9.53	-81
05/07/2018	2.52	13.50	-81
06/07/2018	3.29	13.18	-75
07/07/2018	2.80	17.08	-84
08/07/2018	1.46	8.33	-83
09/07/2018	1.52	7.20	-79
10/07/2018	0.48	4.81	-90
11/07/2018	0.16	6.98	-98
12/07/2018	0.18	9.39	-98
13/07/2018	0.22	10.11	-98
14/07/2018	0.33	9.07	-96
15/07/2018	0.41	7.45	-94
16/07/2018	0.94	6.65	-86
17/07/2018	Data Unavailable	3.60	Data Unavailable
18/07/2018	Data Unavailable	4.15	Data Unavailable
19/07/2018	Data Unavailable	5.84	Data Unavailable
20/07/2018	Data Unavailable	6.97	Data Unavailable
21/07/2018	Data Unavailable	11.78	Data Unavailable
22/07/2018	Data Unavailable	7.24	Data Unavailable
23/07/2018	Data Unavailable	5.04	Data Unavailable
24/07/2018	Data Unavailable	6.54	Data Unavailable
25/07/2018	2.14	7.01	-69
26/07/2018	2.42	14.90	-84
27/07/2018	1.28	9.50	-87
28/07/2018	0.61	5.07	-88
29/07/2018	0.27	3.13	-91
30/07/2018	0.35	3.18	-89
31/07/2018	0.40	3.74	-89



Table 4.5 Comparison of Weather Conditions and average levels of PM₁₀ and PM_{2.5}

Date	Wind Directions	Wind Speed (mph)	Weather Conditions	Average 24 hr Period PM ₁₀ Monitored (µg/m³) on site	Average 24 hr Period PM _{2.5} Monitored (µg/m³) on site
July 2018					
01/07/2018	North East	14	Fair	4.71	0.95
02/07/2018	East North East	17	Fair	9.10	0.94
03/07/2018	East North East	18	Fair	35.47	2.87
04/07/2018	East North East	10	Fair	6.97	1.78
05/07/2018	West South West	9	Fair	6.67	2.52
06/07/2018	North	8	Fair	8.21	3.29
07/07/2018	West North West	9	Fair	6.33	2.80
08/07/2018	North	9	Fair	3.81	1.46
09/07/2018	North	9	Fair	6.56	1.52
10/07/2018	North East	12	Fair	2.86	0.48
11/07/2018	North East	10	Fair	0.17	0.16
12/07/2018	North East	8	Fair	0.20	0.18
13/07/2018	East North East	10	Fair	0.24	0.22
14/07/2018	South West	11	Fair	0.38	0.33
15/07/2018	West	8	Fair	0.47	0.41
16/07/2018	West	13	Fair	3.08	0.94
17/07/2018	West	18	Fair	Data Unavailable	
18/07/2018	West South West	11	Fair		
19/07/2018	South	9	Fair		
20/07/2018	South	11	Fair		
21/07/2018	West	9	Fair		
22/07/2018	West	10	Fair		
23/07/2018	South West	13	Fair		
24/07/2018	South West	14	Fair		
25/07/2018	North West	8	Fair	15.60	2.14
26/07/2018	South	14	Fair	5.29	2.42
27/07/2018	West	7	Fair	3.50	1.28
28/07/2018	South West	17	Fair	4.38	0.61
29/07/2018	South South West	15	Light Rain	1.46	0.27
30/07/2018	South South West	12	Fair	1.60	0.35
31/07/2018	South West	10	Fair	2.29	0.40



Phase 1 Monitoring Location 1B Results

Table 4.8 and Figure 4.2 below show the monitored PM₁₀ on the site compared to the closest Urban Background and Roadside monitoring stations operated by the council so as to assess whether the PM₁₀ on site is being distributed in a pattern similar to the local area and to identify any anomalous results.

The on-site monitoring results have been further analysed to determine any exceedances of the 15-minute traffic criteria outlined in Section 3. These have been split into the number of exceedances within and outside of site working hours as highlighted below in Table 4.9.

Table 4.9 Exceedances of 15-minute Absolute Level Criteria for PM₁₀

Date	Exceedance of 'Green' Criteria	Exceedance of 'Amber' Criteria	Exceedance of 'Red' Criteria
July 2018			
01/07/2018	0	0	0
02/07/2018	0	0	0
03/07/2018	0	0	0
04/07/2018	0	0	0
05/07/2018	0	0	0
06/07/2018	0	0	0
07/07/2018	0	0	0
08/07/2018	0	0	0
09/07/2018	0	0	0
10/07/2018	0	0	0
11/07/2018	1	0	0
12/07/2018	0	0	0
13/07/2018	0	0	0
14/07/2018	0	0	0
15/07/2018	0	0	0
16/07/2018	0	0	0
17/07/2018	0	0	0
18/07/2018	0	0	0
19/07/2018	0	0	0
20/07/2018	0	0	0
21/07/2018	0	0	0
22/07/2018	0	0	0
23/07/2018	0	0	0
24/07/2018	0	0	0
25/07/2018	0	0	0
26/07/2018	0	0	0
27/07/2018	0	0	0
28/07/2018	0	0	0
29/07/2018	0	0	0
30/07/2018	0	0	0
31/07/2018	0	0	0



Date	Exceedance of 'Green' Criteria	Exceedance of 'Amber' Criteria	Exceedance of 'Red' Criteria
*recorded outside working hours			

The on-site monitoring results have been further analysed to determine any exceedances of the 15-minute traffic criteria outlined in Section 3. These have been split into the number of exceedances within and outside of site working hours as highlighted below in Table 4.2.

Table 4.2 Exceedances of 15 minute Absolute Level Criteria for PM_{2.5}

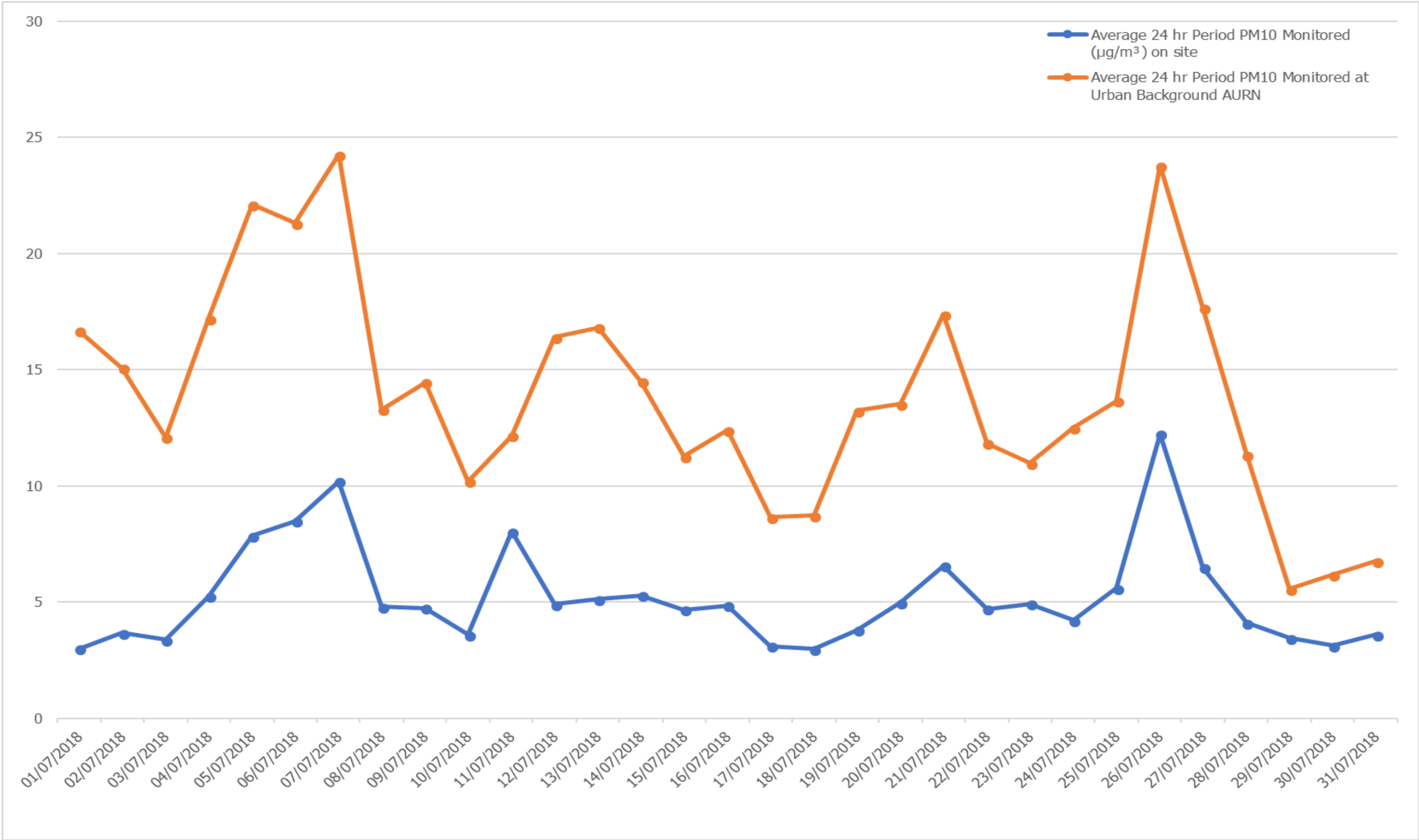
Date	Exceedance of 'Green' Criteria	Exceedance of 'Amber' Criteria	Exceedance of 'Red' Criteria
July 2018			
01/07/2018	0	0	0
02/07/2018	0	0	0
03/07/2018	0	0	0
04/07/2018	0	0	0
05/07/2018	0	0	0
06/07/2018	0	0	0
07/07/2018	0	0	0
08/07/2018	0	0	0
09/07/2018	0	0	0
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24/07/2018	0	0	0
25/07/2018	0	0	0
26/07/2018	0	0	0
27/07/2018	0	0	0
28/07/2018	0	0	0
29/07/2018	0	0	0
30/07/2018	0	0	0
31/07/2018	0	0	0
*recorded outside working hours			

Table 4.8 PM₁₀ 24-hour monitoring results compared with background levels



Date	Average 24 hr Period PM ₁₀ Monitored (µg/m ³) on site	Average 24 hr Period PM ₁₀ Monitored at Urban Background AURN	Difference Between 24 hr Monitored Background and On Site PM ₁₀ (%)
July 2018			
01/07/2018	3.00	16.67	-82
02/07/2018	3.67	15.08	-76
03/07/2018	3.39	12.09	-72
04/07/2018	5.25	17.21	-69
05/07/2018	7.85	22.11	-65
06/07/2018	8.50	21.31	-60
07/07/2018	10.19	24.25	-58
08/07/2018	4.80	13.29	-64
09/07/2018	4.74	14.45	-67
10/07/2018	3.60	10.20	-65
11/07/2018	8.03	12.16	-34
12/07/2018	4.90	16.40	-70
13/07/2018	5.13	16.82	-70
14/07/2018	5.28	14.50	-64
15/07/2018	4.66	11.28	-59
16/07/2018	4.86	12.41	-61
17/07/2018	3.10	8.65	-64
18/07/2018	2.97	8.73	-66
19/07/2018	3.80	13.24	-71
20/07/2018	4.98	13.53	-63
21/07/2018	6.57	17.38	-62
22/07/2018	4.71	11.84	-60
23/07/2018	4.93	10.99	-55
24/07/2018	4.21	12.52	-66
25/07/2018	5.60	13.66	-59
26/07/2018	12.24	23.79	-49
27/07/2018	6.48	17.65	-63
28/07/2018	4.10	11.34	-64
29/07/2018	3.44	5.56	-38
30/07/2018	3.12	6.18	-50
31/07/2018	3.60	6.77	-47

Figure 4.2 Comparison of On Site Monitored PM₁₀ at Phase 1 Monitoring Location 1B Results and Off-Site Monitoring



As shown above, monitoring trends on site generally match trends at surrounding background monitoring sites.

Table 4.10 below shows the monitored PM_{2.5} on the site compared to the closest Urban Background monitoring stations operated by the council so as to assess whether the PM_{2.5} on site is being distributed in a pattern similar to the local area and to identify any anomalous results.

Table 4.10 PM_{2.5} Results 24-hour monitoring results compared with background levels

Date	Average 24 hr Period PM _{2.5} Monitored (µg/m ³) on site	Average 24 hr Period PM _{2.5} Monitored at Urban Background AURN (µg/m ³)	Difference Between 24 hr Monitored Background and On Site PM ₁₀ (%)
July 2018			
01/07/2018	2.00	6.86	-71
02/07/2018	1.92	4.24	-55
03/07/2018	1.33	4.28	-69
04/07/2018	3.54	9.53	-63
05/07/2018	5.01	13.50	-63
06/07/2018	6.50	13.18	-51
07/07/2018	8.52	17.08	-50
08/07/2018	4.05	8.33	-51
09/07/2018	3.57	7.20	-50
10/07/2018	2.53	4.81	-47
11/07/2018	4.18	6.98	-40
12/07/2018	3.99	9.39	-58
13/07/2018	3.86	10.11	-62
14/07/2018	4.47	9.07	-51
15/07/2018	3.73	7.45	-50
16/07/2018	3.08	6.65	-54
17/07/2018	2.13	3.60	-41
18/07/2018	2.14	4.15	-48
19/07/2018	2.84	5.84	-51
20/07/2018	3.94	6.97	-44
21/07/2018	5.41	11.78	-54
22/07/2018	3.94	7.24	-46
23/07/2018	4.00	5.04	-21
24/07/2018	3.53	6.54	-46
25/07/2018	4.23	7.01	-40
26/07/2018	9.74	14.90	-35
27/07/2018	5.43	9.50	-43
28/07/2018	2.90	5.07	-43
29/07/2018	2.78	3.13	-11
30/07/2018	2.55	3.18	-20
31/07/2018	2.75	3.74	-26

**Table 4.11 Comparison of Weather Conditions and average levels of PM₁₀ and PM_{2.5}**

Date	Wind Directions	Wind Speed (mph)	Weather Conditions	Average 24 hr Period PM ₁₀ Monitored (µg/m ³) on site	Average 24 hr Period PM _{2.5} Monitored (µg/m ³) on site
July 2018					
01/07/2018	North East	14	Fair	3.00	2.00
02/07/2018	East North East	17	Fair	3.67	1.92
03/07/2018	East North East	18	Fair	3.39	1.33
04/07/2018	East North East	10	Fair	5.25	3.54
05/07/2018	West South West	9	Fair	7.85	5.01
06/07/2018	North	8	Fair	8.50	6.50
07/07/2018	West North West	9	Fair	10.19	8.52
08/07/2018	North	9	Fair	4.80	4.05
09/07/2018	North	9	Fair	4.74	3.57
10/07/2018	North East	12	Fair	3.60	2.53
11/07/2018	North East	10	Fair	8.03	4.18
12/07/2018	North East	8	Fair	4.90	3.99
13/07/2018	East North East	10	Fair	5.13	3.86
14/07/2018	South West	11	Fair	5.28	4.47
15/07/2018	West	8	Fair	4.66	3.73
16/07/2018	West	13	Fair	4.86	3.08
17/07/2018	West	18	Fair	3.10	2.13
18/07/2018	West South West	11	Fair	2.97	2.14
19/07/2018	South	9	Fair	3.80	2.84
20/07/2018	South	11	Fair	4.98	3.94
21/07/2018	West	9	Fair	6.57	5.41
22/07/2018	West	10	Fair	4.71	3.94
23/07/2018	South West	13	Fair	4.93	4.00
24/07/2018	South West	14	Fair	4.21	3.53
25/07/2018	North West	8	Fair	5.60	4.23
26/07/2018	South	14	Fair	12.24	9.74
27/07/2018	West	7	Fair	6.48	5.43
28/07/2018	South West	17	Fair	4.10	2.90
29/07/2018	South South West	15	Light Rain	3.44	2.78
30/07/2018	South South West	12	Fair	3.12	2.55
31/07/2018	South West	10	Fair	3.60	2.75

5.0 Discussion and Summary

During the sixth month of monitoring at the former NIMR site, Mill Hill, due to the relocation of meter 1A by on site operatives, data loss occurred during the period of 16th July to 25th July. The monitor 1A was moved from its original location on the iron fencing, to inside the site on hoarding next to the main site HGV access route. By moving the meter, this ensures that the worst-case dust levels on site are monitored, so that if any exceedances are experienced within the site, these can be mitigated so that the sensitive receptors closest to the site do not experience any issues associated with the onsite works.

WYG technicians attended site on the 25th July to amend the issues with the relocated monitor, and therefore data reporting at location 1A continued from 12:45, 25th July. Monitor 1B has not been moved on the site and has continuously recorded data throughout July.

The sixth month of monitoring at the former NIMR site, Mill Hill, Barnet during Phase 1 at Monitoring Location 1A shows four exceedances of the PM₁₀ 'red' criteria. These exceedances occurred on 3rd July at 08:00, 09:00, 09:15 and 09:30. During this period on the 3rd July, no adverse weather conditions were observed, and monitored background PM₁₀ concentrations were not elevated. Therefore, a review of on-site activities during this period will be performed.

Additionally, 12 exceedances of the 'amber' criteria, and 13 exceedances of the 'green' PM₁₀ criteria were monitored at Location 1A during July. There were no monitored exceedances of the 'red', 'amber' or 'green' criteria for PM_{2.5} during July.

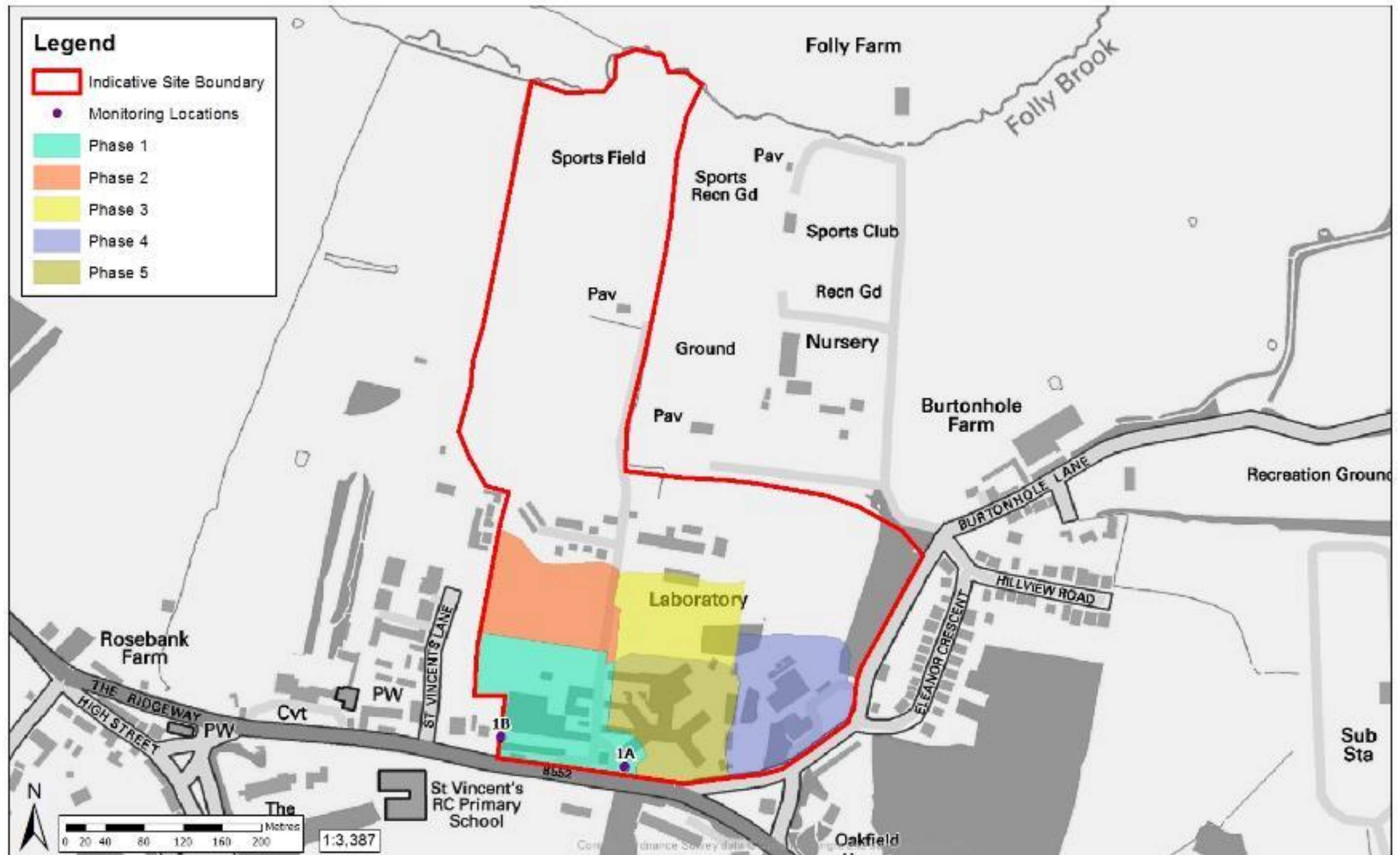
The sixth month of monitoring at the former NIMR site, Mill Hill, Barnet during Phase 1 at Monitoring Location 1B for PM₁₀ showed no exceedances of the 'red' and 'amber' criteria and one exceedance of the 'green' criteria. The exceedance of the green criteria occurred within working hours on the 11th July 2018. At location 1B, there were no monitored exceedances of the 'red', 'amber' or 'green' criteria for PM_{2.5}.

Ongoing investigations into site activities which may have been causal of previous exceedances of monitoring criteria have been conducted throughout July. In addition to this, immediate e-mail alerts have been arranged to notify WYG and Barratts London when any exceedances of the PM₁₀ and PM_{2.5} criteria occur. The main demolition phase has now been completed, however to ensure the effects from the construction phase of the development are monitored sufficiently, WYG will continue to monitor the concentrations of PM₁₀ and PM_{2.5} on site. These will continue to be cross-checked with the construction schedule to identify appropriate dynamic locations of the air quality monitors, any issues and to inform any required future mitigation measures.



Figures

Figure 1 Monitoring Locations





Appendix A Red Limit Exceedances

Red Limit Exceedances

An assessment using the traffic light approach based on sections 5.3.2 and the IAQM document 'Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites (2012)' was conducted for the site. The in-detail results with the date, time and recorded PM₁₀ levels over 250 and PM_{2.5} levels over 48 are outlined in Tables A1. These are regarded as "red" level.

Table A1 Date and Times of PM₁₀ Red Limit Exceedances at Phase 1 Monitoring Location 1A

Date	Time	PM ₁₀ (µg/m ³)	Recorded Weather Conditions
03/07/2018	08:00	257.237	Fair
	09:00	294.410	
	09:15	350.199	
	09:30	307.511	