Air Quality Assessment

AUM a Crematorium by Anoopam Mission, Denham

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Executive Summary

Redmore Environmental Ltd was commissioned by Marchini Curran Associates on behalf of Anoopam Mission to undertake an Air Quality Assessment in support of a planning application for a crematorium on land at the Shree Swaminarayan Spiritual Cultural & Community Centre, The Lea, Denham.

The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was required in order to determine baseline conditions and consider potential effects as a result of the scheme.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of earthworks, construction and trackout activities. It is considered that the use of good practice control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. Due to the relatively low number of anticipated vehicle trips associated with the proposals, road traffic impacts were not predicted to be significant.

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

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Appendix 1 - Curricula Vitae

1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Marchini Curran Associates on behalf of Anoopam Mission to undertake an Air Quality Assessment in support of a planning application for a crematorium on land at the Shree Swaminarayan Spiritual Cultural & Community Centre, The Lea, Denham.

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

1.2 Site Location and Context

1.2.1 The site is located on land at the Shree Swaminarayan Spiritual Cultural & Community Centre, The Lea, Denham, at approximate National Grid Reference (NGR): 505100, 186020. Reference should be made to Figure 1 for a site location plan.

1.2.2 The proposed development is for a new crematorium designed specifically to respond to the ritual needs of the Hindu community, in the grounds of the Shree Swaminarayan Spiritual Cultural & Community Centre, the UK base of Anoopam Mission.

1.2.3 The new accommodation will comprise the crematorium building itself (ritual and ceremonial, operational and administrative spaces), a separate, smaller 'canteen' with washing facilities (for those partaking of a ritual meal) and associated car parking amidst new and existing woodland.

1.3 Assessment Scope

1.3.1 There is the potential for the following air quality impacts as a result of the development:

- Fugitive dust emissions during the construction phase of the proposals; and,

- Road traffic exhaust emissions as a result of vehicle movements associated with the operational phase of the proposals.

1.3.2 An Air Quality Assessment has therefore been undertaken in order to consider effects at sensitive locations and identify any mitigation required to control releases to an acceptable level. This is detailed in the following report.

1.3.3 The development will also result in atmospheric emissions during cremations. At the time of reporting the exact technology had not been selected, with the potential for gas or electric plant to be utilised. As such, an assessment of potential air quality impacts could not be undertaken. However, the cremation of human remains is a process covered by Section 5.1 Part B (b) of the Environmental Permitting (England and Wales) Regulations (2016). As such, the applicant is required to obtain an Environmental Permit for the facility from the Local Authority (LA) prior to operation. This will necessitate the completion of a further Air Quality Assessment to quantify potential effects associated with process emissions from the site. Should the results indicate unacceptable impacts then the LA may refuse the application. As such, there is a suitable control mechanism to ensure significant air quality impacts do not occur as a result of the proposals.

1.3.4 It should be noted that in accordance with the requirements of the National Planning Policy Framework (NPPF)[1], the planning regime must work on the basis that the Environmental Permitting process will be effective in controlling impacts. This is consistent with recent planning appeal decisions, such as that for Appeal Ref: APP/P3420/W/15/3138033. As such, it is considered that omission of process emissions from the scope of the Air Quality Assessment should not be viewed as a reason for objection.

[1] NPPF, Ministry of Housing, Communities and Local Government, 2019.

2.0 LEGISLATION AND POLICY

2.1 European Directives

2.1.1 European Union (EU) air quality legislation is provided within Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new Air Quality Limit Values (AQLVs) for particulate matter with an aerodynamic diameter of less than 2.5µm. The consolidated Directives include:

- Directive 1999/30/EC - the First Air Quality "Daughter" Directive - sets ambient AQLVs for nitrogen dioxide (NO_2), oxides of nitrogen, sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs 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.

2.1.2 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.

2.2 UK Legislation

2.2.1 The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and transpose EU Directive 2008/50/EC into UK law. AQLVs were published in these regulations for 7 pollutants, as well as Air Quality Target Values for an additional 5 pollutants.

2.2.2 Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for

Environment, Food and Rural Affairs (DEFRA) and published in July 2007[2]. The AQS sets out Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.2.3 Table 1 presents the AQOs for pollutants considered within this assessment.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m^3)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum

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

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

2 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

3 Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.3 Local Air Quality Management

2.3.1 Under Section 82 of the Environment Act (1995) (Part IV) LAs are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 Dust

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

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

2.4.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

2.5 National Planning Policy

2.5.1 The revised NPPF[4] was published in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied.

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

> "c) - An environmental objective - to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

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

> "Planning policies and decisions should contribute to and enhance the natural and local environment by:
>
> […]
>
> preventing new and existing development from contributing to, or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of

[4] NPPF, Ministry of Housing, Communities and Local Government, 2019.

soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality […]"

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

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

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

2.6 National Planning Practice Guidance

2.6.1 The National Planning Practice Guidance[5] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?

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

6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

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

2.7 Local Planning Policy

2.7.1 South Bucks District Council (SBDC) adopted the Core Strategy Development Plan Document (DPD)[6] in February 2011. The Core Strategy DPD is the key document in the South Bucks Local Plan. It presents the 'big picture', setting a long term vision, objectives and broad strategy for accommodating future development in the district until 2026.

2.7.2 A review of the Core Strategy DPD indicated the following policy in relation to air quality of relevance to the assessment:

> "Core Policy 13: Environmental and Resource Management
>
> The Council will seek to ensure the prudent and sustainable management of the District's environmental resources by:
>
> […]
>
> - Seeking improvements in air quality, especially in the Air Quality Management Area adjacent to the motorways and close to Burnham Beeches SAC.
>
> New development will be directed away from existing sources of noise and air pollution to avoid adverse impacts on local communities. The Council will work closely with other local authorities to minimise aircraft noise from Heathrow Airport.
>
> […]."

[6] Core Strategy DPD, SBDC, 2011.

2.7.3 This policy has been considered throughout the report by considering potential air quality impacts as a result of the proposed development.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause adverse impacts as a result of construction phase dust emissions and exhaust emissions from vehicles travelling to and from the site during the operational phase. These were assessed in accordance with the following methodology.

3.2 Construction Phase Assessment

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1'[7].

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

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

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

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

3.2.4 The assessment steps are detailed below.

[7] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Step 1

3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route up to 500m from the site entrance, then the assessment also proceeds to Step 2.

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

Step 2

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

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

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

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

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total volume of building to be demolished greater than 50,000m^3 • Potentially dusty material (e.g. concrete) • On-site crushing and screening • Demolition activities more than 20m above ground level

Magnitude	Activity	Criteria
	Earthworks	• Total site area greater than 10,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than 10 heavy earth moving vehicles active at any one time • Formation of bunds greater than 8m in height • More than 100,000 tonnes of material moved
	Construction	• Total building volume greater than 100,000m^3 • On site concrete batching • Sandblasting
	Trackout	• More than 50 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Demolition	• Total volume of building to be demolished between 20,000m^3 and 50,000m^3 • Potentially dusty construction material • Demolition activities 10m to 20m above ground level
	Earthworks	• Total site area 2,500m^2 to 10,000m^2 • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m^3 to 100,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10 to 50 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m
Small	Demolition	• Total volume of building to be demolished less than 20,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities less than 10m above ground and during wetter months

Magnitude	Activity	Criteria
	Earthworks	• Total site area less than 2,500m^2 • Soil type with large grain size (e.g. sand) • Less than 5 heavy earth moving vehicles active at any one time • Formation of bunds less than 4m in height • Total material moved less than 20,000 tonnes • Earthworks during wetter months
	Construction	• Total building volume less than 25,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 10 HDV trips per day • Surface material with low potential for dust release • Unpaved road length less than 50m

3.2.10 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 4.

Table 4 Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	• Users expect high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the AQO for PM_{10}. e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation
Medium	• Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	• Nationally designated site e.g. Site of Special Scientific Interest

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
Low	• Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, shopping streets, playing fields, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve (LNR)

3.2.11 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby site;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

3.2.12 These factors were considered in the undertaking of this assessment.

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

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

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

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

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

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m^3	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m^3	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m^3	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m^3	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	Greater than 32µg/m^3	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
	28 - 32µg/m^3	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m^3	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m^3	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low	Low

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

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

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

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

3.2.17 Table 8 outlines the risk category from demolition activities.

Table 8 Construction Dust - Dust Risk Category from Demolition Activities

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

3.2.18 Table 9 outlines the risk category from construction activities.

Table 9 Construction Dust - Dust Risk Category from Earthworks and Construction Activities

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

3.2.19 Table 10 outlines the risk category from trackout activities.

Table 10 Construction Dust - Dust Risk Category from Trackout Activities

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

Step 3

3.2.20 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance[8] to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For site with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

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

3.2.22 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. The IAQM guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

3.3 Operational Phase Assessment

3.3.1 The development has the potential to increase concentrations of NO_2 and PM_{10} as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'[9] guidance to determine the potential for trips generated by the development to affect local air quality.

3.3.2 The following criteria are provided to help establish when an assessment of potential impacts on the local area is likely to be considered necessary:

[8] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

[9] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

- A change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 AADT elsewhere;
- A change of HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- Realignment of roads where the change is 5m or more and the road is within an AQMA; or,
- Introduction of a new junction or removal of an existing junction near to relevant receptors.

3.3.3 Should these criteria not be met, then the IAQM guidance[10] considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

3.3.4 Should screening of the relevant data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations should be considered further. The significance of predicted impacts can then be determined in accordance with the principles of the the IAQM guidance[11].

[10] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

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

4.0 BASELINE

4.1 Introduction

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

4.2 Local Air Quality Management

4.2.1 As required by the Environment Act (1995), SBDC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 are above the relevant AQO within the district. As such, one AQMA has been declared. This is described as follows:

> "An area comprising the M4, M25 and M40 and adjacent land."

4.2.2 The development is located approximately 90m north of the SBDC AQMA. As such, any NO_2 emissions from the scheme may cause further deterioration of air quality within this sensitive area. This has been considered throughout the assessment.

4.2.3 SBDC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.2.4 The development is also located approximately 50m west of the Hillingdon AQMA. This has been declared due to exceedences of the annual mean AQO for NO_2 and is described as follows:

> "The area from the southern boundary north to the border defined by, the A40 corridor from the western borough boundary, east to the intersection with the Yeading Brook north until its intersection with the Chiltern-Marylebone railway line."

4.2.5 The Hillingdon AQMA was also considered throughout the assessment as necessary.

4.3 Air Quality Monitoring

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

Table 11 Monitoring Results

Monitoring Site		Monitored NO_2 Concentration (µg/m³)		
		2016	2017	2018
5	New Denham, Oxford Rd/Knighten Way	33	32	33

4.3.2 As shown in Table 11, annual mean NO_2 concentrations were below the AQO of 40µg/m³ at the 5 - New Denham, Oxford Rd/Knighten Way monitor in recent years.

4.3.3 Reference should be made to Figure 2 for a map of the survey position.

4.3.4 SBDC do not undertake monitoring of PM_{10} concentrations within the vicinity of the site.

4.4 Background Pollutant Concentrations

4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 505500, 186500. Data for this location was downloaded from the DEFRA website[12] for the purpose of this assessment and is summarised in Table 12.

Table 12 Background Pollutant Concentrations

Pollutant	Predicted 2019 Background Pollutant Concentration (µg/m³)
NO_2	16.61
PM_{10}	14.84

[12] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017.

4.4.2 As shown in Table 12, predicted background concentrations are below the relevant AQOs at the development site.

5.0 ASSESSMENT

5.1 Introduction

5.1.1 There is the potential for air quality impacts as a result of the construction and operation of the proposed development. These are assessed in the following Sections.

5.2 Construction Phase Assessment

Step 1

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

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

5.2.3 Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 13.

Table 13 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	0	1
Up to 50	0	1
Up to 100	0	-
Up to 350	10 - 100	-

5.2.4 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 14.

Table 14 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	0	1
Up to 50	10 - 100	1

5.2.5 Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust soiling and human health impacts was determined as **high**. This was because the identified receptors included residential properties.

5.2.6 The sensitivity of the receiving environment to potential impacts on ecological sites was determined as **low**. This was because the identified receptor was the Denham Quarry Park LNR.

5.2.7 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 15.

Table 15 Sensitivity of the Surrounding Area

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

5.2.8 The potential risk of dust impacts at the identified receptors is considered in the following Sections.

Step 2

Demolition

5.2.9 Demolition will be undertaken at the start of the construction phase and will involve clearance of the existing buildings on site. It is estimated that the building volume to be demolished is less than 20,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **small**.

5.2.10 Table 15 indicates the sensitivity of the area to dust soiling effects on people and property is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **negligible** risk site for dust soiling as a result of demolition activities.

5.2.11 Table 15 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **negligible** risk site for human health impacts as a result of demolition activities.

5.2.12 Table 15 indicates the sensitivity of the area to ecological impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **negligible** risk site for ecological impacts as a result of demolition activities.

Earthworks

5.2.13 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The proposed development site covers an area greater than 10,000m^2. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **large**.

5.2.14 Table 15 indicates the sensitivity of the area to dust soiling effects on people and property is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for human health impacts as a result of earthworks.

5.2.15 Table 15 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for human health impacts as a result of earthworks.

5.2.16 Table 15 indicates the sensitivity of the area to ecological impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for ecological impacts as a result of earthworks.

Construction

5.2.17 Due to the size of the development the total building volume is likely to be between 25,000m^3 and 100,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **medium**.

5.2.18 Table 15 indicates the sensitivity of the area to dust soiling effects on people and property is **low**. In accordance with the criteria outlined Table 8, the development is considered to be a **low** risk site for dust soiling as a result of construction activities.

5.2.19 Table 15 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for human health impacts as a result of construction activities.

5.2.20 Table 15 indicates the sensitivity of the area to ecological impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for ecological impacts as a result of construction activities.

Trackout

5.2.21 Based on the existing hard surfaced access routes around the site, it is anticipated that the unpaved road length is likely to be less than 50m. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **small**.

5.2.22 Table 15 indicates the sensitivity of the area to dust soiling effects to people and property is **low**. In accordance with the criteria outlined in Table 10, the development is considered to be a **negligible** risk site for dust soiling as a result of trackout activities.

5.2.23 Table 15 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 10, the development is considered to be a **negligible** risk site for human health impacts as a result of trackout activities.

5.2.24 Table 15 indicates the sensitivity of the area to ecological impacts is **low**. In accordance with the criteria outlined in Table 10, the development is considered to be a **negligible** risk site for ecological impacts as a result of trackout activities.

Summary of the Risk of Dust Effects

5.2.25 A summary of the risk from each dust generating activity is provided in Table 16.

Table 16 Summary of Potential Unmitigated Dust Risks during Construction

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

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

Step 3

5.2.27 The IAQM guidance[13] provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 17. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan or similar if required by the LA.

13 Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Table 17 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• 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
Site management	• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken • Make the complaints log available to the LA upon request • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Monitoring	• Carry out regular site inspections, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
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 • Avoid site runoff of water or mud
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
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate
Waste management	• Avoid bonfires or burning of waste materials
Trackout	• Ensure vehicles entering and leaving site are covered to prevent escape of materials • Implement a wheel washing system, if required

Step 4

5.2.28 Assuming the relevant mitigation measures outlined in Table 17 are implemented, the residual impact from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance[14].

5.3 Operational Phase Assessment

5.3.1 Any vehicle movements associated with the development will generate exhaust emissions on the local and regional road networks. Predicted trip generation from the proposals was provided by Exigo Project Solutions, the Transport Consultants for the project. This indicated that the scheme is anticipated to generate 691 LDV movements and 24 HDV movements per day. Reference should be made to the Transport Assessment for a detailed calculation methodology.

5.3.2 Information was also provided to describe anticipated distribution of the relevant vehicle movements. This is summarised in Table 18.

Table 18 Trip Distribution

Route	Change in AADT Flow	Base AADT Flow	Change as Proportion of Base (%)
A40 towards London	357	105,784	0.34
A40 towards Tatling End	15	41,017	0.04
A4020 towards Uxbridge	3	19,685	0.01
M40 towards M25	317	107,094	0.30

5.3.3 The A40 towards Tatling End and A4020 towards Uxbridge are not within an AQMA. As shown in Table 18, the predicted change in LDV flow is under 500 AADT on these links. As such, potential air quality impacts are predicted to be **not significant**, in accordance with the IAQM[15] screening criteria shown in Section 3.3.

[14] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

[15] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

5.3.4 The M40 towards the M25 is within an AQMA. However, there is only 1 residential property located inside the AQMA within the vicinity of this link. The dwelling is approximately 85m from the road centreline. It is considered unlikely that an increase in AADT flow of 0.30% of the base would affect air quality over a distance of this magnitude. As such, potential impacts are predicted to be **not significant**.

5.3.5 The A40 towards London is also within an AQMA. However, similarly to the M40, there are few residential properties within the vicinity of this link, with the closest dwelling approximately 75m from the road centreline. It is considered unlikely that an increase in AADT flow of 0.34% of the base would affect air quality over a distance of this magnitude. As such, potential impacts are predicted to be **not significant**.

5.3.6 Based on the above, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant**.

6.0 CONCLUSION

6.1.1 Redmore Environmental Ltd was commissioned by Marchini Curran Associates on behalf of Anoopam Mission to undertake an Air Quality Assessment in support of a planning application for a crematorium on land at the Shree Swaminarayan Spiritual Cultural & Community Centre, The Lea, Denham.

6.1.2 The proposed development has the potential to cause air quality impacts during the construction and operational phases. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions at the site and assess potential air quality effects as a result of the scheme.

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

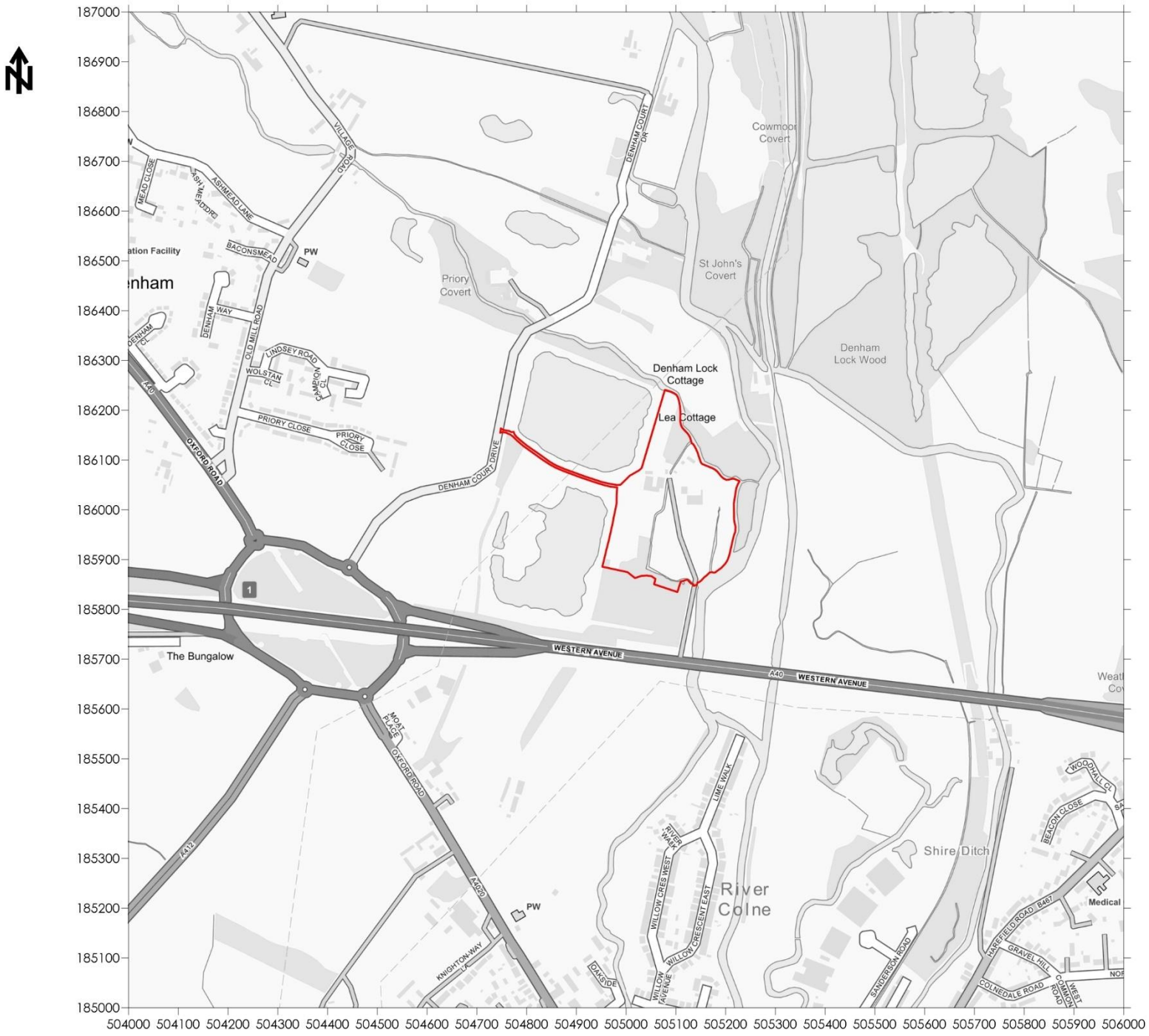
6.1.4 During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. Due to the relatively low number of anticipated vehicle trips associated with the proposals, road traffic exhaust impacts were predicted to be **not significant**.

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

7.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
DEFRA	Department for Environment, Food and Rural Affairs
DPD	Development Plan Document
EU	European Union
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
SBDC	South Bucks District Council

Figures



Legend

Site Boundary

Title
Figure 1 - Site Location

Project
Air Quality Assessment
AUM a Crematorium by Anoopam Mission, Denham

Project Reference
2846

Client
Anoopam Mission

Contains Ordnance Survey Data
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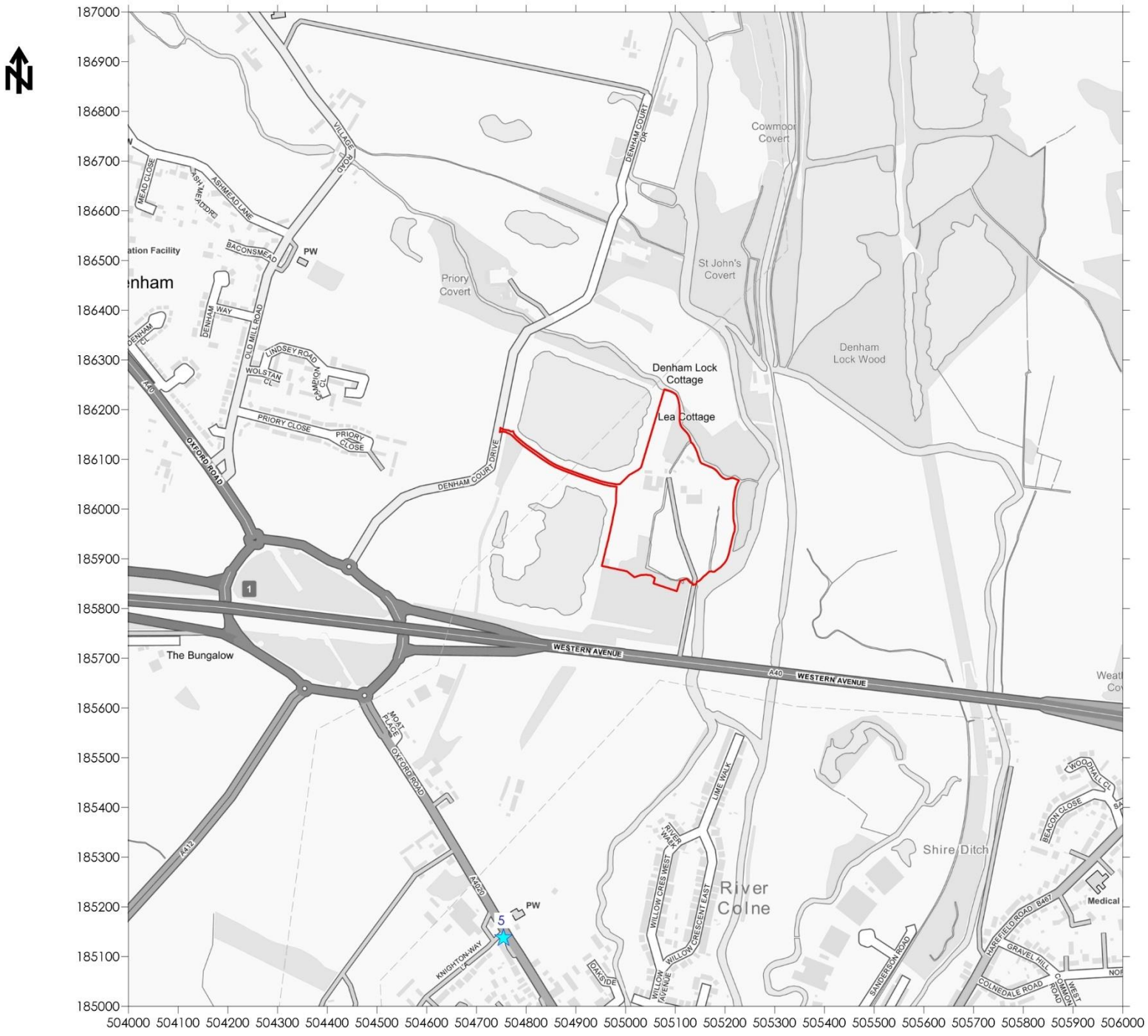

Legend

Site Boundary

Monitor

Title
Figure 2 - Monitoring Locations

Project
Air Quality Assessment
AUM a Crematorium by Anoopam Mission, Denham

Project Reference
2846

Client
Anoopam Mission

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Appendix 1 - Curricula Vitae

JETHRO REDMORE

Director

BEng (Hons), MSc, MIAQM, MIEnvSc, PIEMA, CEnv

KEY EXPERIENCE:

Jethro is a Chartered Environmentalist and Director of Redmore Environmental with specialist experience in the air quality and odour sectors. His key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Production and co-ordination of Environmental Permit applications for a variety of industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-5, AERMOD-PRIME and BREEZE-ROADS. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Provision of expert witness services at Planning Inquiries.
- Design and project management of pollutant monitoring campaigns.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies, as well as involvement in production of industry guidance.

SELECT PROJECTS SUMMARY:

Industrial

Shanks Waste Management - Odour Assessments of two waste management facilities to support Environmental Permit Applications.

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

Doha South Sewage Treatment Works - AQA for works extension in Qatar.

IRIS Environmental Appraisal Report Reviews, Isle of Man Government - odour assessment reviews.

Lankem, Greater Manchester - Environmental Permit Application for chemical manufacturing plant.

Newport Docks Bulk Drying, Pelleting and CHP Facility - air quality EIA for gas CHP.

Springshades, Leicester - Environmental Permit Variation Application for textile manufacturing plant.

Valspar, Chester - Odour Assessment and production of Odour Management Plan for a paint manufacturing plant in response to neighbour complaints.

Agrivert - dispersion modelling of odour and CHP emissions from numerous AD plants.

James Cropper Paper Mill, Cumbria - air quality EIA, Environmental Permit Variation and Human Health Risk Assessment for new biomass boiler adjacent to SSSI.

Rigg Approach, Leyton - Air Quality Assessment in support of waste transfer site.

Lynchford Lane Waste Transfer Station - biomass facility energy recovery plant.

Barnes Wallis Heat and Power, Cobham - biomass facility adjacent to AQMA.

Residential

Wood St Mill, Bury - residential development adjacent to scrap metal yard.

Hyams Lane, Holbrook - Odour Assessment to support residential development adjacent to sewage works.

North Wharf Gardens, London - peer review of EIA undertaken for large residential development.

Loxford Road, Alford - Air Quality EIA for residential development, included consideration of impacts from associated package sewage works

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

Castleford Growth Delivery Plan - baseline air quality constraints assessment for town redevelopment.

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

Etihad Stadium - Air Quality EIA for the extension to the capacity of the Etihad Stadium, Manchester.

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

National Youth Theatre, Islington - redevelopment to provide new arts space and accommodation.