Hyde New Build Ltd

Kingston Wharf, Shoreham-by-Sea

Air Quality Impact Assessment

MLM. Group

Part of Sweco

© MLM Consulting Engineers Limited

Notice

This document and its contents have been prepared and intended solely for Hyde New Build Ltd.'s information and use in relation to Kingston Wharf, Shoreham-by-Sea.

MLM Consulting Engineers Limited assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

Document History

Client: Hyde New Build Ltd
Project: Kingston Wharf, Shoreham-by-Sea
Document Title: Air Quality Impact Assessment
Document Reference: 774885-MLM-ZZ-XX-RP-J-0002
MLM Reference: DG/774885/KN

Revision	Status	Description	Author	Checked	Approved	Date
P01	S2		Tom Bartle	Karunakar Nagula	Karunakar Nagula	19/12/2019
C01	S2	Final after Client comments	Tom Bartle	Karunakar Nagula	Karunakar Nagula	10/01/2020

© MLM Consulting Engineers Limited

Contents

1 Executive Summary 1
2 Limitations and Exceptions 2
3 Introduction 3
3.1 General 3
3.2 Report Structure 3
3.3 Objectives 3
4 The Site 4
4.1 Location 4
4.2 Proposals 4
5 Air Quality Legislation, Policy and Guidance 5
5.1 International Legislation and Policy 5
5.2 National Legislation and Policy 5
5.3 Regional Planning Policy 8
5.4 Local Planning Policy 11
5.5 Guidance 12
6 Local Baseline Air Quality 13
6.1 Local Air Quality Management 13
6.2 Automatic Monitoring 13
6.3 Non-Automatic Monitoring 14
6.4 Defra Background Air Quality Data 14
6.5 Summary 15
7 Scope and Methodology 16
7.1 Scope 16
7.2 Methodology 16
8 Input for ADMS Roads Dispersion Modelling 20
8.1 General 20
8.2 The Assessment Years 20
8.3 Traffic Data 20
8.4 Emissions from Road Traffic 21
8.5 Receptors 21
8.6 Background Data Used In the Model 23
8.7 Model Verification 23
8.8 Meteorological Data 23
8.9 Other Parameters 23

9 Model Verification 24
9.1 General 24
9.2 Baseline Conditions 24
10 Model Results and Discussion 25
10.2 Comparison with Impact Descriptors – Existing Human Receptors 26
11 Construction Dust Assessment 30
11.1 Dust and PM_{10} from On-Site Activities 30
11.2 Assessment of Potential Dust Emission Magnitude 30
11.3 Sensitivity of the Surrounding Area 31
11.4 Defining the Risk of Impacts 32
11.5 Construction Vehicles & Plant 32
12 Mitigation 33
12.1 Construction Phase 33
12.2 Operational Phase 33
12.3 Sussex Air Quality and Emissions Mitigation Assessment 33
13 Conclusions 36

Figures

Figure 1: Site Location Plan
Figure 2: Proposed Site Layout
Figure 3: Monitoring Locations
Figure 4: Roads included within Model Domain
Figure 5: 2018 Road Transport UK Diurnal Profile
Figure 6: Existing and Proposed Receptors
Figure 7: Shoreham Airport Windrose 2018
Figure 8: Construction Dust Buffers

Appendix A - Methodology for Construction Dust Impact Assessment

Appendix B - EPUK/AQM Screening Criteria

Appendix C - Dust Mitigation Measures

1 Executive Summary

MLM Consulting Engineers Ltd was commissioned by Hyde New Build Ltd to undertake an Air Quality Assessment for the proposed mixed-use development at Kingston Wharf, Shoreham-by-Sea. This is in support of a planning application for a mixed-use redevelopment comprised of three blocks of residential dwellings (four to eight storeys) and mixed-use business centre (office, storage and café uses) - incorporating riverside walk, landscaping and ancillary car and cycle parking.

The proposed mixed-use development includes plans for 255 residential apartments in a four to eight storey building with basement car park and cycle parking, a B8 Storage and Distribution Centre (4,188m^2 GFA) and a separate two storey commercial building comprising of flexible B1/B8 (1,927m^2 GFA) and Business B1(a) uses (2,276m^2 GFA) ('Proposed Development'). A surface car park, loading bay and cycle parking spaces will be provided for the commercial floorspace. A public riverside walk and cycle path will also be provided together with flood defences and associated landscaping and highways works.

The Proposed Development lies within the administrative area governed by Adur & Worthing Councils (AWC), a joint management structure for Adur District and Worthing Borough Council. As required by AWC, the assessment has been undertaken in accordance with the Sussex Air Quality and Emissions Mitigation Guidance.

A qualitative assessment on the construction phase activities has been carried out. The risk of the different activities towards dust soiling was 'Negligible to Medium', and that for the human health impact was 'Negligible to Low'. Following the implementation of appropriate mitigation measures as outlined in the report, the impact of emissions during construction of the Proposed Development would be 'Negligible' and the effect 'Not Significant'.

Based on the detailed dispersion modelling undertaken, the air quality impacts on existing receptors during the operational phase are considered to be 'Negligible' and the effect 'Not Significant' for all modelled receptors. However, as per the requirements of Sussex Air Quality and Emissions Mitigation Guidance, an emissions mitigation assessment has been undertaken. This estimates that total calculated damage costs for the Proposed Development is £88,280.00.

In terms of the suitability of the site for its proposed use, detailed dispersion modelling shows that the air pollutant concentrations at the Proposed Development will be below the relevant air quality objectives. The site is suitable for its proposed use.

At this stage, the specifications of the gas boilers have not been confirmed. The energy strategy is expected to comprise gas-fired heating which will be implemented through a centralised system. This will comprise communal gas boilers for communal-based heating and hot water supply. Air-source heat pumps will also be used to compliment in providing cooling and space heating to commercial office spaces. However, if criteria set out within the IAQM/EPUK guidance is exceeded and/or does include CHP units, further dispersion modelling will be needed to determine its impacts.

Air quality constitutes a material consideration in the determination of planning applications. Based on the findings of this AQA, it is considered that air quality is not a constraint to the granting of planning permission for the Proposed Development.

DRAFT

© MLM Consulting Engineers Limited

2 Limitations and Exceptions

This report and its findings should be considered in relation to the Terms and Conditions proposed and scope of works agreed between MLM and the Client.

The Executive Summary, Conclusions and Recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon until considered in the context of the whole report.

This Report provides available factual data for the site and the surrounding area at the time of the study and as obtained by the means described in the text. The data is related to the site on the basis of the site location information provided by the Client.

It should be appreciated that the information that has been made available to date, is not necessarily exhaustive and that further information relevant to the proposed site usage may be provided which could change the overall findings.

The copyright in this report and other plans and documents prepared by MLM Consulting Engineers Ltd (MLM) is owned by them and no such report, plan or document may be reproduced, published or adapted without their written consent. Complete copies of this Report may, however, be made and distributed by the Client as an expedient in dealing with matters related to its commission.

The content of websites visited during the internet searches has not been validated and is accepted de facto and without prejudice. Anyone relying upon the information obtained from such sources does so at their own risk. Notwithstanding, MLM takes all reasonable care in assessing information only from reputable and professional sources. No responsibility can be accepted by MLM for inaccuracies within the data supplied.

This report is prepared and written in the context of the proposals stated in the introduction to this report and should not be used in a differing context. Furthermore, new information, improved practices and legislation may necessitate an alteration to the report in whole or in part after its submission. Therefore, with any change in circumstances or after the expiry of one year from the date of the report, the report should be referred to us for re-assessment and, if necessary, re-appraisal.

3 Introduction

3.1 General

MLM Consulting Engineers Ltd (MLM) was commissioned by Hyde New Build Ltd ('The Client'), to undertake an Air Quality Assessment (AQA) to support the planning application for the proposed mixed-use development on land off Brighton Road, Shoreham-by-Sea ('Site').

The proposal involves the development of 255 residential apartments in a four to eight storey building with basement car park and cycle parking and the erection of a B8 Storage and Distribution Centre (4,188m^2 GFA) and a separate two storey commercial building comprising of flexible B1/B8 (1,927m^2 GFA) and Business B1(a) uses (2,276m^2 GFA) ('Proposed Development'). A surface car park, loading bay and cycle parking spaces will be provided for the commercial floorspace. A public riverside walk and cycle path will also be provided together with flood defences and associated landscaping and highways works.

The Proposed Development lies within the administrative area governed by Adur & Worthing Councils (AWC), a joint management structure for Adur District Council (ADC) and Worthing Borough Council (WBC). AWC's Local Air Quality Management (LAQM) assessments indicate that three Air Quality Management Areas (AQMAs) have been declared within its administrative area due to exceedances of the national air quality objectives for nitrogen dioxide (NO_2). Whilst the Site does not fall within any of the AQMAs, the Site is in close proximity to ADC AQMA 1 (approximately 1 km to the west), and ADC AQMA 2 (approximately 1 km to the north-east).

The approximate central grid reference for the Site is 522904 (Easting) and 105023 (Northing).

3.2 Report Structure

The structure of the report is summarised below:

- A brief description of the Site and Proposed Development;
- A brief description of the legislation governing air quality in England, AWC and West Sussex;
- Details of the method and the input data used for the following assessments:
  - Demolition/Construction dust impact assessment;
  - Operation Phase impact assessment;
- Results of each assessment; and
- Conclusions.

3.3 Objectives

The Proposed Development is in an area where the existing air quality currently is expected to be in compliance with relevant air quality objectives. The main objectives of the assessment are to:

- Assess the suitability of the site for the Proposed Development in terms of potential exposure of future occupants; and
- Assess the impact on the local air quality and existing residential receptors during the construction and operational phases of the Proposed Development.

4 The Site

4.1 Location

The Proposed Development site is located at Kingston Wharf, to the east of Shoreham-by-Sea town centre and is currently in commercial use, including a builder's merchants, breakers yard and storage facilities. The Site is broadly rectangular in shape, and is bounded by the River Adur to the south and the A259 Brighton Road to the north. Surrounding land uses are predominantly industrial or commercial with the closest residential properties lying approximately 40m to the northeast.

The location of the Site is presented in Figure 1.

There are no consented developments that are considered to result in a cumulative increase in traffic on the local road network.

The location of the Proposed Development benefits from existing sustainable transport options. The nearest bus stops are located on Brighton Road approximately 30m and 40m walking distance from the Site, with access for the westbound and eastbound stops to Littlehampton/Worthing and Brighton respectively. In addition, Shoreham-by-Sea Railway Station is approximately 1.2km west.

4.2 Proposals

The proposed redevelopment scheme will provide:

- 255 residential apartments in a four to eight storey building;
- Basement car park and cycle parking;
- Erection of a B8 Storage and Distribution Centre (4,188m^2 GFA);
- A separate two storey commercial building comprising of flexible B1/B8 (1,927m^2 GFA) and Business B1(a) uses (2,276m^2 GFA);
- A surface car park, loading bay and cycle parking spaces will be provided for the commercial floorspace;
- Provision of a public riverside walk and cycle path; and
- Provision of flood defences and associated landscaping and highways works.

The proposed site layout plan is provided in Figure 2.

5 Air Quality Legislation, Policy and Guidance

5.1 International Legislation and Policy

The European Directive (2008/50/EC)[1] sets legally binding limits for concentrations of outdoor air of major air pollutants that impact public health such as particulate matter (PM_{10} and $PM_{2.5}$) and nitrogen dioxide (NO_2). The European Directive is implemented in the UK under the Air Quality Standards Regulations 2010[2]. The obligations under the Air Quality Standards Regulations 2010 are separate from those of the 2000[3] and 2002[4] UK Regulations because local authorities in the UK will only have powers to manage some of the pollutants in the Air Quality Standards Regulations 2010, as most of the source pollutants will be managed by the Environment Agency under the IPPC Regime. Therefore, the obligation to meet the Air Quality Standards Regulations 2010 rests with the Secretary of State for Environment.

5.2 National Legislation and Policy

5.2.1 Local Air Quality Management

Part IV of the Environment Act 1995[5], requires the UK Government to publish an Air Quality Strategy and local authorities to review, assess and manage air quality within their areas. This is known as Local Air Quality Management (LAQM)[6]. The 2007 Air Quality Strategy[7] establishes the policy for ambient air quality in the UK. It includes the National Air Quality Objectives (AQOs) for the protection of human health and vegetation for 11 pollutants. Those AQOs included as part of LAQM are prescribed in the Air Quality (England) Regulations 2000 and the Air Quality (Amendment) (England) Regulations 2002. Table 5.1 presents the AQOs for Nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of 10µg or less (PM_{10}), the key pollutants of concern in relation to vehicle emissions.

Table 5.1 Relevant Objectives set out in the Air Quality Strategy

Pollutant	Concentrations	Measured As
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times per year	One-hour mean
	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3 not to be exceeded more than 35 times per year	24-hour mean
	40µg/m^3	Annual mean
Particulate Matter ($PM_{2.5}$)	25µg/m^3	Annual Mean

The Air Quality Strategy also introduced a new policy framework for tackling fine particles ($PM_{2.5}$) including an exposure reduction target. However, although EU Directive 2008/50/EC includes a new regulatory framework for $PM_{2.5}$ this pollutant is not included within LAQM, therefore, there is no requirement to assess this pollutant unless as part of an Environmental Impact Assessment (EIA). However, to ensure a robust assessment $PM_{2.5}$ has been considered in this assessment. The objective for this pollutant has been included in Table 5.1.

[1] Directive 2008/50/EC of the European Parliament and of the Council. May 2008. Official Journal of the European Union.
[2] Air Quality Regulations 2010 – Statutory Instrument 2010 No. 1001
[3] The Air Quality (England) Regulations 2000 no. 928. Stationary Office.
[4] The Air Quality (England) (Amendment) Regulations 2002 No. 4034. Stationary Office.
[5] Environment Act 1995.
[6] Local Air Quality Management Technical Guidance LAQM.TG (16). April 2016. Department for Environment, Food and Rural Affairs
[7] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. 2007. Department for Environment, Food and Rural Affairs

The AQOs apply to external air where there is relevant exposure to the public over the associated averaging periods within each objective. Guidance is provided within the Local Air Quality Management Technical Guidance 2016 (LAQM.TG (16)) issued by Department for Environment, Food and Rural Affairs (Defra) for Local Authorities, on where the AQOs apply as detailed in Table 5.2. The objectives do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

Table 5.2 Locations Where Air Quality Objectives Apply

Averaging Period	Objectives Should Apply at:	Objectives Should Generally 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.
24-hour mean and eight-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.
One-hour mean	All locations where the annual mean and: 24 and eight-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 expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-min mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes.	

* – Such locations should represent parts of the garden where relevant public exposure to pollutants is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure to pollutants would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.

5.2.2 National Planning Policy Framework

The latest guidance published in February 2019, the National Planning Policy Framework (NPPF)[8] sets out the Government's planning policies for England and how these are expected to be applied. It replaces Planning Policy Statement 23[9]: Planning and Pollution Control and NPPF 2012 which provided planning guidance for local authorities with regards to air quality.

At the heart of the NPPF is a presumption in favour of sustainable development.

It provides a framework within which locally-prepared plans for housing and other development can be produced. It requires Local Plans to be consistent with the principles and policies set out in the Framework with the objective of contributing to the achievement of sustainable development.

Current planning law requires that application for planning permissions must be determined in accordance with the relevant development plan (i.e. Local Plan or Neighbourhood Plan). The NPPF should be taken into account in the preparation of development plans and therefore the policies set out within the Framework are a material consideration in planning decisions.

Under paragraph 103, it states that:

> *"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making."*

Under paragraph 170(e), 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, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of 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, taking into account relevant information such as river basin management plans."*

Under paragraph 181, it 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."*

[8] National Planning Policy Framework. February 2019. Ministry of Housing, Communities and Local Government
[9] Planning Policy Statement 23 (PPS 23): Planning and Pollution Control (ODPM).

5.2.3 Control of Dust and Particulates Associated with Construction

Section 79 of the Environmental Protection Act (1990)[10] states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Statutory nuisance is defined as:

> *"Any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance".*
>
> *"Any accumulation or deposit which is prejudicial to health or a nuisance".*

Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

In the context of the Proposed Development, the main potential for nuisance of this nature will arise during the construction phase - potential sources being the clearance, earthworks, construction and landscaping processes.

There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist - 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates. However, impacts remain subjective and statutory limits have yet to be derived.

5.3 Regional Planning Policy

5.3.1 Air Quality and Emissions Guidance for Sussex Authorities

The Sussex air quality and emissions guidance[11] sets out a stepped approach in the air quality and emissions mitigation assessment process.

Section 1

Screening Checklist 1: the purpose of checklist 1 is to screen out developments which are not likely to have a significant effect on air quality, and therefore do not require any further assessments. Checklist 1 is detailed in Table 5.3 below and if the answer to all questions is 'NO' then no further action is required. If the answer to any question is 'YES' then it is necessary to proceed to Checklist 2, detailed in Table 5.4.

Table 5.3 Checklist 1: Screening Checklist

Screening Checklist	Yes	No	Recommendations:
1. Is the proposed development within an Air Quality Management Area (AQMA)*?		√	-If YES, go to checklist 2. -If both NO, no further assessment required.
2. Is the proposed development categorised as a major** sized development?	√		

The Proposed Development is classified as a major development; therefore, it is necessary to proceed to Checklist 2.

[10] Available at https://www.legislation.gov.uk/ukpga/1990/43/pdfs/ukpga_19900043_en.pdf
[11] Air Quality and Emissions Mitigation Guidance for Sussex, 2013. Available at http://www.sussex-air.net/Consultation/AirQualitydocument.pdf

Screening Checklist 2: the purpose of checklist 2 is to determine whether a development requires an air quality assessment and/or an emissions mitigation assessment. Checklist 2 is detailed in Table 5.4 below if the answer to all questions is 'NO' then only an emissions mitigation assessment is required, and it is necessary to proceed to Section 3. If the answer to any question in the checklist is 'YES' then an air quality assessment is required, and it is necessary to proceed to Section 2.

Table 5.4 Checklist 2: Screening Checklist

Screening Checklist	Yes	No	Recommendations:
1. Is the proposed development within or in relevant proximity to an Air Quality Management Area (AQMA) or in an area near to exceeding AQ limits (candidate AQMA)?	√		-If any questions answered = YES, contact the Air Quality Officer to confirm that an air quality (AQ) assessment is required and then undertake an emissions assessment. -If all questions are answered = NO, OR the air quality officer determines there is no need for an AQ assessment. = Go to Section 2.
2. Does the development require an EIA?		√	
3. Will development type likely to become large scale major development category size? (Either on its own or as part of several separate (cumulative) planned developments.)		√	
4. Is vehicle parking in development: >100 (outside AQMA) or >50 (within or adjacent to an AQMA)?	√		
5. For existing roads with >10,000 Annual Average Daily Traffic (AADT) does the development: introduce extra vehicle movements (>5%), change avg. vehicle speeds (10 kph), is it likely to cause congestion or introduce >15 heavy duty extra vehicle movements per day?	√		
6. Will the development introduce new sensitive receptors: into or an area in relevant proximity to an AQMA or into a candidate AQMA?		√	
7. Are there any other proposed developments in the vicinity of this development which could have a cumulative effect on air quality?		√	

Screening Checklist	Yes	No	Recommendations:
8. Is the development introducing biomass energy/heating plant into an urban environment?		√	
9. Is the development likely to impact on sensitive environments (i.e. SSSI's, National Parks etc.)?		√	

The Proposed Development answers yes to a number of questions in Checklist 2; an air quality assessment and an emissions assessment are therefore required. This was initially confirmed in an email dated 6th February 2018, by Nadeem Shad, Team Leader of Environmental Protection at Adur and Worthing Councils.

Section 2 Emissions Mitigation Assessments

The purpose of an emissions mitigation assessment is to assess the local emissions from a development and to determine the appropriate level of mitigation required to help reduce the potential effect on health and/or the local environment.

The most recent DEFRA Emissions Factor Toolkit has been used to estimate the additional pollutant emissions from the Proposed Development and also the latest DEFRA IGCB Air Quality Damage Costs for the specific pollutant of interest has been used to calculate the resultant damage cost.

The calculation process includes:

- Identifying the additional trip rates or numbers generated by the proposal;
- The emissions calculated for the pollutants of concern (NO_x and $PM_{2.5}$) from the emissions factor toolkit;
- Using the DEFRA IGCB Air Quality Damage Costs for the specific pollutant emissions to provide a resultant damage cost calculation; and
- The result is totalled for a five-year period to enable mitigation implementation and impact.

The calculations are undertaken as detailed in Defra's guidance[12].

The mitigation measures should be agreed with the Local Planning Authority to ensure that mitigation is in line with local policy and is appropriate for the type, size and location of the development.

The Sussex guidance provides a list of mitigation options to be considered and these are detailed below:

- EV recharging infrastructure within the development (wall mounted or free standing in-garage or off-street points)
- Car club provision or support to local car club/eV car club;
- Designation of parking spaces for low emission vehicles;
- Differential parking charges depending on vehicle emissions;
- All commercial vehicles should comply with either current or previous European Emission Standards;

12 Air Quality Damage Cost Guidance 2019. Defra.

- Fleet operations should provide a strategy for considering reduced emissions, low emission fuels and technologies;
- Use of ultra-low emission vehicles;
- Support local walking and cycling initiatives;
- On street EV charging;
- Contribution to low emission vehicle refuelling infrastructure;
- Low emission bus service provision or waste collection services;
- Bike/e-bike hire schemes;
- Contribution to renewable fuel and energy generation projects; and,
- Incentives for the take-up of low emission technologies and fuels.

The Sussex guidance also requires each development to provide a brief mitigation statement and follow the Control of Dust and Emissions from Construction and Demolition Best Practice Guidance to minimise dust and other emissions to atmosphere during the construction phase.

The scheme mitigation statement must include:

- Development traffic input data for emissions calculation;
- Emissions calculation and totals;
- Mitigation proposed to be equivalent to the value of emissions calculation (appropriate to the type and size of development and local policy requirements); and,
- Statement of provisions required to minimise emissions to atmosphere under The Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance.

Section 3 Air Quality Assessment

The Sussex guidance states that *'the purpose of the air quality assessment is to determine whether the predicted impact of a development on local air quality will adversely affect public health and/or the local environment, both to help determine a planning application and to determine the appropriate level of mitigation from a development'.*

5.4 Local Planning Policy

5.4.1 Adur District Council (ADC) Local Plan 2017

The Adur Local Plan, adopted in December 2017[13], provides a strategy for development in Adur up to 2032. The policy that relates to air quality is:

Policy 34: Pollution and Contamination which states that:

> *'Development should not result in pollution or hazards which prejudice the health and safety of the local community and the environment, including nature conservation interests and the water environment.*
>
> *New development in Adur will be located in areas most suitable to the use of that development to avoid risks from noise, air, odour or light pollution.*
>
> *Mitigation measures will need to be implemented for developments that council increase levels of pollution or have a negative impact on drinking water supplies in Adur. Where there are significant levels of increased pollution that cannot be mitigated, development will be refused.*

[13] Adur Local Plan 2017. Adur District Council

Where appropriate air quality assessments and/or noise assessments will be required in conjunction with development proposals.

Investigations and assessments of all sites situated in or in close proximity to potentially contaminated land will be required in relation to relevant development proposals.'

5.5 Guidance

A summary of the publications referred to in the undertaking of this assessment is provided below.

5.5.1 Adur Air Quality Action Plan 2007

An air quality action plan[14] for Adur District Council was drawn up in 2007 which included a list of generic and specific measures to help improve air quality within the AQMAs. ADC have confirmed that this is to be reviewed shortly and requested that consideration is given to the unofficial draft of measures listed in the latest Annual Status Report (ASR) 2017. Measures relating to new developments and to be funded by developer contributions include:

- Adur/Worthing Car Clubs;
- eV charging infrastructure;
- Travel Plans for all significant developments;
- Promotion of walking and cycling;
- Transport network infrastructure improvements for new development; and,
- New infrastructure for cyclists and pedestrians;

5.5.2 Local Air Quality Management Review and Assessment Technical Guidance[15]

The Defra has published technical guidance for use by local authorities in their review and assessment work. This guidance, referred to in this document as LAQM.TG(16), has been used where appropriate in the assessment presented herein.

5.5.3 Land-Use Planning & Development Control: planning for Air Quality[16]

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts.

5.5.4 Guidance on the Assessment of Dust from Demolition and Construction[17]

Guidance on the Assessment of Dust from Demolition and Construction published by the Institute of Air Quality Management (IAQM) was produced to provide guidance to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM_{10} impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

[14] Local Air Quality Management, Air Quality Action Plan 2007, Adur District Council
[15] Available at https://www.london.gov.uk/sites/default/files/llaqm_technical_guidance_llaqm.tg_16.pdf
[16] Available at http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf
[17] Available at http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf

6 Local Baseline Air Quality

6.1 Local Air Quality Management

AWC is dominated by residential and commercial use. The main source of air pollution in AWC is traffic emissions from the busy road network including Brighton Road, A270 and emissions associated with Shoreham Port.

AWC has carried out a number of assessments of air quality within Adur District which has identified exceedances of the annual mean NO_2 objective and resulted in the declaration of three AQMAs:

- **ADC AQMA 1** - High Street, Shoreham-by-Sea; and
- **ADC AQMA 2** - Old Shoreham Road, Southwick.

The Site lies approximately 1km east and 1.2km south southwest of ADC AQMA 1 and ADC AQMA 2 respectively. Air quality in the immediate vicinity of the Site has not been found to be exceeding the relevant air quality objectives.

6.2 Automatic Monitoring

According to the ADC Air Quality Status Report (ASR) 2019[18], ADC undertakes automatic monitoring at one site within the district at Shoreham High Street. This monitoring site is located 1.5km to the west of the development site.

Details of the monitoring site are provided in Table 6.1, with records of the measured annual mean NO_2 and PM_{10} concentrations for the past five years provided in Table 6.2. No data is available for High Street Shoreham from 2016 as data capture has been less than 50%.

Table 6.1 Details of the Automatic Monitoring Site

Site ID	Site Name	Type	In AQMA	Pollutants Monitored	Distance to Kerb of Nearest Road	Distance to Relevant Exposure
AD1	High Street Shoreham	Kerbside	Yes	NO_2, PM_{10}	1.6m	4.0m

Table 6.2 Annual Mean NO_2 Concentrations, Automatic Site, 2014-2018

Site ID	Pollutant	Annual Mean Concentration (µg/m³)				
		2014	2015	2016	2017	2018
AD1	NO_2	42.6	48.3 (45.2)	N/A	N/A	29.2[1]
	PM_{10}	N/A	N/A	N/A	N/A	24.2[1]

Note: parentheses denotes a recording that has been biased adjusted.
[1] Data capture less than 75%, data annualised.

The data presented shows concentrations above the annual mean NO_2 objective of 40 µg/m³ during 2014 and 2015 at the High Street Shoreham automatic monitoring station. No NO_2 data is available for 2016 as ADC experienced a large number of faults with the automatic monitor during this year and the site was temporarily closed. The monitoring site did not record any exceedances of the 1-hour objective during 2014 and 2015, indicating that the short-term objective is being met at the site. The 1-hour objective has also been met during previous years.

[18] Available at: https://www.adur-worthing.gov.uk/media/media,154329,en.pdf

6.3 Non-Automatic Monitoring

Non-automatic monitoring using passive diffusion tube samplers was carried out at 26 locations within ADC in 2018. Monitored data from locations within 1km of the Site are summarised in Table 6.3.

Table 6.3 Annual Mean NO_2 Concentrations from Diffusion Tube Sites, 2014 - 2018

Site ID	Site Name	Type	In AQMA	Annual Mean NO_2 (µg/m³)				
				2014	2015	2016	2017	2018
S1	Albion Street, Southwick	Kerbside	No	32.6	30.9	32.2	33.0	31.0
S2	Old Mill Close, Fishersgate	Roadside	No	26	23.9	24.9	26.4	27.0
S8	Underdown Road, Southwick	Roadside	Yes	31.7	27.8	30.4	32.8	30.4
S9	Old Shoreham Road, Southwick	Roadside	Yes	34.9	32.1	34.5	35.8	35.0
S10	Holmbush Roundabout, Shoreham	Roadside	No	24.7	22.2	25.2	24.6	27.0
S17	High Street AQMS1 Shoreham	Kerbside	Yes	39	38.1	38.4	38.1	33.7
S18	High Street AQMS2	Kerbside	Yes	38.7	38.0	39.1	37.8	32.8
S19	High Street AQMS3	Kerbside	Yes	38.5	**40.1**	**40.9**	37.8	32.8
S39	Brighton Road, Kingston	Kerbside	No	N/A	N/A	N/A	N/A	26.1
Note: **Bold** denotes exceedances in the 40 µg/m³ NO_2 AQO.								

The data presented shows annual mean concentrations below the annual mean objective of 40 µg/m³ at the sites presented in 2018. The data shows a general downward trend in NO_2 concentrations at all monitoring locations for the period 2014 to 2018. The sites all recorded an increase during 2016 although concentrations have decreased in 2018, particularly across sites along Brighton Road.

These monitoring locations are shown in Figure 3.

6.4 Defra Background Air Quality Data

Additional information on estimated background pollutant concentrations has been obtained from the Defra background maps provided on UK-AIR, the Air Quality Information Resource. The background data, based on the 2017 version of background maps[19], are available in 1km x 1km grid squares and provide an estimate of concentrations for the grid covering the Site. The background concentrations of pollutants have been taken for the closest grid square (522500; 105500) of the Site. Background data for NO_2, PM_{10} and $PM_{2.5}$ for years 2018-2023 are presented in Table 6.6.

Table 6.6 Estimated Background Concentration Provided by Defra

Pollutant	Estimated Annual Mean Concentration (µg/m³)					
	2018	2019	2020	2021	2022	2023
NO_2	13.8	13.3	12.8	12.3	11.9	11.5
PM_{10}	15.3	15.1	14.9	14.8	14.6	14.4
$PM_{2.5}$	10.6	10.4	10.3	10.2	10.0	9.9

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

6.5 Summary

The closest NO_2 monitoring site to the Site is S39 Brighton Road, which showed compliance with the annual mean AQO in 2018. Data from S1 Albion Street also shows NO_2 concentrations to be below the AQO at roadside locations along the A259. NO_2 concentrations have generally been trending downwards since 2014. The Proposed Development proposals indicate that the residential buildings will be set back from the A259 by 5-10 m. As NO_2 concentrations generally decrease with distance from the source, concentrations at the facades of the new residential building and across the rest of the development site are expected to be below the annual mean and one hour NO_2 AQOs.

Concentrations of Particulate Matter (PM_{10} and $PM_{2.5}$) are also expected to be below the AQOs in the vicinity of the Site, based on Defra background air quality data.

7 Scope and Methodology

7.1 Scope

The scope of the assessment includes consideration of the potential impacts on local air quality resulting from:

- Dust and particulate matter generated by on-site activities during the construction phase;
- Increases in pollutant concentrations as a result of exhaust emissions arising from construction traffic;
- Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Proposed Development once operational; and,
- The impact of existing poor air quality on future users of the Proposed Development.

7.2 Methodology

7.2.1 Construction Phase

Dust comprises particles typically in the size range 1-75 micrometres (µm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials. The larger dust particles fall out of the atmosphere quickly after initial release and therefore tend to be deposited in close proximity to the source of emission. Dust therefore, is unlikely to cause long-term or widespread changes to local air quality; however, its deposition on property and cars can cause 'soiling' and discolouration. This may result in complaints of nuisance through amenity loss or perceived damage caused, which is usually temporary.

The smaller particles of dust (less than 10µm in aerodynamic diameter) are known as particulate matter (PM_{10}) and represent only a small proportion of total dust released; this includes a finer fraction, known as $PM_{2.5}$ (with an aerodynamic diameter less than 2.5µm). As these particles are at the smaller end of the size range of dust particles they remain suspended in the atmosphere for a longer period of time than the larger dust particles, and can therefore be transported by wind over a wider area. PM_{10} and $PM_{2.5}$ are small enough to be drawn into the lungs during breathing, which in sensitive members of the public could have a potential impact on health.

An assessment of the likely significant impacts on local air quality due to the generation and dispersion of dust and PM_{10} during the construction phase has been undertaken using: the relevant assessment methodology published by the IAQM; the available information for this phase of the Proposed Development provided by the Client and Project Team; and, professional judgement.

The IAQM assessment is undertaken where there are: 'human receptors' within 350m of the site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/or 'ecological receptors' within 50m of the site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). It is within these distances that the impacts of dust soiling and increased particulate matter in the ambient air will have the greatest impact on local air quality at sensitive receptors.

The IAQM methodology assesses the risk of potential dust and PM_{10} impacts from the following four sources: demolition; earthworks; general construction activities and track-out. It takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM_{10} levels to assign a level of risk. Risks are described in terms of there being a low, medium or high risk of dust impacts. Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined. A summary of the IAQM assessment methodology is provided in Appendix A.

In addition to impacts on local air quality due to on-site construction activities, exhaust emissions from construction vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the Site and in the vicinity of the Site itself. As information on the number of vehicles and plant associated with the construction phase was not available at the time of writing, a qualitative assessment of their impact on local air quality has been undertaken using professional judgement and by considering the following:

- The number and type of construction traffic and plant likely to be generated by this phase of the Proposed Development;
- The number and proximity of sensitive receptors to the Site and along the likely routes to be used by construction vehicles; and
- The likely duration of the construction phase and the nature of the construction activities undertaken.

7.2.2 Operational Phase

A screening assessment for air quality impacts has been undertaken following the IAQM/EPUK guidance screening criteria to establish whether the proposals warrant the need for a detailed air quality assessment. The guidance provides a decision making process which assists with the understanding of air quality impacts and implications as a result of development proposals. It provides a framework for air quality considerations within local development control processes, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes a method for screening the requirement for an air quality assessment, the undertaking of an air quality assessment, the determination of the air quality impact associated with a development proposal and whether this impact is significant.

The IAQM/EPUK guidance also provides some clarification as to when air quality constitutes a material consideration and highlights the linkage with other relevant issues (for example traffic speed reduction measures and the use of alternative technology to provide energy) and the importance of the understanding of these with the input from other discipline specialists. The 'creeping baseline' is another issue raised with regard to cumulative impacts.

The IAQM/EPUK guidance note is widely accepted as the most appropriate reference method for this purpose. This guidance makes reference to the Town and Country Planning (Development Management Procedure) Order (England) 2010 [(Wales) 2012] for the definition of a 'major' development when scoping assessments required for the planning process. A 'major' development includes developments where:

- The number of dwellings is ten or above;
- The residential development is carried out of a site of more than 0.5ha where the number of dwellings is unknown;
- The provision of more than 1,000m^2 commercial floor space; or
- Development carried out on land of 1ha or more.

There are two types of air quality impacts to be considered:

- The impact of existing sources in the local area on the Proposed Development (governed by background pollutant levels and proximity to sources of air pollution); and
- The impacts of the Proposed Development on the local area.

With regard to the changes in air quality or exposure to air pollution, the guidance indicates that each local authority will be likely to have their own view on the significance of this; these are to be described in relation to whether an AQO is predicted to be met, or at risk of not being met. Exceedances of these objectives are considered as significant, if not mitigated.

As part of the impact of the Proposed Development on the local area, a two-staged assessment is recommended as per guidance:

Stage 1: review of the development proposals, including number of residential units, floor space, car park spaces and the presence of an energy centre or other combustion processes on site, against the screening criteria. In the event that the Stage 1 criteria are exceeded we will proceed to Stage 2; and,

Stage 2: review of the changes in Light Duty Vehicles (LDVs) and Heavy Duty Vehicles (HDVs), road alignment, and the introduction of new junctions and bus stops (if applicable) due to the Proposed Development. As part of Stage 2, a comparison of the Annual Average Daily Traffic (AADT) flows associated with the consented development and Proposed Development has also been undertaken to assess if there is a potential for further air quality impacts.

A full list of the screening criteria are presented in Appendix B.

7.2.3 Operational Phase Screening Assessment

The Proposed Development seeks to provide 255 residential units with commercial elements. As such, the Proposed Development is classed as a 'major' development, with the potential to impact local air quality through traffic generation. The development proposals exceed the Stage 1 criteria and the assessment needs to proceed to Stage 2.

EPUK/IAQM guidance includes a number of indicative criteria that should be used to assess whether there is a need to proceed to a detailed air quality assessment, as shown in Table 7.1.

Table.7.1 EPUK/IAQM Stage 2 Screening Assessment

Screening Criteria	Development Proposal
1. Change of LDVs flows > 500 AADT[1]	Existing - 514 AADT Proposed - 1261 AADT (total trip generation)
2. Change of HDVs flows >100 AADT[1]	Not applicable
3. Change of 5m in road alignment	Not applicable
4. Introduce new junction or remove junction causing significant change in traffic speeds	Not applicable
5. Introduce/Change bus station causing bus flows to change by > 100 AADT	Not applicable
6. Underground car park with ventilation within 20m of receptor, with car park movements > 100 (in and out)	Not applicable
7. Substantial Combustion process	Details are yet to be confirmed, however, it will comprise communal gas boilers and air-source heat pumps.
Notes: [1]Annual Average Daily Traffic;	

Table 7.1 indicates the Stage 2 criteria are exceeded and the resulting air quality impacts are to be considered in more detail as explained in the below sections.

Summary of Potential Impacts from Traffic

Development trip generation has been provided by the project transport consultant, MLM.

The Proposed Development includes the provision for 207 car parking spaces. The existing AADT generated by the current building use is 514. The increased provision for car parking and the change in use class results in a predicted ingress/egress on Brighton Road of 674 AADT.

Therefore, the predicted increase in vehicle trips is above the 500 AATD EPUK/IAQM criteria. As such, the impact of vehicle emissions associated with the Proposed Development can be considered to be 'Significant' as per the EPUK/IAQM guidance. As such, the impact of vehicle emissions associated with the Proposed Development needs to be quantified.

Summary of Potential Impacts from Energy Plant

It is understood that mechanical ventilation with summer by-pass is to be installed within all residential units to provide adequate ventilation internally and to aid cooling/reduce overheating potential within the dwellings during times of peak external temperatures.

Within the Energy and Sustainability Strategy for the Proposed Development, a gas-fired heating strategy will be implemented which will provide space heating and hot water to all areas of the building through a centralised system. This will comprise communal gas boilers for communal-based heating and hot water supply. Air-source heat pumps will also be used to compliment in providing cooling and space heating to commercial office spaces.

At this stage, the specifications of the gas boilers have not been confirmed. However, if criteria set out within the IAQM/EPUK guidance is exceeded and/or does include CHP unit(s) or substantial combustion plant, further dispersion modelling will be needed to determine its impacts.

Summary of Existing Conditions at Proposed Development

The nearest diffusion tubes to the Proposed Development are S1 and S39, which recorded NO_2 concentrations of 31.0µg/m^3 and 26.1µg/m^3 in 2018 respectively. Although both of these monitoring sites are in compliance with the NO_2 annual mean AQO, they do highlight an elevation in NO_2 concentration compared to background concentrations. As such, it is expected that NO_2 concentrations will be highest along the northern boundary with Brighton Road, decreasing southwards across the Site.

A quantitative dispersion modelling assessment has been undertaken to predict pollutant concentrations at the Proposed Development at relevant ground floor facades. The methodology for the dispersion model study is detailed in Section 8.

8 Input for ADMS Roads Dispersion Modelling

8.1 General

Atmospheric dispersion modelling has been undertaken using the ADMS-Roads Extra software suite (version 4.1.1.0) developed by Cambridge Environmental Research Consultants (CERC). The model uses a number of input parameters to simulate the dispersion of emissions and predictions of pollutant concentration at specified receptors are made across the area of interest. The details of the input parameters are described in the following sections.

The following parameters are required to determine the air pollution concentration using the ADMS-Roads Extra model:

- The assessment years;
- Receptor(s) location(s) details;
- Background pollutant concentrations;
- The road network details (including traffic volume and associated emissions);
- Meteorological data; and
- Traffic data.

The details of the parameters used in the analysis for the site are presented below.

8.2 The Assessment Years

For the assessment, three scenarios were modelled as follows:

- 2018 – Model Verification;
- 2023 Opening Year 'Without Development ' – Using 2018 Emission Factors; and
- 2023 Opening Year 'With Development' – Using 2018 Emission Factors.

For model verification, 2018 is the year in which the latest available ADC monitoring data is available. Both future year scenarios have been run predicting no improvement in vehicle emission technology or fleet turnover between 2018 and 2023 ('opening year'), thus presenting a 'worst case' scenario. The reasoning for this is due to uncertainties in vehicle emissions in modern cars and the resulting impact on fleet turnover. Furthermore, background concentrations from 2018 have been used for future year scenarios.

Given the increased changes in policy towards improving air quality, the above methodology is considered to be very conservative.

8.3 Traffic Data

Traffic data for the model has been obtained from traffic consultants MLM and included within the traffic model for the following roads:

- Old Shoreham Road;
- A259 Brighton Road;
- A259 High Street;
- Eastern Avenue;
- Kingston Lane; and,
- A270 Upper Shoreham Road.

The full details of each road link and its traffic data used within the model domain are presented in Table 8.1 and Figure 4.

Table 8.1 Traffic Data included within Model

Link ID	Link Description	Base Year in 2018		Without Development Scenario in 2023		With Development Scenario in 2023	
		AADT	%HGV	AADT	%HGV	AADT	%HGV
1	Old Shoreham Road	14,879	4	16,068	4	16,316	4
2	A259 Brighton Road	30,503	3	32,940	3	33,074	3
3	A259 High Street	21,867	5	23,614	5	23,996	4
4	A259 Brighton Road - West	18,531	5	20,012	5	20,394	4
5	A259 Brighton Road - East	19,766	5	21,345	5	21,764	4
6	Eastern Avenue	7,149	4	7,720	4	7,784	3
7	Eastern Avenue - North	5,950	4	6,425	4	6,438	4
8	A259 Brighton Road - West of Site	8,960	5	9,675	5	10,094	3
9	A259 Brighton Road - East of Site	19,064	5	20,587	5	20,909	4
10	A259 Brighton Road - West	19,819	5	21,403	5	21,725	4
11	A259 Brighton Road - East	20,934	5	22,606	5	22,779	5
12	Kingston Lane	8,286	3	8,948	3	9,097	2
13	A270 Upper Shoreham Road	48,693	3	52,582	3	52,582	3

Speeds provided by MLM were between 40-56km/hr on all free-flowing roads sections. For junctions and roundabouts, speeds were slowed down in line with the LAQM.TG(16) guidance. Road dimensions were determined from Google satellite images. A typical national diurnal profile for 2018, provided by Department for Transport (DfT), has been incorporated into the models and is presented in Figure 5.

8.4 Emissions from Road Traffic

Roads are the main source of pollution in this area. The road source emissions are calculated from traffic flow data using the latest Defra Emission Factor Toolkit (EFT v 9.0.1 May 2019). The toolkit calculates emission rate for selected pollutants for each modelled road for input in to the atmospheric dispersion modelling.

The general input option along with a vehicle fleet composition from the appropriate year was used to derive emission rates for all scenarios. It should be noted that, similar to the background concentrations used in the assessment, the same year of emission factors (2018) has been applied for future prediction year (2023). This assumes that there will not be any improvement in vehicle emissions technology or changes in fleet composition in the future.

8.5 Receptors

The locations of the selected existing and future receptors are shown in Table 8.2 and Figure 6.

In addition, five ADC monitoring site locations (S1, S8, S9, S17 and S39) have been included as receptors within the dispersion model for model verification.

Table 8.2 Receptor Locations

Receptor Ref	Receptor Location	OS Grid Reference		Receptor Height (m)
		X	Y	
ER1	19 Old Shoreham Road	521278	105240	1.5
ER2	118 High Street (1st floor flat)	521309	105153	4.5
ER3	94 High Street (1st floor flat)	521318	105101	4.5
ER4	Residential on Brighton Road	521300	105054	1.5
ER5	Riverside House (1st floor flat)	521420	105030	4.5
ER6	406 Brighton Road	521674	105024	1.5
ER7	79 Brighton Road	521879	105094	1.5
ER8	6 Eastern Avenue	522303	105296	1.5
ER9	27 Eastern Avenue	522283	105427	1.5
ER10	84 Brighton Road	523372	104972	1.5
ER11	20 Brighton Road	523587	104968	1.5
ER12	445 Kingston Lane	523682	104974	1.5
ER13	5a Albion Street	523711	104973	1.5
ER14	21 Albion Street	523779	104985	1.5
ER15	110 Kingston Lane	523726	105257	1.5
ER16	100 Kingston Lane	523736	105450	1.5
ER17	24 Kingston Lane	523726	105959	1.5
ER18	2 Old Shoreham Road	523775	106075	1.5
ER19	18 Old Shoreham Road	523824	106079	1.5
ER20	51 Old Shoreham Road	523911	106106	1.5
ER21	92 Old Shoreham Road	524035	106064	1.5
ER22	112 Old Shoreham Road	524124	106088	1.5
PR1	Proposed Residential	523194	105004	1.5
PR2	Proposed Residential	523148	105004	1.5
PR3	Proposed Residential	523193	104992	1.5

8.6 Background Data Used In the Model

As there is no monitored background NO_2, PM_{10} or $PM_{2.5}$ data available within the vicinity of the Proposed Development, Defra mapped estimated concentrations for 2018 are utilised in all modelled scenarios, thus providing a conservative assessment that assumes no improvement in background emissions across all sectors.

No adjustment has been made to background pollutants to remove the road emissions within each grid square to avoid double counting, as such background values may be overestimated.

8.7 Model Verification

Model verification has been undertaken in accordance with the LAQM.TG(16) guidance document. As recommended, 2018 emission factors and 2018 background concentration data have been used to be consistent.

8.8 Meteorological Data

ADMS Roads utilises sequential meteorological data to calculate atmospheric dispersion. The minimum meteorological data that must be entered are: wind speed and direction, and cloud cover. The wind, cloud, temperature, rainfall and humidity data were obtained for Shoreham Airport meteorological station for the year 2018 and has been used for the road source dispersion modelling.

Shoreham Airport's weather station is approximately 3km west of the Site and the dominant, prevailing wind direction is from the south-west. A wind rose, illustrating the data for the year 2018, is presented in Figure 7.

8.9 Other Parameters

For all scenarios the site latitude was set to 50.2°, dispersion site surface roughness was set to 0.5m (Parkland, open suburbia) and the Minimum Monin-Obukhov Length (MMOL) was set to 30m (Mixed urban/industrial).

The meteorological measurement site surface roughness was set to 0.5m (Parkland, open suburbia) and the MMOL was set to 10m (Small towns). This is based on the rural to suburban in nature of the area surrounding Shoreham Airport meteorological station.

9 Model Verification

9.1 General

The total concentration of oxides of nitrogen (NO_X) at the chosen locations were predicted using dispersion modelling. The verification year of 2018, the latest year for which monitored data was available, was chosen to predict the NO_X levels at the selected diffusion tube sites and these values were compared with monitored NO_2 data to verify the model predictions.

An adjustment factor was determined for the modelling and applied to predicted values for the future year scenarios. The details of the process are presented below.

9.2 Baseline Conditions

9.2.1 Method

Local Authority run monitoring sites S1, S8, S9, S17 and S39 have been selected for model verification due to the close proximity to the Proposed Development site.

An adjustment factor of 2.756 has been applied to the verification points. The modelled and monitored road contributed NO_2 values at the monitoring site with the ratio between them is given in Table 9.1. The monitored road contributed NO_x was calculated using the Defra NO_x/NO_2 Calculator (v7.1 April 2019).

Table 9.1 Monitored and Modelled Road Contributed NO_2 for 2018

Monitor ID	Modelled Total NO_2 (including background) ($\mu g/m^3$)	Monitored Total NO_2 (including background) ($\mu g/m^3$)	Ratio of Modelled vs Monitored NO_2
S1	25.8	31.0	-16.9%
S8	33.6	30.4	10.4%
S9	39.8	35.0	13.7%
S17	28.8	33.7	-14.7%
S39	21.0	26.1	-19.7%

As the ratio of measured NO_2 to modelled NO_2 is below +/- 25%, it is deemed that no further adjustment is required. In accordance with Defra guidance, the total PM_{10} and $PM_{2.5}$ concentrations are derived by adding the road contribution value to the Defra background concentrations as described in Section 6.3.

© MLM Consulting Engineers Limited

10 Model Results and Discussion

10.1.1 Model Results

The predicted NO_2, PM_{10}, and $PM_{2.5}$ concentrations for all receptors included within the assessment are shown in Table 10.1 for both 'Without Development' and 'With Development' scenarios.

Table 10.1 Modelled NO_2, PM_{10} and $PM_{2.5}$ Concentrations at Existing Receptors (using 2018 Emission Factors and 2018 Background Concentrations)

Receptor ID	Receptor height (m)	'Without Development' Scenario Annual Mean (µg/m³)			'With Development' Scenario Annual Mean (µg/m³)		
		NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
ER1	1.5	17.7	14.2	15.2	17.7	14.2	15.2
ER2	4.5	20.9	14.7	15.4	20.8	14.7	15.4
ER3	4.5	27.5	15.3	16.3	27.3	15.3	16.3
ER4	1.5	**41.8**	16.7	18.2	**41.7**	16.7	18.2
ER5	4.5	20.6	14.3	16.0	20.6	14.3	16.0
ER6	1.5	28.8	16.3	18.1	28.8	16.3	18.1
ER7	1.5	30.2	16.6	18.4	30.2	16.6	18.4
ER8	1.5	18.6	14.0	15.5	18.6	14.0	15.5
ER9	1.5	17.4	13.9	15.4	17.4	13.9	15.4
ER10	1.5	26.3	13.9	16.3	26.3	13.9	16.3
ER11	1.5	25.1	13.8	16.2	25.1	13.8	16.2
ER12	1.5	26.6	13.2	15.7	26.0	13.2	15.7
ER13	1.5	31.3	13.8	16.2	30.9	13.8	16.2
ER14	1.5	28.5	14.0	16.4	28.5	14.0	16.4
ER15	1.5	20.7	12.9	15.5	20.7	12.9	15.5
ER16	1.5	20.1	12.8	15.4	20.1	12.8	15.4
ER17	1.5	16.9	12.9	15.4	16.9	12.9	15.4
ER18	1.5	35.9	17.6	16.7	35.4	17.6	16.7
ER19	1.5	**45.8**	19.7	17.7	**45.7**	19.7	17.7
ER20	1.5	30.5	18.1	17.0	30.4	18.1	17.0
ER21	1.5	34.2	17.4	17.6	34.2	17.4	17.6
ER22	1.5	29.1	16.4	17.1	29.1	16.4	17.1
PR1	1.5				20.7	13.0	15.6
PR2	1.5				16.3	12.9	15.5
PR3	1.5				15.8	11.7	14.1
Annual Mean AQO		**40**	**40**	**25**	**40**	**40**	**25**

Notes – Data in bold indicates exceedance of annual mean AQO.

10.1.2 Comparison with the National Air Quality Objectives – All Receptors

Comparison with the National Air Quality Objectives at sensitive receptor is shown below:

- The objective for the annual mean NO_2 concentration is 40µg/m³. During the operational phase of the Proposed Development, the predicted concentrations are not expected to exceed the air quality objective at the proposed future receptors. There are two receptors, E4 and ER19 that are predicted to exceed in both scenarios. However, it has been predicted that NO_2 concentrations would fall slightly during the 'With Development' scenario. All other receptors are in compliance of the AQOs;
- According to LAQM.TG (16) guidance, exceedance of the one-hour NO_2 mean objective is generally unlikely to occur where annual mean concentrations do not exceed 60µg/m³. Since the annual mean NO_2 concentration at all receptors are lower than 60µg/m³, it is unlikely the one-hour mean will be exceeded at any of the above locations;
- The objective for the annual mean PM_{10} concentration is 40µg/m³. The forecast suggested that this objective will be met at all sensitive receptors;
- LAQM.TG (16) guidance provides guidance on calculating the number of exceedances, as a 24-hour mean PM_{10} concentration, of 50µg/m³. In all scenarios, the number of exceedance is considerably below the limit of 35; and
- The objective for the annual mean $PM_{2.5}$ concentration is 25µg/m³. The forecast suggested that this objective will be met at all sensitive receptors.

10.2 Comparison with Impact Descriptors – Existing Human Receptors

The impact descriptors used in this assessment are summarised in Table 10.2. The impact descriptors consider the change in magnitude of the concentration in the context of the absolute concentration at the sensitive receptor.

Table 10.2 Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
*Changes are rounded to the nearest whole percentage. Changes of less than 0.5% of the AQAL are considered imperceptible.				

Operational impacts have been compared against the baseline (i.e. 'Without Development') using the criteria detailed above, and are summarised in Tables 10.3, 10.4 and 10.5.

The results show that the long term NO_2, PM_{10} and $PM_{2.5}$ impacts can be considered 'Negligible' at all receptors. Therefore, the air quality effects are considered to be 'Not Significant'.

© MLM Consulting Engineers Limited

Table 10.3 NO_2 Annual Mean Concentration Changes and Associated Impact at Existing Sensitive Receptors during Operational Phase (Without Proposed Development, With Proposed Development)

Receptor ID	Predicted Annual Mean NO_2 Concentration		Pollutant Concentration Change (µg/m³)	Long term average Concentration at receptor	Change Relative to AQAL (%)	Impact Descriptor
	Without Development (µg/m³)	With Development (µg/m³)				
ER1	17.7	17.7	-0.01	75% or less of AQAL	<0.5	Negligible
ER2	20.9	20.8	-0.04	75% or less of AQAL	<0.5	Negligible
ER3	27.5	27.3	-0.17	75% or less of AQAL	<0.5	Negligible
ER4	41.8	41.7	-0.06	103-109% of AQAL	<0.5	Negligible
ER5	20.6	20.6	<-0.01	75% or less of AQAL	<0.5	Negligible
ER6	28.8	28.8	<-0.01	75% or less of AQAL	<0.5	Negligible
ER7	30.2	30.2	<-0.01	75% or less of AQAL	<0.5	Negligible
ER8	18.6	18.6	<-0.01	75% or less of AQAL	<0.5	Negligible
ER9	17.4	17.4	<-0.01	75% or less of AQAL	<0.5	Negligible
ER10	26.3	26.3	<-0.01	75% or less of AQAL	<0.5	Negligible
ER11	25.1	25.1	-0.02	75% or less of AQAL	<0.5	Negligible
ER12	26.6	26.0	-0.57	75% or less of AQAL	1%	Negligible
ER13	31.3	30.9	-0.39	76-94% of AQAL	1%	Negligible
ER14	28.5	28.5	-0.04	75% or less of AQAL	<0.5	Negligible
ER15	20.7	20.7	<-0.01	75% or less of AQAL	<0.5	Negligible
ER16	20.1	20.1	<-0.01	75% or less of AQAL	<0.5	Negligible
ER17	16.9	16.9	-0.04	75% or less of AQAL	<0.5	Negligible
ER18	35.9	35.4	-0.59	76-94% of AQAL	1%	Negligible
ER19	45.8	45.7	-0.06	110% or more of AQAL	<0.5	Negligible
ER20	30.5	30.4	-0.02	76-94% of AQAL	<0.5	Negligible
ER21	34.2	34.2	-0.01	76-94% of AQAL	<0.5	Negligible
ER22	29.1	29.1	<-0.01	75% or less of AQAL	<0.5	Negligible

DRAFT

© MLM Consulting Engineers Limited

Table 10.4 PM_{10} Annual Mean Concentration Changes and Associated Impact at Existing Sensitive Receptors during Operational Phase (Without Proposed Development, With Proposed Development)

Receptor ID	Predicted Annual Mean PM_{10} Concentration		Pollutant Concentration Change (µg/m³)	Long term average Concentration at receptor	Change Relative to AQAL (%)	Impact Descriptor
	Without Development (µg/m³)	With Development (µg/m³)				
ER1	14.2	14.2	<0.005	75% or less of AQAL	<0.5	Negligible
ER2	14.7	14.7	<0.005	75% or less of AQAL	<0.5	Negligible
ER3	15.3	15.3	<0.005	75% or less of AQAL	<0.5	Negligible
ER4	16.7	16.7	<0.005	75% or less of AQAL	<0.5	Negligible
ER5	14.3	14.3	<0.005	75% or less of AQAL	<0.5	Negligible
ER6	16.3	16.3	<0.005	75% or less of AQAL	<0.5	Negligible
ER7	16.6	16.6	<0.005	75% or less of AQAL	<0.5	Negligible
ER8	14.0	14.0	<0.005	75% or less of AQAL	<0.5	Negligible
ER9	13.9	13.9	<0.005	75% or less of AQAL	<0.5	Negligible
ER10	13.9	13.9	<0.005	75% or less of AQAL	<0.5	Negligible
ER11	13.8	13.8	<0.005	75% or less of AQAL	<0.5	Negligible
ER12	13.2	13.2	<0.005	75% or less of AQAL	<0.5	Negligible
ER13	13.8	13.8	<0.005	75% or less of AQAL	<0.5	Negligible
ER14	14.0	14.0	<0.005	75% or less of AQAL	<0.5	Negligible
ER15	12.9	12.9	<0.005	75% or less of AQAL	<0.5	Negligible
ER16	12.8	12.8	<0.005	75% or less of AQAL	<0.5	Negligible
ER17	12.9	12.9	<0.005	75% or less of AQAL	<0.5	Negligible
ER18	17.6	17.6	<0.005	75% or less of AQAL	<0.5	Negligible
ER19	19.7	19.7	<0.005	75% or less of AQAL	<0.5	Negligible
ER20	18.1	18.1	<0.005	75% or less of AQAL	<0.5	Negligible
ER21	17.4	17.4	<0.005	75% or less of AQAL	<0.5	Negligible
ER22	16.4	16.4	<0.005	75% or less of AQAL	<0.5	Negligible

DRAFT

© MLM Consulting Engineers Limited

Table 10.5 $PM_{2.5}$ Annual Mean Concentration Changes and Associated Impact at Existing Sensitive Receptors during Operational Phase (Without Proposed Development, With Proposed Development)

Receptor ID	Predicted Annual Mean $PM_{2.5}$ Concentration		Pollutant Concentration Change (µg/m³)	Long term average Concentration at receptor	Change Relative to AQAL (%)	Impact Descriptor
	Without Development (µg/m³)	With Development (µg/m³)				
ER1	15.2	15.2	<0.005	75% or less of AQAL	<0.5	Negligible
ER2	15.4	15.4	<0.005	75% or less of AQAL	<0.5	Negligible
ER3	16.3	16.3	<0.005	75% or less of AQAL	<0.5	Negligible
ER4	18.2	18.2	<0.005	75% or less of AQAL	<0.5	Negligible
ER5	16.0	16.0	<0.005	75% or less of AQAL	<0.5	Negligible
ER6	18.1	18.1	<0.005	75% or less of AQAL	<0.5	Negligible
ER7	18.4	18.4	<0.005	75% or less of AQAL	<0.5	Negligible
ER8	15.5	15.5	<0.005	75% or less of AQAL	<0.5	Negligible
ER9	15.4	15.4	<0.005	75% or less of AQAL	<0.5	Negligible
ER10	16.3	16.3	<0.005	75% or less of AQAL	<0.5	Negligible
ER11	16.2	16.2	<0.005	75% or less of AQAL	<0.5	Negligible
ER12	15.7	15.7	<0.005	75% or less of AQAL	<0.5	Negligible
ER13	16.2	16.2	<0.005	75% or less of AQAL	<0.5	Negligible
ER14	16.4	16.4	<0.005	75% or less of AQAL	<0.5	Negligible
ER15	15.5	15.5	<0.005	75% or less of AQAL	<0.5	Negligible
ER16	15.4	15.4	<0.005	75% or less of AQAL	<0.5	Negligible
ER17	15.4	15.4	<0.005	75% or less of AQAL	<0.5	Negligible
ER18	16.7	16.7	<0.005	75% or less of AQAL	<0.5	Negligible
ER19	17.7	17.7	<0.005	75% or less of AQAL	<0.5	Negligible
ER20	17.0	17.0	<0.005	75% or less of AQAL	<0.5	Negligible
ER21	17.6	17.6	<0.005	75% or less of AQAL	<0.5	Negligible
ER22	17.1	17.1	<0.005	75% or less of AQAL	<0.5	Negligible

DRAFT

11 Construction Dust Assessment

11.1 Dust and PM_{10} from On-Site Activities

Construction activities that have the potential to generate and/or re-suspend dust and PM_{10} include:

- Demolition;
- Site clearance and preparation;
- Preparation of temporary access/egress to the Site and haulage routes;
- Earthworks;
- Materials handling, storage, stockpiling, spillage and disposal;
- Movement of vehicles and construction traffic within the Site (including excavators and dumper trucks);
- Use of crushing and screening equipment/plant;
- Exhaust emissions from site plant, especially when used at the extremes of their capacity and during mechanical breakdown;
- Construction of buildings, roads and areas of hardstanding alongside fabrication processes;
- Internal and external finishing and refurbishment; and
- Site landscaping after completion.

The majority of the releases are likely to occur during the 'working week'. However, for some potential release sources (e.g. exposed soil produced from significant earthwork activities) in the absence of dust control mitigation measures, dust generation has the potential to occur 24 hours per day over the period during which such activities are to take place.

A windrose from Shoreham Airport Meteorological Station (2018) is provided in Figure 7, which shows that there are strong south-westerly and northerly components to the wind direction. Areas most consistently affected by dust are influenced by prevailing winds that are generally located downwind of an emission source. Therefore, the highest risks would occur at receptors to the northwest and south of the Site. The river Adur is located to the south of the Site and to the north-west is mainly commercial and industrial units in the immediate vicinity, although there are residential properties approximately 160 m to the north-west and some to the west along Brighton Road.

11.2 Assessment of Potential Dust Emission Magnitude

The IAQM assessment methodology has been used to determine the potential dust emission magnitude for the following four different dust and PM_{10} sources: demolition; earthworks; construction; and, track out. The findings of the assessment are presented below.

11.2.1 Demolition

The works will involve the demolition of one warehouse, which is predominately made of corrugated steel, and therefore has limited potential of dust emission. The total volume of the building to be demolished is estimated to be approximately 750m^3. Therefore, the potential dust emission magnitude is considered to be **small** for demolition activities.

11.2.2 Earthworks

The area is currently made up of hardstanding ground, however, earthworks will arise from ground preparation, such as building foundations for the Proposed Development. The site area is > 10,000m^2 and the hardstanding is underline with clay. It is anticipated that there will be bunds of height 4-8m. As such, the dust emission magnitude is considered **Large.**

11.2.3 Construction

The total volume of buildings to be constructed on the Proposed Development will be > 100,000m^3 with potentially dusty construction materials being used. It is assumed that concrete batching will occur. Therefore, the potential dust emission magnitude is considered to be **Large** for construction activities.

11.2.4 Trackout

The total anticipated trackout is 10-50 HDV movements per day and unpaved haul roads <50m. It is expected that during the construction phase there will be a maximum of 30 outward movements of HDV per day on the adjacent road network. It is understood that access to the Site will be off Brighton Road. Therefore, the potential dust emission magnitude is considered to be **Medium** for trackout activities.

Table 11.1 provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 11.1 Summary of Dust Emission Magnitude for Each Activity

Source	Magnitude
Demolition	Small
Earthworks	Large
Construction	Large
Trackout	Medium

11.3 Sensitivity of the Surrounding Area

The predominant wind direction in the area is from the south-west. Therefore receptors north-east of the Proposed Development are more likely to be affected by dust and particular matter emitted and re-suspended during the construction phase.

Areas most consistently affected by dust are influenced by prevailing winds that are generally located downwind of an emission source. Therefore, the highest risks would occur at receptors to the northwest and south of the Site. The river Adur is located to the south of the Site and to the north-west is mainly commercial and industrial units in the immediate vicinity, although there are residential properties approximately 160 m to the north-west and some to the west along Brighton Road. Based on the IAQM guidance, residential dwellings and school are considered as 'High' sensitivity receptors in relation to both dust soiling and health effects of PM_{10}. A review of data held on the DEFRA MAGIC website shows no sites designated as important for wildlife within 50m of the Site therefore impacts on ecological receptors has not been considered any further within this assessment.

As seen in Figure 8, there are <10 high sensitive receptors within the 50m buffer zone including commercial and residential receptors. As a result, given the distance and number of these receptors, the sensitivity of the surrounding area is considered to be 'Low' in relation to dust soiling effects on people and property from the demolition, earthworks and construction activities. There are no automatic monitors measuring PM_{10} within 1km of the proposed development site at a background location. As such Defra background values have been used to assess the impact upon human health, with the sensitivity of the surrounding area considered to be 'low'.

Taking the above into account and following the IAQM Assessment methodology, the sensitivity of the area to changes in dust and PM_{10} has been derived for each of the construction activities considered. The results are shown in Table 11.2.

Table 11.2 Summary of Sensitivity of Surrounding Area

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

11.4 Defining the Risk of Impacts

The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. Table 11.3 below provides a summary of the risk of dust impacts for the Proposed Development. The risk category identified for each construction activity has been used to determine the level of mitigation required, which is presented in Appendix C.

Table 11.3 Summary of Risk Effects to Define Site Specific Mitigation

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

11.5 Construction Vehicles & Plant

The greatest impact on air quality due to emissions from vehicles and plant associated with the construction phase will be in the areas immediately adjacent to the site access. Construction vehicles are anticipated to use Brighton Road.

Final details of the exact plant and equipment likely to be used on Site will be determined by the appointed contractor, it is considered likely to comprise dump trucks, diesel generators, cranes, compressors and trucks. The number of plant and their location within the Site are likely to be variable over the construction period.

Based on the current local air quality in the area, the proximity of sensitive receptors to the roads likely to be used by construction vehicles, and the likely numbers of construction vehicles and plant that will be used, the impacts are therefore considered to be of low significance according to the assessment significance criteria.

12 Mitigation

12.1 Construction Phase

Particle generation from construction activities can be substantially reduced through carefully selected mitigation techniques and effective management. The most effective technique is to control at source, as once particles are airborne, it is difficult to prevent them from dispersing into the surrounding area. However, once airborne, water sprays are probably the most effective method for suppression.

Pre-project planning, implementation and on-site management issues are an essential requirement for effective dust control. This includes, for example environmental risk assessments, method statements, training and satisfying planning requirements. Before the start of a project, it is also important to identify which construction activities are likely to generate dust and to draw up action plans to minimise emissions to the atmosphere. Dust emissions from construction sites will mainly be the sum of a large number of small activities. Therefore, attention to detail is a critical feature of effective management of the total site emissions.

Once granted approval, the appointed contractor should consult with AWC to determine whether a Dust Management Plan (DMP), forming part of the Construction Environmental Management Plan (CEMP), will need to be prepared. This will ensure that the construction phase will cause minimal disruption to the surrounding area and neighbours.

Site specific mitigation measures should be set up based on the outcome of the consultation with AWC. Examples of these measures are provided in the IAQM guidance documents. The impact of the development is predicted to be low and as such best practice measures should be adhered to as laid out in Appendix C. Communication with the local cumulative developments should be established such that construction activities at both locations do not create a combined large impact.

Construction related transport, NRMM and construction plant have the potential to increase pollutant concentrations over the duration of the construction works at nearby sensitive receptors. A construction logistics plan (CLP) should be implemented and agreed with AWC to manage the amounts and routes taken by HDVs when accessing the site. NRMM and construction plant should meet the relevant emissions standards and a travel plan should be implanted for all construction workers accessing the site.

12.2 Operational Phase

Based on the operational phase impacts detailed in Section 10 of this report, no further mitigation measures are considered necessary in terms of the impact of the operation of the Proposed Development on the existing and proposed sensitive human receptors.

It should be noted that within the Proposed Development design, additional bike storage is included above the existing amount in line with the ADC Local Plan 2017, supporting sustainable transport methods.

12.3 Sussex Air Quality and Emissions Mitigation Assessment

Air quality guidance published by a consortium of Sussex local authorities[20] outlines the requirement for an emissions mitigation assessment for all developments which satisfy certain criteria. The purpose of this assessment is to assess the emissions associated with a development and then determine the appropriate level of mitigation required to help reduce the potential effects on health. The development meets the criteria in the Sussex guidance and therefore requires an air quality and emissions mitigation assessment.

20 Sussex Air Quality and Emissions Mitigation Assessment, 2013.

12.3.1 Damage Cost Calculations

The Proposed Development is considered a Major Development, therefore, emissions resulting from the development must to quantitated and a subsequent exposure cost value to be spent on mitigation measures calculated.

Damage costs are a simple way to value changes in air pollution. They estimate the cost to society of a change in emissions of different pollutants. Damage costs are provided by pollutant, source and location. This is appropriate for small air quality impacts (below £50 million), provided the development does not affect areas likely to breach legally binding air quality limits.

A full list of damage costs used to assess national policies, programmes and projects by location and source is available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/460398/air-quality-econanalysis-damagecost.pdf

The resulting five-year exposure cost value is the value that is to be used to implement mitigation measures within the development.

12.3.2 Damage Costs estimates 2023 - 2027

Our estimates of damage costs due to NO_x and $PM_{2.5}$ transport emissions from the Proposed Development have been calculated for the year 2023 (development likely to be in operation) until 2027. The assumptions used to represent the 'worst –case' scenario in estimating the damage costs are:

- The link length is assumed to be 10km for all journeys;
- The number of operating days has been taken as 365 days, 24 hours.

Damage costs from the Proposed Development are then estimated using the procedure listed in below.

Inputs to the Damage Cost Calculator

Following the IAQM/EPUK & DEFRA guidance, Defra's EFT calculator (v9.0) for 2023 – 2027 is used to calculate the emissions of NO_x and $PM_{2.5}$ as shown in Table.12.1 below. For each calculated year, the inputs into the EFT calculator were:

- Road Type – Urban (not London);
- Traffic Flow - 674;
- %HGV – 0;
- Speed (kph) – 48;
- No. of Hours – 24; and
- Link Length (kms)- 10.

The NO_x and PM_{10} emissions in kg/yr are converted into tonnes/yr, as shown in Table 12.1.

Table 12.1 NO_x and PM_{10} Emission Rates for 2023 – 2027 from the Proposed Development

Pollutant Name	2023	2024	2025	2026	2027
NO_x (kg/yr);	574.67	529.03	485.68	446.11	408.63
PM_{10}(kg/yr)	52.39	52.15	51.98	51.86	51.78
NO_x (tonnes/yr)	0.57	0.53	0.49	0.45	0.41
PM_{10}(tonnes/yr)	0.0524	0.0522	0.0520	0.0519	0.0518

The above emission rates were included within the Damage Costs Appraisal Toolkit[21], published by Defra in January 2019. PM_{10} emissions have been converted to $PM_{2.5}$ using factor of 0.673 as per Defra's recommendation.

Output of the Damage Cost Calculator

The results as per the output worksheet of the Damage Cost Appraisal Toolkit are shown below in Table 12.2 and 12.3 for the corresponding years.

Table 12.2 NO_x Road Transport Urban Medium Emissions

Year	2023	2024	2025	2026	2027
Reduction in emissions (tonnes)	0.574668	0.529027	0.48568	0.446112	0.408629
Central Damage Costs (£)	12398	12646	12899	13157	13420
Central Benefit (£)	7125	6690	6265	5870	5484
Discounted Central Benefit (£)	7125	6464	5848	5294	4779
Central Present Value	**£29,511**				
Note: Data extracted from Defra's Damage Cost Appraisal Toolkit					

Table 12.3 $PM_{2.5}$ Road Transport Urban Medium Emissions

Year	2023	2024	2025	2026	2027
Reduction in emissions (tonnes)	0.052394	0.052154	0.05197	0. 051861	0. 05178
Central Damage Costs (£)	232513	237163	241906	246745	251679
Central Benefit (£)	12182	12369	12574	12796	13032
Discounted Central Benefit (£)	12182	11951	11738	11542	11357
Central Present Value	**£58,769**				
Note: Data extracted from Defra's Damage Cost Appraisal Toolkit					

Summary of Damage Cost Calculations

The total damage costs from the Proposed Development is £88,280.

[21] Available for download at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770577/air-quality-damage-cost-appraisal-toolkit.xlsm

13 Conclusions

MLM Consulting Engineers Ltd was commissioned by Hyde New Build Ltd to undertake an Air Quality Assessment for the Proposed Development at Kingston Wharf, Brighton Road, Shoreham-by-Sea, in support of a planning application.

A qualitative assessment on the construction phase activities has been carried out. The risk of the different activities towards dust soiling was 'Negligible to Medium', and that for the human health impact was 'Negligible to Low'. Following the implementation of appropriate mitigation measures as outlined in the report, the impact of emissions during construction of the Proposed Development would be 'Negligible' and the effect 'Not Significant'.

Based on the detailed dispersion modelling undertaken, the air quality impacts on existing receptors during the operational phase are considered to be 'Negligible' and the effect 'Not Significant' for all modelled receptors. However, as per the requirements of Sussex Air Quality and Emissions Mitigation Guidance, an emissions mitigation assessment has been undertaken. This estimates that total calculated damage costs for the Proposed Development is £88,280.00.

In terms of the suitability of the site for its proposed use, detailed dispersion modelling shows that the air pollutant concentrations at the Proposed Development will be below the relevant air quality objectives. The site is suitable for its proposed use.

At this stage, the specifications of the gas boilers have not been confirmed. The energy strategy is expected to comprise gas-fired heating which will be implemented through a centralised system. This will comprise communal gas boilers for communal-based heating and hot water supply. Air-source heat pumps will also be used to compliment in providing cooling and space heating to commercial office spaces. However, if criteria set out within the IAQM/EPUK guidance is exceeded and/or does include CHP units, further dispersion modelling will be needed to determine its impacts.

Air quality constitutes a material consideration in the determination of planning applications. Based on the findings of this AQA, it is considered that air quality is not a constraint to the granting of planning permission for the Proposed Development.

© MLM Consulting Engineers Limited

Figures

Figure 1: Site Location Plan

Figure 2: Proposed Site Layout

Figure 3: Monitoring Locations

Figure 4: Roads included within Model Domain

Figure 5: 2018 Road Transport UK Diurnal Profile

Figure 6: Existing and Proposed Receptors

Figure 7: Shoreham Airport Windrose 2018

Figure 8: Construction Dust Buffers

LEGEND

SITE BOUNDARY



0 50 100 150 m

THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:2000
BASEMAP SOURCE: GOOGLE SATELLITE IMAGERY AND OSM

REV	DATE	DESCRIPTION	MADE	CKD

MLM. Group Part of Sweco

DRAWING STATUS: FINAL

DRAWING TITLE: SITE LOCATION PLAN

CLIENT: HYDE NEW BUILD LTD

DRAWN/DESIGN:	JJ	DATE:	19/12/2019	STATUS:	S2
CHECKED:	TB	APPROVED:	KN	REVISION:	C01

PROJECT: KINGSTON WHARF, SHOREHAM-BY-SEA

DRAWING NO: 774885-MLM-ZZ-XX-DR-J-FIGURE 1

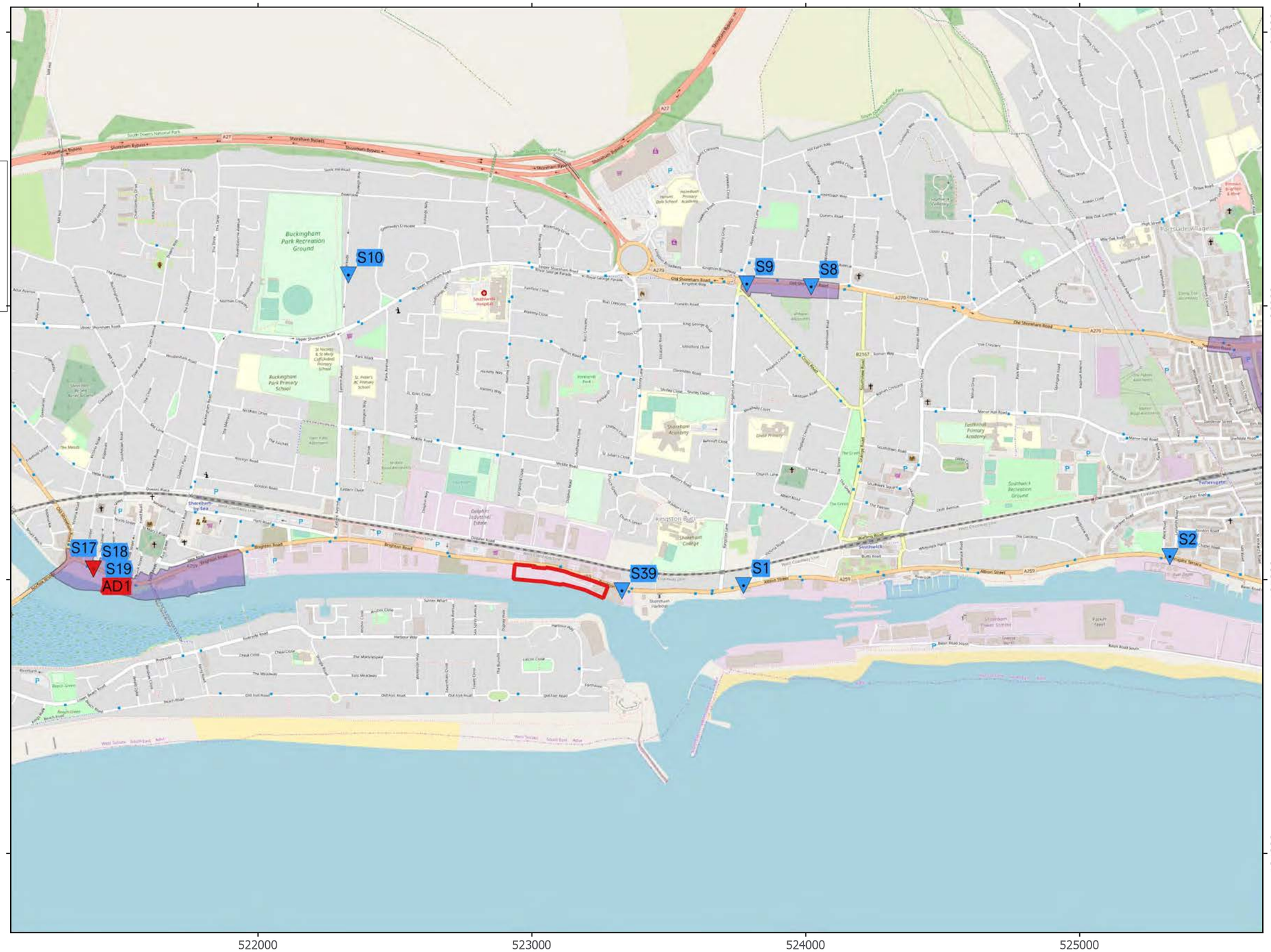
REV	DATE	DESCRIPTION	MADE	CKD

MLM. Group
Part of Sweco

DRAWING STATUS: FINAL			DRAWING TITLE: PROPOSED SITE LAYOUT		
CLIENT: HYDE NEW BUILD LTD	DRAWN/DESIGN: JJ	DATE: 19/12/2019	STATUS: S2		
	CHECKED: TB	APPROVED: KN	REVISION: C01		
PROJECT: KINGSTON WHARF, SHOREHAM-BY-SEA	DRAWING NO: 774885-MLM-ZZ-XX-DR-J-FIGURE 2				

LEGEND

- SITE BOUNDARY
- ADC 2018 AUTOMATIC MONITORING
- ADC 2018 DIFFUSION TUBES
- AIR QUALITY MANAGEMENT AREAS



0 250 500 750 m

THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:15000
BASEMAP SOURCE: OSM

REV	DATE	DESCRIPTION	MADE	CKD

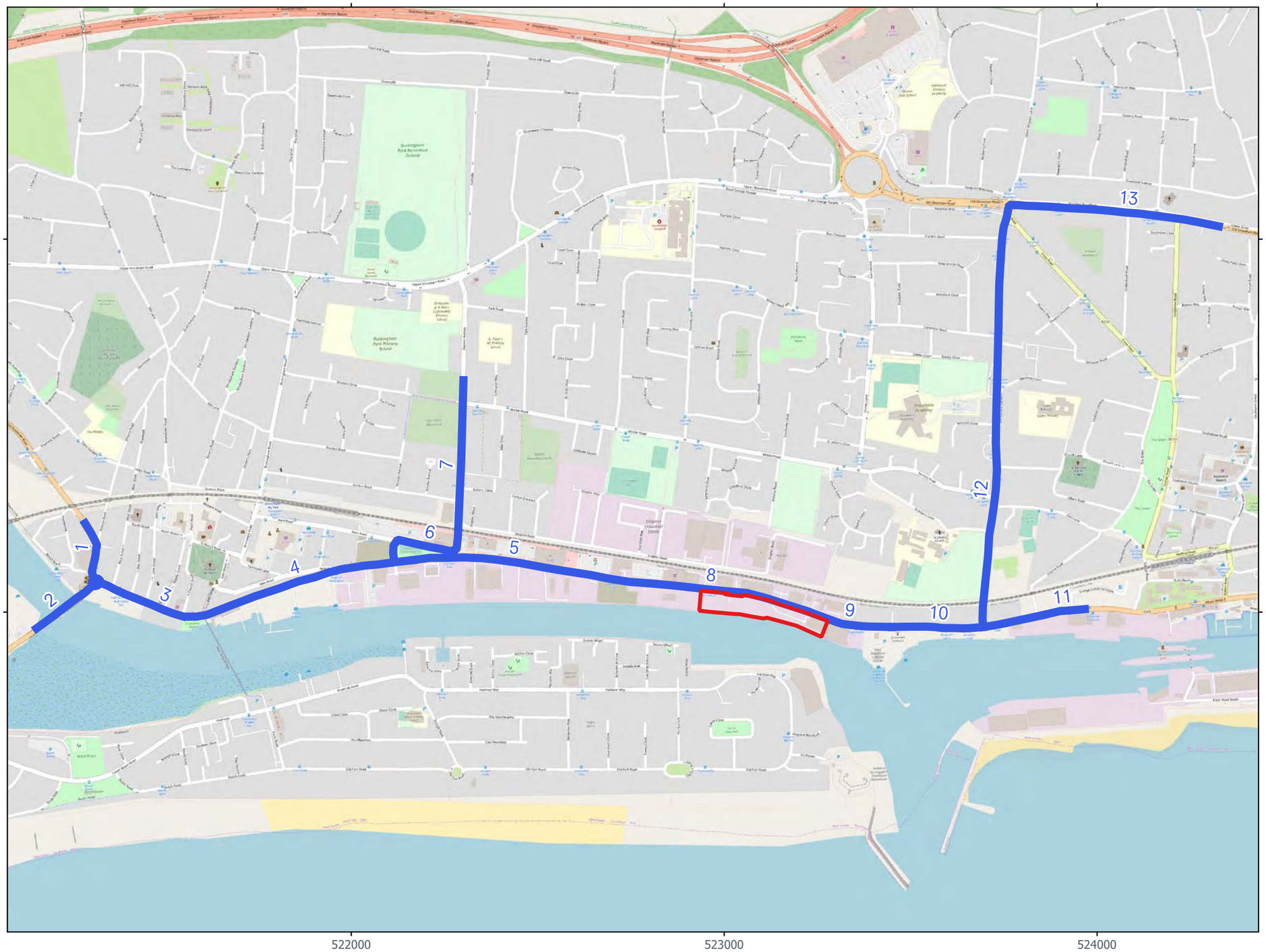
MLM. Group Part of Sweco

DRAWING STATUS: FINAL				DRAWING TITLE: MONITORING LOCATIONS	
CLIENT: HYDE NEW BUILD LTD	DRAWN/DESIGN: JJ	DATE: 19/12/2019	STATUS: S2		
	CHECKED: TB	APPROVED: KN	REVISION: C01		
PROJECT: KINGSTON WHARF, SHOREHAM-BY-SEA	DRAWING NO: 774885-MLM-ZZ-XX-DR-J-FIGURE 3				

LEGEND

SITE BOUNDARY

MODELLED ROADS



0 250 500 750 m

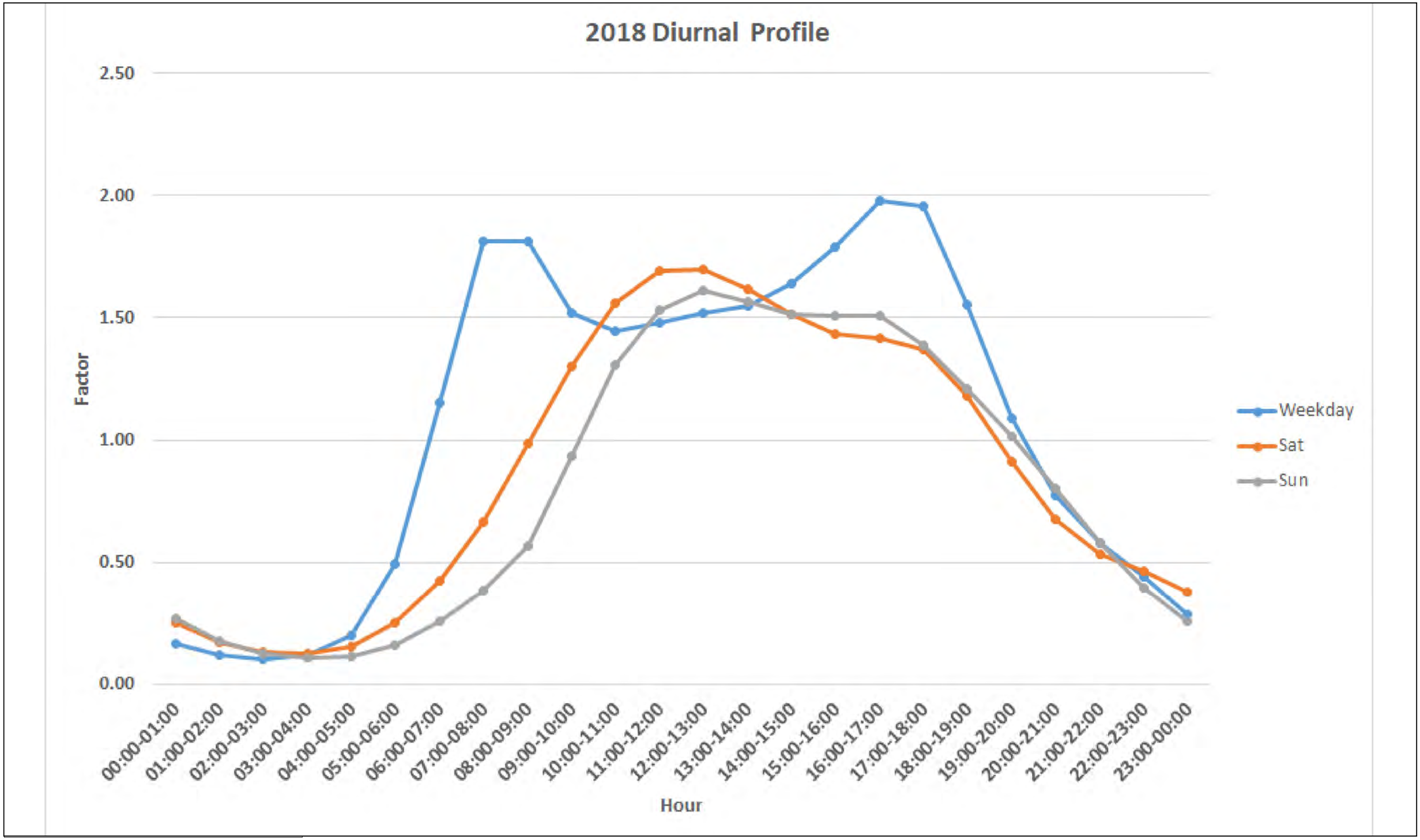
THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:11000
BASEMAP SOURCE: OSM

REV	DATE	DESCRIPTION	MADE	CKD

MLM. Group Part of Sweco

DRAWING STATUS: FINAL				DRAWING TITLE: ROADS INCLUDED WITHIN MODEL DOMAIN	
CLIENT: HYDE NEW BUILD LTD	DRAWN/DESIGN: JJ	DATE: 19/12/2019	STATUS: S2		
	CHECKED: TB	APPROVED: KN	REVISION: C01		
PROJECT: KINGSTON WHARF, SHOREHAM-BY-SEA	DRAWING NO: 774885-MLM-ZZ-XX-DR-J-FIGURE 4				



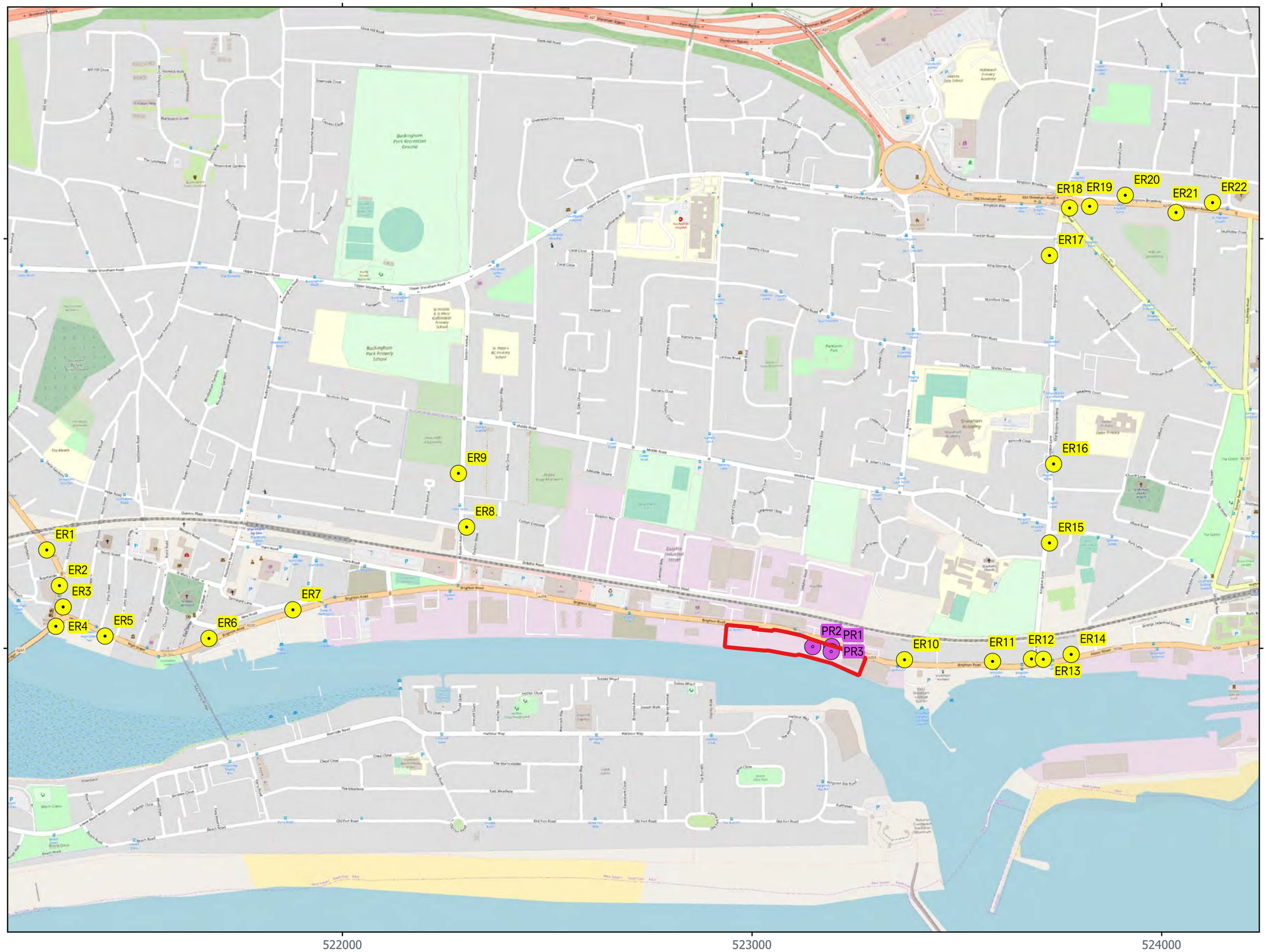
REV	DATE	DESCRIPTION	MADE	CKD

MLM. Group
Part of Sweco

DRAWING STATUS: FINAL				DRAWING TITLE: 2018 ROAD TRANSPORT UK DIURNAL PROFILE	
CLIENT: HYDE NEW BUILD LTD	DRAWN/DESIGN: JJ	DATE: 19/12/2019	STATUS: S2		
	CHECKED: TB	APPROVED: KN	REVISION: C01		
PROJECT: KINGSTON WHARF, SHOREHAM-BY-SEA				DRAWING NO: 774885-MLM-ZZ-XX-DR-J-FIGURE 5	

LEGEND

- SITE BOUNDARY
- EXISTING RECEPTORS
- PROPOSED RECEPTORS



0 250 500 750 m

THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:10000
BASEMAP SOURCE: OSM

REV	DATE	DESCRIPTION	MADE	CKD

MLM. Group Part of Sweco

DRAWING STATUS: FINAL

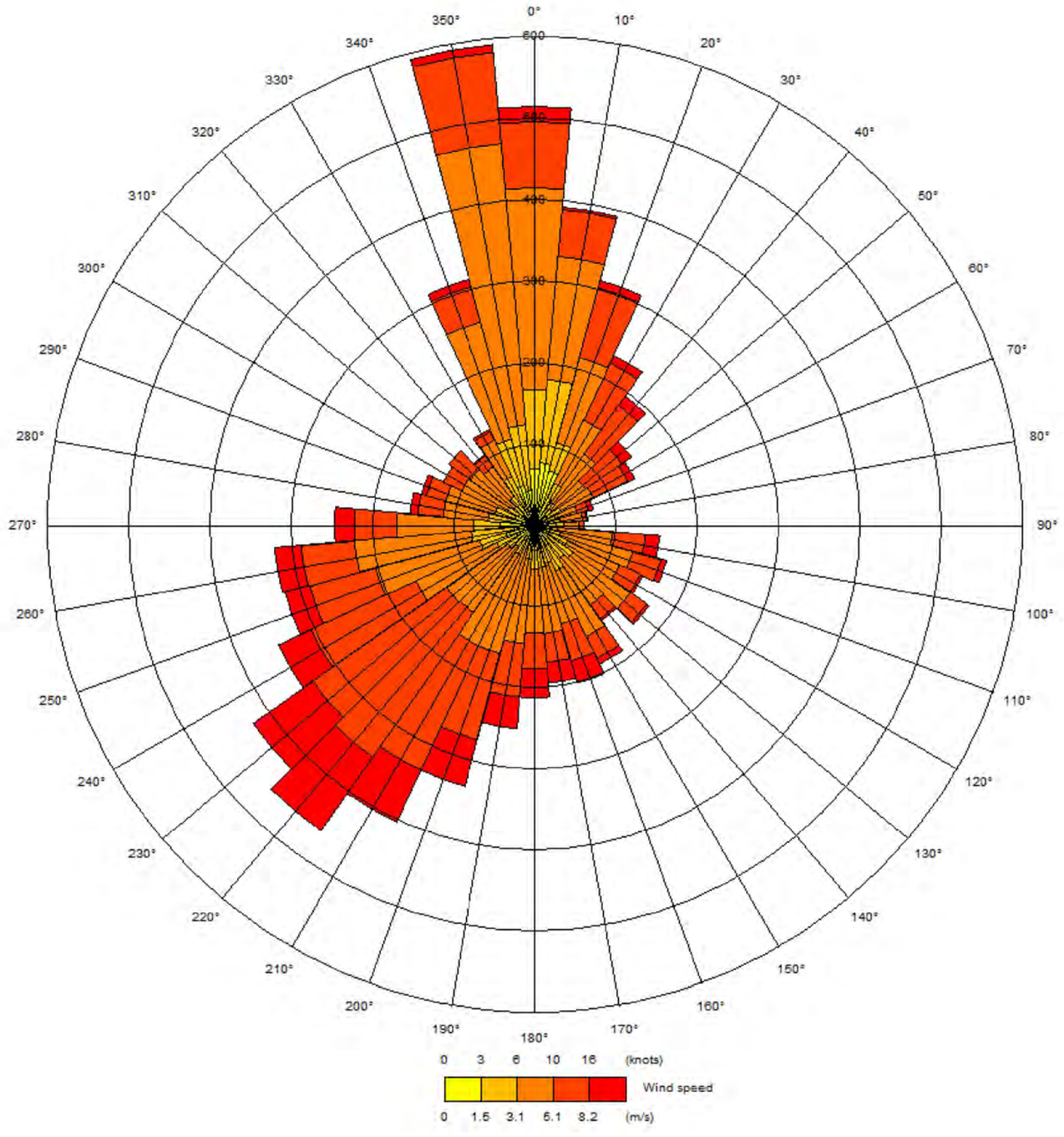
CLIENT: HYDE NEW BUILD LTD

PROJECT: KINGSTON WHARF, SHOREHAM-BY-SEA

DRAWING TITLE: EXISTING AND PROPOSED RECEPTORS

DRAWN/DESIGN:	JJ	DATE:	19/12/2019	STATUS:	S2
CHECKED:	TB	APPROVED:	KN	REVISION:	C01

DRAWING NO: 774885-MLM-ZZ-XX-DR-J-FIGURE 6



REV	DATE	DESCRIPTION	MADE	CKD

MLM. Group Part of Sweco

DRAWING STATUS: FINAL			DRAWING TITLE: SHOREHAM AIRPORT 2018 WINDROSE		
CLIENT: HYDE NEW BUILD LTD	DRAWN/DESIGN: JJ	DATE: 19/12/2019	STATUS: S2		
	CHECKED: TB	APPROVED: KN	REVISION: C01		
PROJECT: KINGSTON WHARF, SHOREHAM-BY-SEA	DRAWING NO: 774885-MLM-ZZ-XX-DR-J-FIGURE 7				

LEGEND

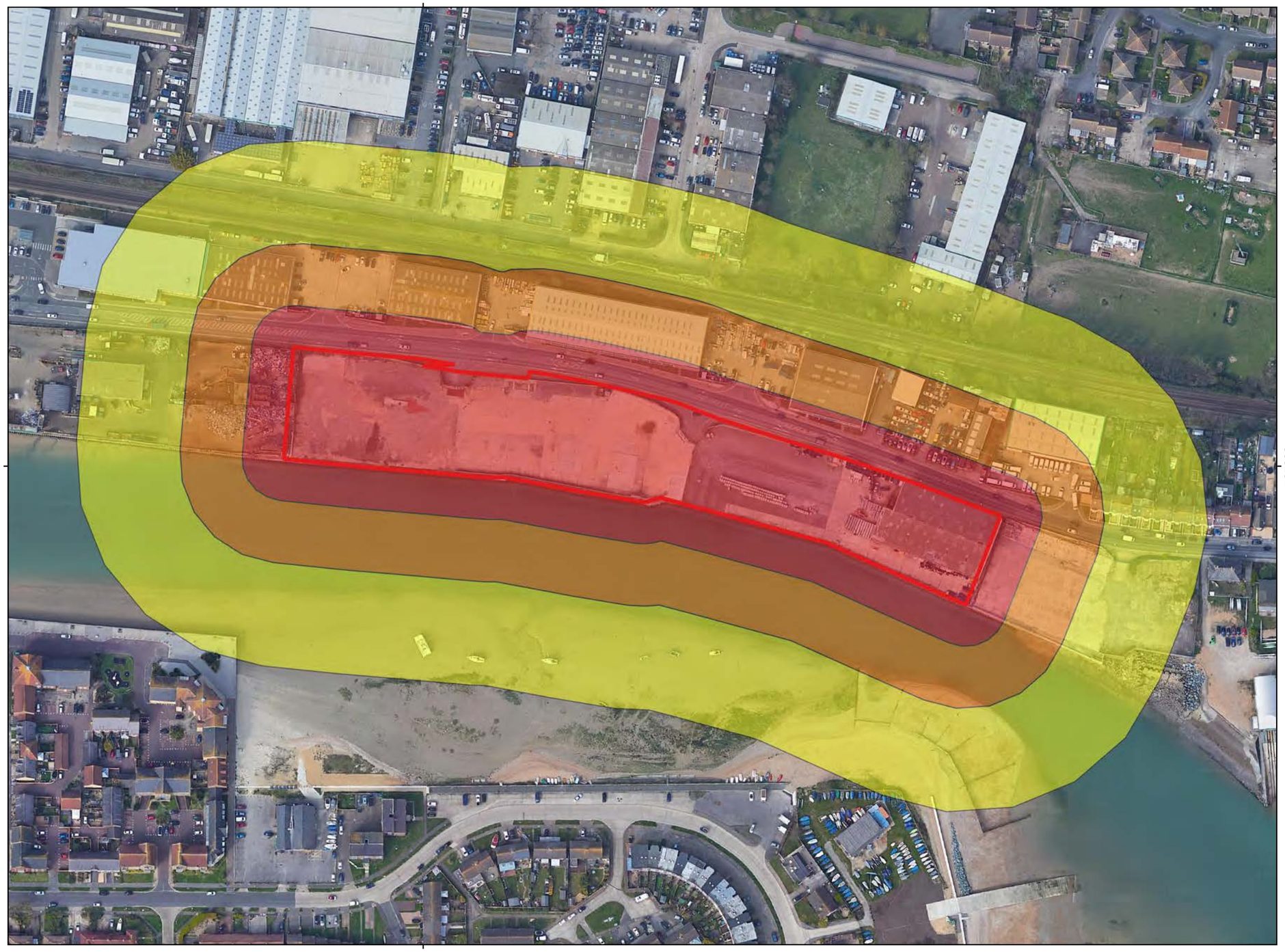
SITE BOUNDARY

DUST BUFFER ZONES

20 M

50 M

100 M



0 50 100 150 m

THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:2000
BASEMAP SOURCE: GOOGLE SATELLITE IMAGERY

REV	DATE	DESCRIPTION	MADE	CKD

MLM Group Part of Sweco

DRAWING STATUS: FINAL

CLIENT: HYDE NEW BUILD LTD

PROJECT: KINGSTON WHARF, SHOREHAM-BY-SEA

DRAWING TITLE: CONSTRUCTION DUST BUFFERS

DRAWN/DESIGN:	JJ	DATE:	19/12/2019	STATUS:	S2
CHECKED:	TB	APPROVED:	KN	REVISION:	C01

DRAWING NO: 774885-MLM-ZZ-XX-DR-J-FIGURE 8

© MLM Consulting Engineers Limited

Appendix A - Methodology for Construction Dust Impact Assessment

It is inevitable that with any development, demolition and construction activities would cause some disturbance to those nearby. Dust arising from most construction activities tends to be of a coarse nature, which through dispersion by the wind, can lead to soiling of property including windows, cars, external paintwork and laundry.

The ability of dust particles to remain suspended in the air depends on its shape, size and density. Coarse particles (>30µm) tend to be deposited within 100m of source. Finer particles, between 10-30µm, are generally deposited within 200 to 500m of source, while very fine particles (<10µm), which remain suspended for longer, can travel up to 1km from source. The greatest proportion of construction dust is made up of coarse particles, thus the majority of dust emissions are deposited within 100m of source.

However, as well as giving rise to annoyance due to soiling of surfaces from dust emissions, there is evidence of major construction activities causing increases in long term PM_{10} concentrations and in the number of days exceeding the short term PM_{10} objective of 50µg/m^3. The potential for impacts to occur during the construction of a proposed development must therefore be considered, to ensure appropriate mitigation measures are applied to reduce potential impacts at adjacent receptors. However, it should be noted that disruption due to demolition and construction is a localised phenomenon and is temporary in nature.

During the construction of the proposed development, lorries would require access to the site to deliver and remove materials; earthmoving plant and other mobile machinery will work on site and generators and cranes will also be in operation. These machines produce exhaust emissions; of particular concern are emissions of NO_2 and PM_{10}.

The assessment of construction impacts has followed the methodology set out within guidance produced by the Institute of Air Quality Management (IAQM) on assessing impacts from construction activities and is set out below.

Prediction Method and Approach

In order to assess the potential impacts, the activities on construction sites are divided into four categories. These are:

- Demolition (removal of existing structures);
- Earthworks (soil-stripping, ground-levelling, excavation and landscaping);
- Construction (activities involved in the provision of a new structure); and
- Trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

For each activity, the risk of dust annoyance, health and ecological impact is determined using three risk categories: low, medium and high risk. The risk category may be different for each of the four activities. The risk magnitude identified for each of the construction activities is then compared to the number of sensitive receptors in the near vicinity of the site in order to determine the risks posed by the construction activities to these receptors.

Step 1: Screen the Need for an Assessment

The first step is to screen the requirement for a more detailed assessment. An assessment is required where there is:

- A 'human receptor' within:
  350m of the boundary of the site or
  50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/or
- An 'ecological receptor' within:
  50m of the boundary of the site; or
  50m of the route(s) used by the construction vehicles on the public highway, up to 500m from the site entrance(s).

Step 2A: Define the Potential Dust Emission Magnitude

This is based on the scale of the anticipated works and the proximity of nearby receptors. The risk is classified as small, medium or large for each of the four categories.

Demolition: The potential dust emission classes for demolition are:

- Large: Total building volume >50,000m^3, potentially dusty construction material (e.g. Concrete), on site crushing and screening, demolition activities >20m above ground level;
- Medium: total building volume 20,000m^3 - 50,000m^3, potentially dusty construction material, demolition activities 10-20m above ground level; and
- Small: total building volume <20,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

Earthworks: This involves excavating material, haulage, tipping and stockpiling. The potential dust emission classes for earthworks are:

- Large: Total site area >10,000m^2, potentially dusty soil type (e.g. clay, which would be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100,000 tonnes;
- Medium: Total site area 2,500m^2 - 10,000m^2, moderately dusty soil (e.g. silt), five - ten heavy earth moving vehicles active at any one time, formation of bunds 4m - 8m in height, total material moved 20,000 tonnes- 100,000 tonnes; and
- Small: Total site area <2,500m^2, soil type with large grain size (e.g. sand), <five heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <20,000 tonnes, earthworks during wetter months.

Construction: The important issues when determining the potential dust emission magnitude include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The categories are:

- Large: Total building volume >100,000m^3, on site concrete batching, sandblasting;
- Medium: Total building volume 25,000m^3 - 100,000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- Small: Total building volume <25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout: The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of the trackout. The categories are:

- Large: >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100m;
- Medium: 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content, unpaved road length 50-100m; and
- Small: <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length >50m.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health (PM_{10}) and ecological receptors. 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
- In the case of PM_{10}, the local background concentration; and
- Site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table A1.1 is used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table A1.1 Examples of Factors Defining Sensitivity of an Area

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
High	Users can reasonably expect enjoyment of a high level of amenity. The appearance, aesthetics or value of their property would be diminished by soiling. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. E.g. dwellings, museums and other important collections, medium and long-term car parks and car showrooms.	10 – 100 dwellings within 20m of site. Local PM_{10} concentrations close to the objective (e.g. annual mean 36 -40µg/m^3), e.g. residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red List for Great Britain. E.g. A Special Area of Conservation (SAC).
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home. The appearance, aesthetics or value of their property could be diminished by soiling. The people or property wouldn't reasonably be expected 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.	Less than ten receptors within 20m. Local PM_{10} concentrations below the objective (e.g. annual mean 30-36µg/m^3). e.g. office and shop workers but would generally not include workers occupationally exposed to PM_{10} as protection is covered by the Health and Safety at Work legislation	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition E.g. A Site of Special Scientific Interest (SSSI) with dust sensitive features.
Low	The enjoyment of amenity would not reasonably be expected. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling.	Locations where human exposure is transient. No receptors within 20m. Local PM_{10} concentrations well	Locations with a local designation where the features may be

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
	There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. E.g. playing fields, farmland unless commercially sensitive horticultural, footpaths, short lived car parks and roads.	below the objectives (less than 75%). E.g. public footpaths, playing fields, parks and shopping streets.	affected by dust deposition. E.g. Local Nature Reserve with dust sensitive features.

Based on the sensitivities assigned to the different receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification can be defined for each. Tables A1.2 to A1.4 indicate the criteria used to determine the sensitivity of the area to dust soiling, human health and ecological impacts.

Table A1.2 Sensitivity of the Area to Dust Soiling on People and Property

Pollutant	Concentrations	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A1.3 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	>32µg/m³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32µg/m³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28µg/m³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32µg/m³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low

© MLM Consulting Engineers Limited

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

Table A1.4 Sensitivity of the Area to Ecological Impacts

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

Step 2C: Define the Risk of Impacts

The final step is to combine the dust emission magnitude determined in step 2A with the sensitivity of the area determined in step 2B to determine the risk of impacts with no mitigation applied. Tables A1.5 to A1.7 indicate the method used to assign the level of risk for each construction activity.

The identified risk of impact is then used to identify appropriate mitigation measures for inclusion with a Dust Management Plan (DMP) which is usually incorporated within the Site's Construction Environmental Management Plan (CEMP).

Table A1.5 Risk of Dust Impacts from Demolition

Sensitivity of Area	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table A1.6 Risk of Dust Impacts from Earthworks/Construction

Sensitivity of Area	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

© MLM Consulting Engineers Limited

Table A1.7 Risk of Dust Impacts from Trackout

Sensitivity of Area	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

© MLM Consulting Engineers Limited

Appendix B - EPUK/AQM Screening Criteria

© MLM Consulting Engineers Limited

Stage 1 Criteria to proceed to Stage 2

Criteria to Proceed to Stage 2
A. If any of the following apply: • Ten or more residential units of a site area of more than 0.5ha • More than 1,000m^2 of floor space for all other uses or a site area greater than 1ha
B. Coupled with any of the following: • The development has more than ten parking spaces • The development will have a centralised energy facility or other centralised combustion process

Indicative Criteria at Stage 2 to determine if an Air Quality Assessment is required

The Development will	Indicative Criteria to Proceed to an Air Quality Assessment
1 Cause a significant change in Light Duty Vehicle (LDV) traffic slows on local roads with relevant receptors.	A change of LDV flows of: • More than 100AADT within or adjacent to an AQMA; • More than 500AADT elsewhere.
2 Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors.	A change of HDV flows of: • More than 25AADT within or adjacent to an AQMA; • More than 100AADT elsewhere.
3 Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
4 Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, egg traffic-lights, or roundabouts.
5 Introduce or change a bus station.	Where bus flows will change by: • More than 25AADT within or adjacent to an AQMA; • More than 100AADT elsewhere.
6 Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).

© MLM Consulting Engineers Limited

The Development will	Indicative Criteria to Proceed to an Air Quality Assessment
7 Have one or more substantial combustion processes.	Where the combustion unit is: • Any centralised plant using bio fuel • Any combustion plant with single or combined thermal input >300kWh • A standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year).
8 Have a combustion process of any size.	Where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way or their size and/or height.

© MLM Consulting Engineers Limited

Appendix C - Dust Mitigation Measures

© MLM Consulting Engineers Limited

It is recommended that the 'desirable' and 'highly recommended' measures set out below are incorporated into the DMP and approved by AWC prior to commencement of any work on site. The 'desirable' measures are shown in italics.

- Display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- Display the head or regional office contact information on the site boundary;
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.
- Record all dust and air quality complaints, identify cause, take appropriate measures to reduce emissions in a timely manner and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site and the action taken to resolve the situation in the log book;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to AWC when asked;
- Increase frequency of site inspection 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 periods of dry or windy conditions;
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Fully enclose site or specific operations where there is a high potential for dust production and the activities are being undertaken for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If being re-used on site, cover as detailed below;
- 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;
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction egg suitable local exhaust ventilation systems;
- Ensure an adequate water supply on site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- Reuse and recycle waste to reduce dust from waste materials;
- Avoid bonfires and burning of waste.

Measures Specific to Earthworks

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

Measures Specific to Construction

- *Avoid scabbling (roughening of concrete surfaces) if possible*
- 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;
- *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 over filling during delivery*
- *For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust*

Measures Specific to Trackout

- *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.*
- *Avoid dry sweeping of large areas.*
- *Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.*
- *Record all inspections of haul routes and any subsequent action in a site log book.*
- *Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable)*



MLM.
Group
Part of Sweco

T +44 20 7422 7800
A 3rd Floor Eldon House
2 Eldon Street
London, EC2M 7LS

www.mlmgroup.com