National Consultancy, Locally Delivered

AIR QUALITY ASSESSMENT
OPERATIONAL COMMAND CENTRE, SPEKE HALL DRIVE, LIVERPOOL

REC REFERENCE: 34593R1

REPORT PREPARED FOR: POLICE & CRIME COMMISSIONER FOR MERSYSIDE POLICE

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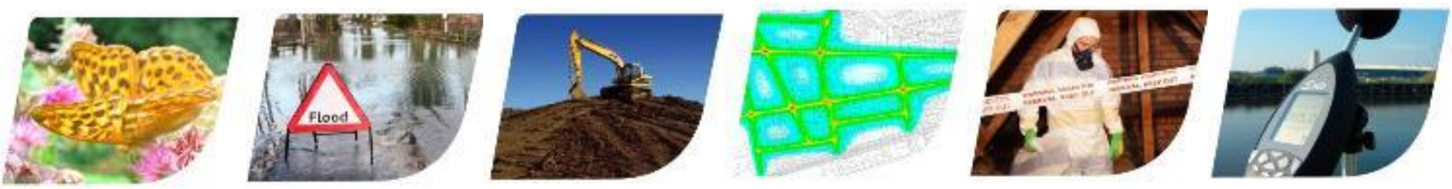

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EXECUTIVE SUMMARY

Resource and Environmental Consultants Ltd was commissioned by the Police and Crime Commissioner for Merseyside Police to undertake an Air Quality Assessment in support of a planning application for the development of an Operational Command Centre at Speke Hall Drive, Liverpool.

The proposals comprise an Operational Command Centre and associated infrastructure.

The site is located within an area identified by Liverpool City Council as experiencing elevated pollutant concentrations. As such, the development has the potential to cause impacts at sensitive locations. These may include fugitive dust emissions from construction works and road vehicle exhaust emissions associated with traffic generated by the site during the operational phase. An Air Quality Assessment has therefore been undertaken to consider potential impacts at sensitive locations in the vicinity of the site as a result of the proposals.

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

Dispersion modelling was undertaken in order to quantify existing pollutant concentrations at the site and predict air quality impacts as a result of road vehicle exhaust emissions associated with traffic generated by the development. This indicated impacts were not predicted to be significant at any sensitive location in the vicinity of the site. Additionally, pollutant concentrations at locations of future exposure associated with the development were below the relevant standards.

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

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APPENDICES

1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Ltd was commissioned by the Police and Crime Commissioners for Merseyside Police to undertake an Air Quality Assessment in support of a planning application for the development of an Operational Command Centre at Speke Hall Drive, Liverpool.

The development is located within an area identified by Liverpool City Council (LCC) as experiencing elevated pollutant concentrations. As such, an Air Quality Assessment was required to quantify potential impacts in the vicinity of the site.

1.2 Site Location and Context

The site is located on Speke Hall Drive, Liverpool, at approximate National Grid Reference (NGR): 342250, 383700. Reference should be made to Figure 1 for a location plan.

The proposals comprise an Operational Command Centre and associated infrastructure.

The development is located within an Air Quality Management Area (AQMA) which was declared by LCC due to exceedences of the annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO_2). As such, the proposals have the potential to cause impacts in this area of poor air quality during the operational and construction phases. An Air Quality Assessment was therefore undertaken in order to determine baseline conditions and consider potential impacts as a result of the development. This is detailed in the following report.

1.3 Limitations

This report has been produced in accordance with REC's standard terms of engagement. REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.

2.0 LEGISLATION AND POLICY

2.1 European Legislation

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

- Directive 99/30/EC - the First Air Quality "Daughter" Directive - sets ambient Air Quality Limit Values (AQLVs) for NO_2, oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide; and,
- Directive 2002/3/EC - the Third Air Quality "Daughter" Directive - seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

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

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

2.2 UK Legislation

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

Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007[1]. The AQS sets out AQOs that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for compliance vary slightly.

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

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m^3)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year
PM_{10}	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year
$PM_{2.5}$	25	Annual mean

Table 2 summarises the advice provided in DEFRA guidance LAQM.TG(09)[2] on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objectives Should Apply At	Objectives Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2 Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.

2.3 Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves considering present and likely future air quality against the AQOs. If it is predicted that levels at sensitive locations where members of the public are regularly present for the relevant averaging period are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 Dust

The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2010) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

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

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

2.5 National Planning Policy

2.5.1 National Planning Policy Framework

The National Planning Policy Framework[3] (NPPF) was published on 27th March 2012 and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to this assessment:

> "The planning system should contribute to and enhance the natural and local environment by: […]
>
> Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability"
>
> "Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality

[3] National Planning Policy Framework, Department for Communities and Local Government, 2012.

> Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

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

2.5.2 National Planning Practice Guidance

The National Planning Practice Guidance[4] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. Why should planning be concerned about air quality?
2. What is the role of Local Plans with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality be relevant to a planning decision?
6. Where to start if bringing forward a proposal where air quality could be a concern?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?
9. How do considerations about air quality fit into the development management process?

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

2.6 Local Planning Policy

The City of Liverpool Unitary Development Plan[5] (UDP) was formally adopted in 2002 and provides a framework for development within the city. A number of policies contained within the UDP have been saved in accordance with the Planning and Compulsory Purchase Act (2004) and therefore provide the basis for the determination of planning applications prior to the finalisation of the Local Development Framework.

A review of the UDP indicated the following policy in relation to air quality that is relevant to this assessment:

> "Policy EP11
>
> 1. Planning permissions will not be granted for development which has the potential to create unacceptable air, water, noise or other pollution or nuisance."

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

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4 http://planningguidance.planningportal.gov.uk/.
5 The City of Liverpool Unitary Development Plan, Liverpool City Council, 2002.

3.0 METHODOLOGY

The proposed development has the potential to cause air quality impacts during the construction and operational phases. These have been assessed in accordance with the following methodology.

3.1 Construction Phase Assessment

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction'[6].

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

- Earthworks;
- Construction; and,
- Trackout.

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

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

The assessment steps are detailed below.

3.1.1 Step 1

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

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

3.1.2 Step 2

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

6 Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, 2014.

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

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

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

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Earthworks	• Total site area greater than 10,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than 10 heavy earth moving vehicles active at any one time • Formation of bunds greater than 8m in height • More than 100,000 tonnes of material moved
	Construction	• Total building volume greater than 100,000m^3 • On site concrete batching • Sandblasting
	Trackout	• More than 50 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Earthworks	• Total site area 2,500m^2 to 10,000m^2 • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m^3 to 100,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10 to 50 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m

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

Step 2B defines the sensitivity of the area around the development site for construction, earthworks and trackout. The factors influencing the sensitivity of the area are shown in Table 4.

Table 4 Examples of Factors Defining Sensitivity of an Area

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

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

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

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

These factors were considered in the undertaking of this assessment.

The sensitivity of the area to dust soiling effects on people and property is shown in Table 5.

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

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

Table 6 outlines the sensitivity of the area to human health impacts.

Table 6 Sensitivity of the Area to Human Health Impacts

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

Table 7 outlines the sensitivity of the area to ecological impacts.

Table 7 Sensitivity of the Area to Ecological Impacts

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

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

Table 8 outlines the risk category from earthworks and construction activities.

Table 8 Dust Risk Category from Earthworks and Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 9 outlines the risk category from trackout.

Table 9 Dust Risk Category from Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

3.1.3 Step 3

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

3.1.4 Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'. This has been described as **negligible** within this report to provide continuity between assessment terminologies.

The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts. The IAQM[7] guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix III.

7 Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, 2014.

3.2 Operational Phase Assessment

The development has the potential to impact on existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site. Potential impacts have been defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- 2013 Verification;
- Opening year do-minimum (DM) (predicted traffic flows in 2022 should the proposals not proceed); and,
- Opening year do-something (DS) (predicted traffic flows in 2022 should the proposals be completed).

Reference should be made to Appendix II for assessment input data.

Receptors potentially sensitive to changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations were identified within 200m of the affected highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB)[8] on the likely limits of pollutant dispersion from road sources. LAQM.TG(09)[9] provides the following examples of where annual mean AQOs should apply:

- Residential properties;
- Schools;
- Hospitals; and,
- Care homes.

The sensitivity impact significance of each receptor was defined in accordance with the criteria shown in Table 10. These are based upon the guidance provided within the Environmental Protection UK (EPUK) and IAQM document Land-Use Planning and Development Control: Planning for Air Quality[10].

Table 10 Operational Traffic Exhaust Emissions - Significance of Impact

Long Term Average Concentration	% Change in Concentration Relative to AQO			
	1	2-5	6-10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

8 Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.
9 Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.
10 Land-Use Planning and Development Control: Planning for Air Quality, Environmental Protection UK and Institute of Air Quality Management, 2015.

The criteria shown in Table 10 is adapted from the EPUK and IAQM guidance Land-Use Planning and Development Control: Planning for Air Quality[11] with sensitivity descriptors included to allow comparisons of various air quality impacts. It should be noted that changes of 0%, i.e. less than 0.5%, will be described as negligible in accordance with the EPUK and IAQM guidance.

Following the prediction of impacts at discrete receptor locations utilising the criteria in Table 10, the EPUK and IAQM[12] document states that this framework is to be used as a starting point to make a judgement on significance of effect but other influences might need to be accounted for. Whilst impacts might be determined as 'slight', 'moderate' or 'substantial' at individual receptors, overall effect might not necessarily be deemed as significant in some circumstances. The following factors may provide some assistance in determining the overall significance of a development:

- Number of properties affected by significant air quality impacts and a judgement on the overall balance;
- Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective will be relevant;
- The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors;
- Whether or not an exceedence of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease; and,
- The extent to which an objective is exceeded e.g. an annual mean NO_2 concentration of 41µg/m^3 should attract less significance than an annual mean of 51µg/m^3.

These factors were considered and an overall significance determined for the impact of operational phase road traffic emissions. It should be noted that the determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts. The EPUK and IAQM[13] guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix III.

11 Land-Use Planning and Development Control: Planning for Air Quality, Environmental Protection UK and Institute of Air Quality Management, 2015.
12 Land-Use Planning and Development Control: Planning for Air Quality, Environmental Protection UK and Institute of Air Quality Management, 2015.
13 Land-Use Planning and Development Control: Planning for Air Quality, Environmental Protection UK and Institute of Air Quality Management, 2015.

4.0 BASELINE

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

4.1 Local Air Quality Management

As required by the Environment Act (1995), LCC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process concluded that concentrations of NO_2 are above the AQO within the city. As such, an AQMA has been declared, which is described as:

> "An area encompassing the whole of the City of Liverpool."

The site is located within the City of Liverpool AQMA. As such, there is the potential for the development to introduce future site users to elevated pollutant concentrations as well as cause adverse impacts to air quality within this area. This has been considered within this report.

LCC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs and as such no further AQMAs have designated.

4.2 Air Quality Monitoring

Monitoring of pollutant concentrations is undertaken by the LCC using continuous and periodic methods throughout their area of jurisdiction. There is one automatic monitor in the vicinity of the proposal and recent monitoring results from this site are summarised in Table 11. Reference should be made to Figure 2 for a graphical representation of monitoring sites.

Table 11 NO_2 Monitoring Results

Location	Type	NGR (m)		Annual Mean Concentration (μg/m³)		
		X	Y	2011	2012	2013
S58	Speke Urban Background	343884	383601	24	25	27

As indicated in Table 11, there were no exceedences of annual mean NO_2 concentrations AQO during recent years at the Speke automatic monitor. This is to be expected due to its urban background location.

LCC also utilise passive diffusion tubes to monitor NO_2 concentrations throughout the city. There is one site in the vicinity of the proposed development and monitoring results from recent years are summarised in Table 12. Exceedences of the AQO are shown in **bold**.

Table 12 NO_2 Monitoring Results

Location		NGR (m)		Annual Mean Concentration (μg/m³)		
		X	Y	2011	2012	2013
S55	Speke Pelican Crossing	340959	384247	**66**	**71**	**71**

As indicated in Table 12, NO_2 concentrations exceeded the annual mean AQO during recent years at S55. This is to be expected due to its roadside location in an AQMA.

4.3 Background Pollutant Concentrations

Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 342500, 383500. Data for this location was downloaded from the DEFRA website[14] for the purpose of this assessment and is summarised in Table 13.

Table 13 Predicted Background Pollutant Concentrations

Pollutant	2013 Predicted Background Concentration (μg/m^3)
NO_x	30.88
NO_2	21.35
PM_{10}	15.98
$PM_{2.5}$	10.76

As shown in Table 13, background concentrations in the vicinity of the site are predicted to be relatively high.

4.4 Sensitive Receptors

A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

4.4.1 Construction Phase Sensitive Receptors

Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 14.

Table 14 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Residential Receptors	Approximate Number of Ecological Receptors
Less than 20	1 - 10	0
20 - 50	1 - 10	0
50 - 100	1 - 10	-

14 http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html.

Distance from Site Boundary (m)	Approximate Number of Residential Receptors	Approximate Number of Ecological Receptors
100 - 350	10 - 100	-

Reference should be made to Figure 3 for a graphical representation of earthworks and construction dust buffer zones.

Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 100m from the road network within 500m of the site access. These are summarised in Table 15. The exact construction vehicle access routes were not available for the purpose of this assessment as they will depend on sourcing of materials. This is likely to be decided by the contractor. However, it was assumed traffic would access the site from Speke Hall Avenue and Speke Hall Road to ensure the maximum potential trackout distance was considered.

Table 15 Trackout Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Residential Receptors	Approximate Number of Ecological Receptors
Less than 20	1 - 10	0
20 - 50	1 - 10	0
50 - 100	1 - 10	-

Reference should be made to Figure 4 for a graphical representation of trackout dust buffer zones.

There are no ecological receptors within 50m of the site or trackout boundary. As such, ecological impacts have not been assessed further within this report.

A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 16.

Table 16 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The site is located in a predominantly industrial location. A review of the local industry in the vicinity of the proposals did not indicate any potentially dust generating activities. As this area is relatively established, historical dust generation is considered unlikely
The likelihood of concurrent dust generating activity on nearby sites	A review of the LCC planning portal indicated that there are currently no planning applications in the vicinity of the development. As such, the likelihood of concurrent dust generation is minimal

Guidance	Comment
Pre-existing screening between the source and the receptors	The site is bounded by vegetation along the southern, eastern and western boundaries. This will provide some screening from dust if retained
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	The wind direction is predominantly from the north-west of the development, as shown in Figure 5. As such, properties to the south-east would be most affected by dust emissions
Conclusions drawn from local topography	The topography of the area appears to be predominantly flat. As such, there are no constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is unlikely that it will extend over one year
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline

Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was considered to be **high**. This was because users would expect to enjoy a reasonable level of amenity, aesthetics or value of their property could be diminished by soiling and people would be expected to be present for extended periods of time e.g. residential properties.

The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.1.2, is shown in Table 17.

Table 17 Sensitivity of the Surrounding Area

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

4.4.2 Operational Phase Sensitive Receptors

Receptors sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 18.

Table 18 Road Vehicle Exhaust Emission Sensitive Receptors

Receptor		NGR (m)	
		X	Y
R1	Residential - School Way	342866	383340

Receptor		NGR (m)	
		X	Y
R2	Residential - Evans Road	342881	383906
R3	Residential - Speke Road	341379	383980
R4	Residential - Almond Court	341222	384192
R5	Residential - Speke Road	340952	384237
R6	Educational - St Benedict's Catholic College	340848	384583
R7	Educational - Garston C of E School	340711	384762
R8	Residential - Horrocks Avenue	340653	384524
R9	Residential - Barford Road	342591	384719
R10	Residential - Rycot Road	343503	383765

The sensitive receptors identified in Table 18 represent worst-case locations. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that may experience air quality impacts as a result of the proposed development that have not been individually identified above. Reference should be made to Figure 6 for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

Receptor sensitivity was defined based upon the methodology outlined in Table 10 and predicted pollutant concentrations for the development opening year of 2022. These are detailed within Table 19. Exceedences of the relevant AQO are highlighted in **bold**.

Table 19 Road Vehicle Exhaust Emission Receptor Sensitivity

Receptor	NO_2		PM_{10}	
	Predicted Annual Mean Concentration (μg/m^3)	Long Term Average Concentration as a Percentage of AQO	Predicted Annual Mean Concentration (μg/m^3)	Long Term Average Concentration as a Percentage of AQO
R1	26.58	75% or Less	16.90	75% or Less
R2	34.31	76 - 94%	18.22	75% or Less
R3	37.66	95 - 102%	18.83	75% or Less
R4	38.81	95 - 102%	19.01	75% or Less
R5	**49.46**	110% or More	18.94	75% or Less
R6	25.51	75% or Less	16.49	75% or Less
R7	27.27	75% or Less	16.84	75% or Less
R8	31.50	76 - 94%	17.26	75% or Less

Receptor	NO_2		PM_{10}	
	Predicted Annual Mean Concentration (µg/m^3)	Long Term Average Concentration as a Percentage of AQO	Predicted Annual Mean Concentration (µg/m^3)	Long Term Average Concentration as a Percentage of AQO
R9	28.79	75% or Less	17.27	75% or Less
R10	27.26	75% or Less	16.97	75% or Less

5.0 ASSESSMENT

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

5.1 Construction Phase Assessment

5.1.1 Step 1

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

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

The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

5.1.2 Step 2

Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. Information on soil type was not available for the purpose of this assessment. As such, the soil type was considered to be potentially dusty in order to provide a worst-case scenario.

The proposed development site is estimated to cover an area greater than 10,000m^2. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **large**.

Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 8, the development is considered to be a **medium** risk site for dust soiling as a result of earthworks activities.

Table 17 indicates the sensitivity of the area to human health is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for human health as a result of earthwork activities.

Construction

Due to the size of the development site the total building volume is likely to be greater than 100,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **large**.

Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 8, the development is considered to be a **medium** risk site for dust soiling as a result of construction activities.

Table 17 indicates the sensitivity of the area to human health is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for human health as a result of construction activities.

Trackout

Information on the number of HDV trips to be generated during the construction phase of the development was not available at the time of assessment. Similarly, the surface material and unpaved road length was not known at this stage of the project.

Based on the site area, it is anticipated that the unpaved road length is likely to be greater than 100m. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **large**.

Table 17 indicates the sensitivity of the area to dust soiling effects to people and property is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for dust soiling as a result of trackout activities.

Table 17 indicates the sensitivity of the area to human health is **low**. In accordance within the criteria outlined in Table 9, the development is considered to be a **low** risk site for human health as a result of trackout activities.

Summary of the Risk of Dust Effects

A summary of the risk from each dust generating activity is provided in Table 20.

Table 20 Summary of Potential Unmitigated Dust Risks

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

As indicated in Table 20, the potential risk of dust soiling is **medium** from earthworks, construction and trackout activities. The potential risk of human health impacts is **low** for earthworks construction and trackout activities.

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

5.1.3 Step 3

The IAQM guidance provides a number of potential mitigation measures to reduce impacts during the construction phase. These measures have been adapted for the development site as summarised in Table 21. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan if required by the Local Planning Authority.

Table 21 Fugitive Dust Mitigation Measures

Issue	Control Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site Management	• Record all dust and air quality complaints and make the log available to the LA when asked • Record any exceptional incidents that cause dust/or air emissions, and the action taken to resolve the situation
Monitoring	• Undertake daily on-site and off-site inspection to monitor dust • Carry out regular site inspections to monitor compliance with the DMP • Increase frequency of site inspections when activities with a high potential to produce dust are being carried out
Preparing and Maintaining the Site	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Avoid site runoff of water or mud • Use water as a dust suppressant where applicable • Remove materials that have a potential to produce dust from site as soon as possible • Cover, seed or fence stockpiles to prevent wind whipping
Operating Vehicle/ Machinery and Sustainable Travel	• All vehicles to switch of engines - no idling vehicles • Avoid the use of diesel or petrol powered generators where practicable • Impose a maximum-speed-limit of 15mph on surfaced and 10mph on un-surfaced haul roads and work areas • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing)

Issue	Control Measure
Operations	• Cutting equipment to use water as dust suppressant or suitable local extract ventilation • Ensure an adequate water supply on site • Use enclosed chutes and covered skips • Minimise drop heights • Ensure equipment is readily available on site to clean any spillages
Waste Management	• No bonfires
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 • Only remove the cover in small areas during work and not all at once
Construction	• Avoid scabbling • Ensure sand and other aggregates are stored and not able to dry out • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems • For smaller supplies of fine powder material ensure bags are sealed after use and stored appropriately
Trackout	• Use water-assisted dust sweeper on the access and local roads • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving sites are covered to prevent escape of materials • Install hard surfaced haul routes and inspect for integrity • Implement a wheel washing system at a suitable location near site exit • Access gates to be located at lease 10m from receptors where possible

5.1.4 Step 4

Assuming the relevant mitigation measures outlined in Table 21 are implemented, the residual effect from all dust generating activities is predicted to be **negligible**, in accordance with IAQM guidance.

5.2 Operational Phase Assessment

Additional vehicle movements associated with the operation of the proposed development will generate exhaust emissions on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site.

The assessment considered the following scenarios:

- 2013 Verification;

- 2022 DM; and,
- 2022 DS.

The DM (i.e. without development) scenario is representative of anticipated traffic data for 2022. The DS (i.e. with development) scenario is representative of anticipated traffic data for 2022, with the addition of predicted variations in traffic flow patterns as a result of the proposals.

For the purpose of this assessment traffic data was supplied for 2022, the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors for 2013 were utilised within the dispersion model. The use of 2022 traffic data and 2013 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

Reference should be made to Appendix II for full assessment input details.

5.2.1 Nitrogen Dioxide

Annual mean NO_2 concentrations were predicted for each scenario and are summarised in Table 22. Exceedences of the AQO are highlighted in **bold**. Reference should be made to Figures 7 and 8 for graphical representations of annual mean NO_2 concentrations across the modelling extents.

Table 22 Predicted Annual Mean NO_2 Concentrations

Sensitive Receptor		Predicted Annual Mean NO_2 Concentration (µg/m^3)		
		DM	DS	Change
R1	Residential - School Way	26.44	26.58	0.14
R2	Residential - Evans Road	34.23	34.31	0.08
R3	Residential - Speke Road	37.55	37.66	0.11
R4	Residential - Almond Court	38.70	38.81	0.11
R5	Residential - Speke Road	**49.33**	**49.46**	0.13
R6	Educational - St Benedicts Catholic College	25.48	25.51	0.03
R7	Educational - Garston C of E School	27.21	27.27	0.06
R8	Residential - Horrocks Avenue	31.42	31.50	0.08
R9	Residential - Barford Road	28.75	28.79	0.04
R10	Residential - Rycot Road	27.22	27.26	0.04

As indicated in Table 22, predicted NO_2 concentrations exceeded the relevant AQO at one receptor location. This is to be expected due to its roadside location within an AQMA. It should be noted that there were no new exceedences in the DS scenario.

Predicted impacts on annual mean NO_2 concentrations at the sensitive receptor locations are summarised in Table 23.

Table 23 Predicted NO_2 Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Predicted Concentration as a proportion of AQO	Significance of Impact
R1	Residential - School Way	0.35	75% or Less	Negligible
R2	Residential - Evans Road	0.20	76 - 94%	Negligible
R3	Residential - Speke Road	0.27	95 - 102%	Negligible
R4	Residential - Almond Court	0.27	95 - 102%	Negligible
R5	Residential - Speke Road	0.33	110% or More	Negligible
R6	Educational - St Benedict's Catholic College	0.08	75% or Less	Negligible
R7	Educational - Garston C of E School	0.15	75% or Less	Negligible
R8	Residential - Horrocks Avenue	0.20	76 - 94%	Negligible
R9	Residential - Barford Road	0.10	75% or Less	Negligible
R10	Residential - Rycot Road	0.10	75% or Less	Negligible

As indicated in Table 23, the significance of impacts on annual mean NO_2 concentrations as a result of the development was predicted to be **negligible** at all locations.

5.2.2 Particulate Matter with an Aerodynamic Diameter of less than 10µm

Annual mean PM_{10} concentrations were predicted for each scenario and are summarised in Table 24. Reference should be made to Figures 9 and 10 for graphical representations of annual mean PM_{10} concentrations across the modelling extents.

Table 24 Predicted Annual Mean PM_{10} Concentrations

Sensitive Receptor		Predicted Annual Mean PM_{10} Concentration (µg/m^3)		
		DM	DS	Change
R1	Residential - School Way	16.87	16.90	0.03
R2	Residential - Evans Road	18.19	18.22	0.03
R3	Residential - Speke Road	18.80	18.83	0.03
R4	Residential - Almond Court	18.98	19.01	0.03
R5	Residential - Speke Road	18.91	18.94	0.03
R6	Educational - St Benedict's Catholic College	16.48	16.49	0.01
R7	Educational - Garston C of E School	16.83	16.84	0.01

Sensitive Receptor		Predicted Annual Mean PM_{10} Concentration (µg/m^3)		
		DM	DS	Change
R8	Residential - Horrocks Avenue	17.25	17.26	0.01
R9	Residential - Barford Road	17.26	17.27	0.01
R10	Residential - Rycot Road	16.96	16.97	0.01

As indicated in Table 24, annual mean PM_{10} concentrations were below the relevant AQO at all sensitive receptor locations for both scenarios considered.

Predicted impacts on annual mean PM_{10} concentrations are summarised in Table 25.

Table 25 Predicted PM_{10} Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Predicted Concentration as a proportion of AQO	Significance of Impact
R1	Residential - School Way	0.08	75% or Less	Negligible
R2	Residential - Evans Road	0.06	75% or Less	Negligible
R3	Residential - Speke Road	0.07	75% or Less	Negligible
R4	Residential - Almond Court	0.08	75% or Less	Negligible
R5	Residential - Speke Road	0.07	75% or Less	Negligible
R6	Educational - St Benedict's Catholic College	0.01	75% or Less	Negligible
R7	Educational - Garston C of E School	0.03	75% or Less	Negligible
R8	Residential - Horrocks Avenue	0.04	75% or Less	Negligible
R9	Residential - Barford Road	0.02	75% or Less	Negligible
R10	Residential - Rycot Road	0.03	75% or Less	Negligible

As indicated in Table 25, impacts on annual mean PM_{10} concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all receptor locations.

5.2.3 Particulate matter with an aerodynamic diameter of less than 2.5µm

Annual mean $PM_{2.5}$ concentrations were predicted for each scenario and are summarised in Table 24. Reference should be made to Figures 11 and 12 for graphical representations of annual mean $PM_{2.5}$ concentrations across the modelling extents.

Table 26 Predicted Annual Mean $PM_{2.5}$ Concentrations

Sensitive Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration ($\mu g/m^3$)		
		DM	DS	Change
R1	Residential - School Way	11.31	11.33	0.02
R2	Residential - Evans Road	12.13	12.14	0.01
R3	Residential - Speke Road	12.51	12.52	0.01
R4	Residential - Almond Court	12.62	12.64	0.02
R5	Residential - Speke Road	12.72	12.74	0.02
R6	Educational - St Benedict's Catholic College	11.08	11.08	0.00
R7	Educational - Garston C of E School	11.29	11.30	0.01
R8	Residential - Horrocks Avenue	11.57	11.58	0.01
R9	Residential - Barford Road	11.55	11.55	0.00
R10	Residential - Rycot Road	11.36	11.37	0.01

As indicated in Table 24, annual mean $PM_{2.5}$ concentrations were below the relevant AQO at all sensitive receptor locations for both scenarios considered.

Predicted impacts on annual mean $PM_{2.5}$ concentrations are summarised in Table 25.

Table 27 Predicted $PM_{2.5}$ Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Predicted Concentration as a proportion of AQO	Significance of Impact
R1	Residential - School Way	0.08	75% or Less	Negligible
R2	Residential - Evans Road	0.06	75% or Less	Negligible
R3	Residential - Speke Road	0.07	75% or Less	Negligible
R4	Residential - Almond Court	0.07	75% or Less	Negligible
R5	Residential - Speke Road	0.07	75% or Less	Negligible
R6	Educational - St Benedict's Catholic College	0.01	75% or Less	Negligible
R7	Educational - Garston C of E School	0.03	75% or Less	Negligible
R8	Residential - Horrocks Avenue	0.04	75% or Less	Negligible
R9	Residential - Barford Road	0.02	75% or Less	Negligible
R10	Residential - Rycot Road	0.03	75% or Less	Negligible

As indicated in Table 25, impacts on annual mean $PM_{2.5}$ concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all receptor locations.

5.2.4 Impact Significance

The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the predicted impacts at discrete receptor locations and the considerations outlined in Section 3. Further justification is provided in Table 28.

Table 28 Overall Road Traffic Exhaust Emission Impact Significance

Guidance	Comment
Number of properties affected by slight, moderate or substantial air quality impacts and a judgement on the overall balance	Impacts on NO_2, PM_{10} and $PM_{2.5}$ concentrations were predicted to be negligible at all sensitive receptors. These represent worst-case locations and therefore it is unlikely that any other receptors would be significantly affected by the proposed development
Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective or limit value will be relevant	The proposed development does not include any sensitive land use
The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors	The change in concentrations relative to the AQO was predicted to be less than 0.5% at all receptor locations and as such, the resultant impacts were negligible
Whether or not an exceedence of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease	There were exceedences of the annual mean AQO for NO_2 at sensitive and non-sensitive locations within the modelling extents. The area of exceedence was not predicted to substantially increase or decrease as a result of the development. There were no exceedences of the annual mean AQO for PM_{10} or $PM_{2.5}$ at any location within the modelling extents
The extent to which an objective is exceeded e.g. an annual mean NO_2 concentration of 41µg/m^3 should attract less significance than an annual mean of 51µg/m^3	There were exceedences of annual mean NO_2 concentrations at one sensitive receptor location in both scenarios considered. The predicted change was below 0.5% of the relevant AQO and as such, the resultant impacts were negligible. There were no exceedences of the annual mean PM_{10} or $PM_{2.5}$ AQO at any sensitive location

6.0 CONCLUSION

REC Ltd was commissioned by the Police and Crime Commissioners for Merseyside Police to undertake an Air Quality Assessment in support of a planning application for the development of an Operational Command Centre at Speke Hall Drive, Liverpool.

The proposals comprise an Operational Command Centre and associated infrastructure.

The site is located within an area identified by LCC as experiencing elevated pollutant concentrations. As such, the development has the potential to cause impacts at sensitive locations. These may include fugitive dust emissions from construction works and road vehicle exhaust emissions associated with traffic generated by the site during the operational phase. An Air Quality Assessment has therefore been undertaken to consider potential impacts at sensitive locations in the vicinity of the site as a result of the proposals.

During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities was predicted to be **negligible**.

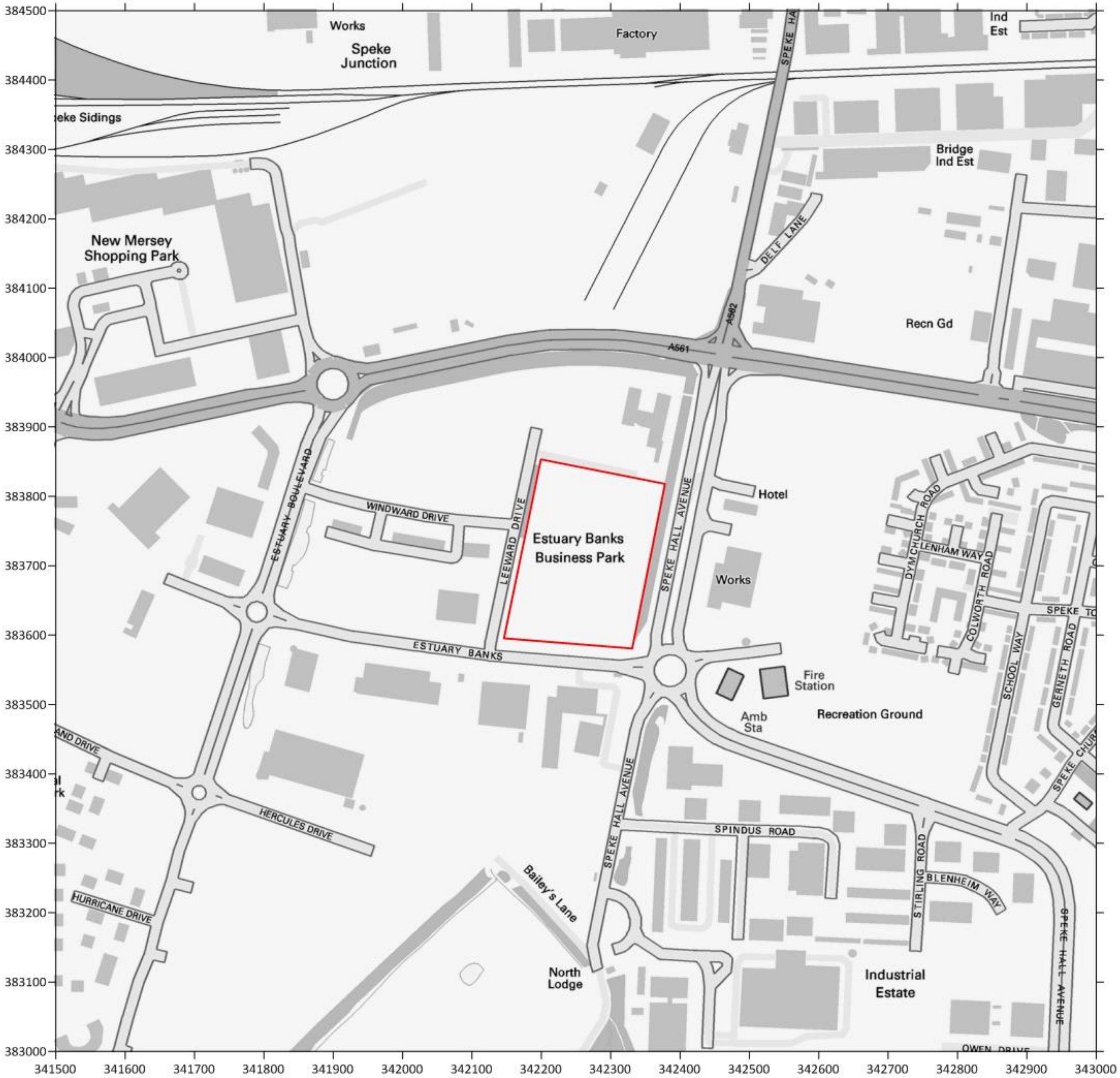
During the operational phase of the development there is the potential for air quality impacts as a result of vehicle exhaust emissions associated with traffic generated by the proposals. These were assessed using detailed dispersion modelling. This indicated impacts on annual mean NO_2, PM_{10} and $PM_{2.5}$ levels were predicted to be **negligible** at all sensitive receptor locations. The overall significance of potential impacts was determined to be **negligible**, in accordance with the EPUK and IAQM guidance.

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

7.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do-Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DS	Do-Something
EPUK	Environmental Protection UK
EU	European Union
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LCC	Liverpool City Council
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5µm
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
REC	Resource and Environmental Consultants
TEMPRO	Trip End Model Presentation Program
UDP	Unitary Development Plan
z_0	Roughness Length

APPENDIX I FIGURES



Legend

Site Boundary

Title

Figure 1

Site Location

Project

Air Quality Assessment
Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

34593

Client

Police and Crime Commissioner for Mersyside Police

Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE

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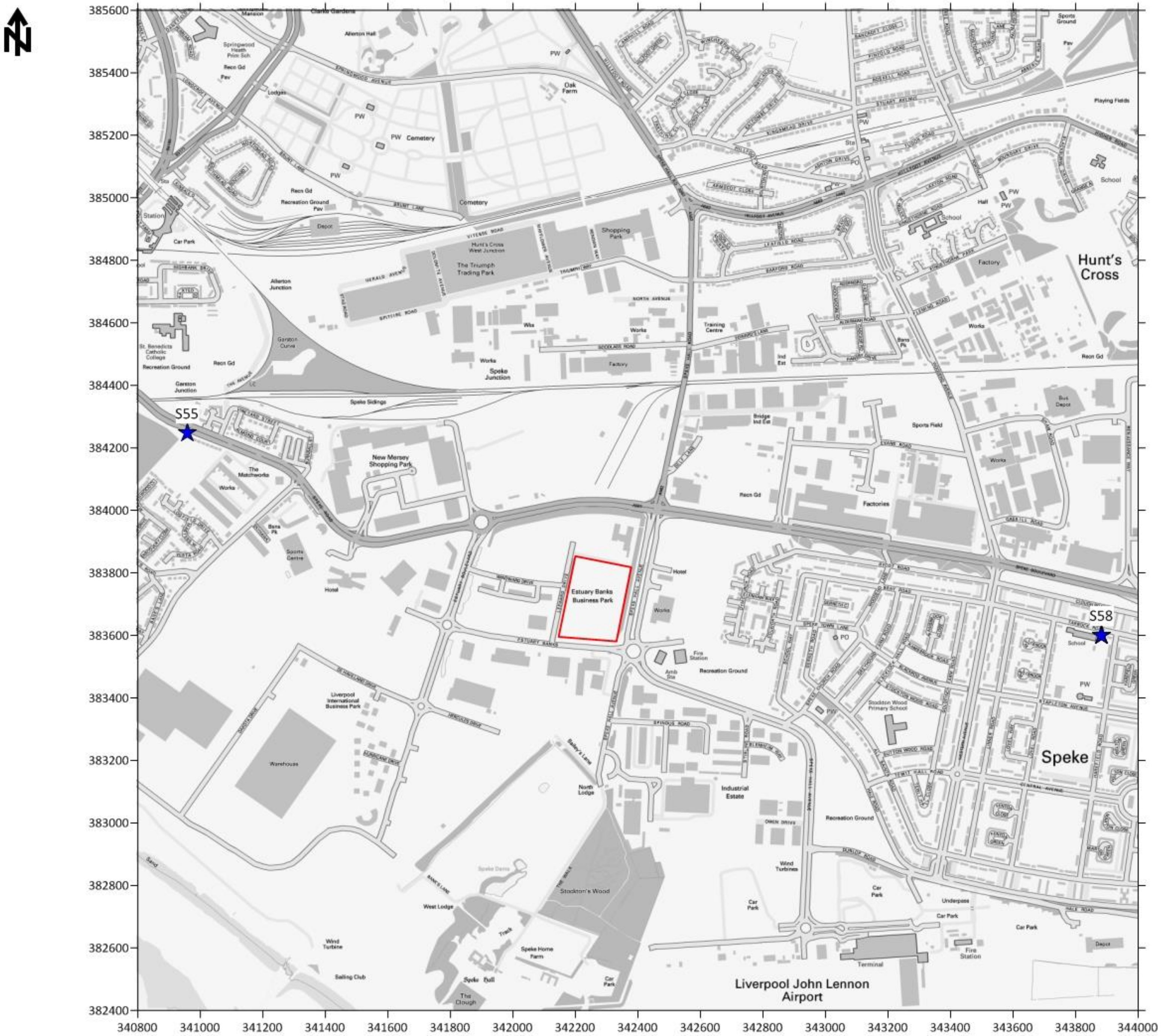

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Site Boundary

Diffusion Tube Monitoring Location

Title

Figure 2

Monitoring Locations

Project

Air Quality Assessment
Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

34593

Client

Police and Crime Commissioner for Mersyside Police

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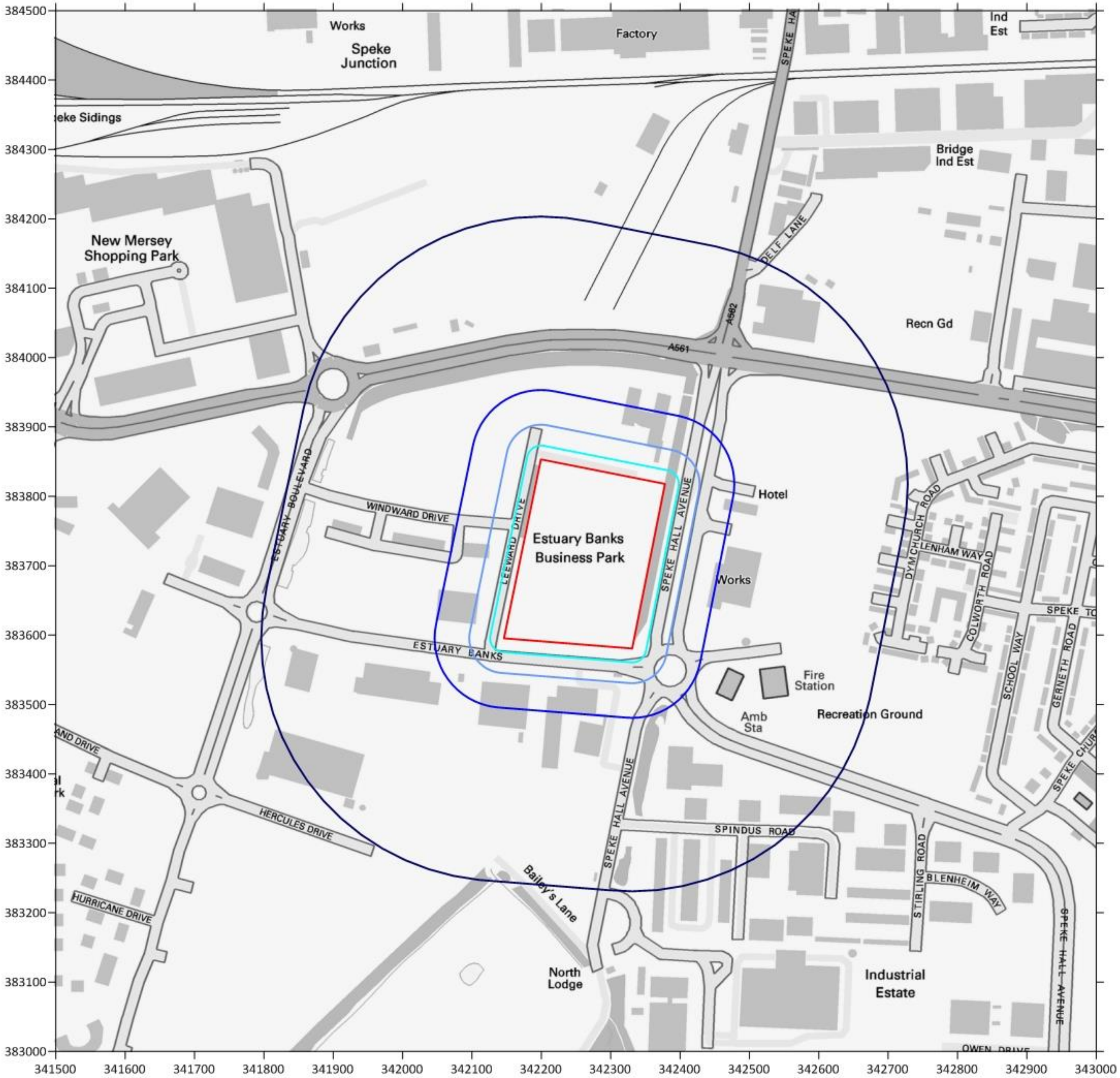

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Site Boundary

20m from Site Boundary

50m from Site Boundary

100m from Site Boundary

350m from Site Boundary

Title

Figure 3

Earthworks and Construction Dust Buffer Zones

Project

Air Quality Assessment
Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

34593

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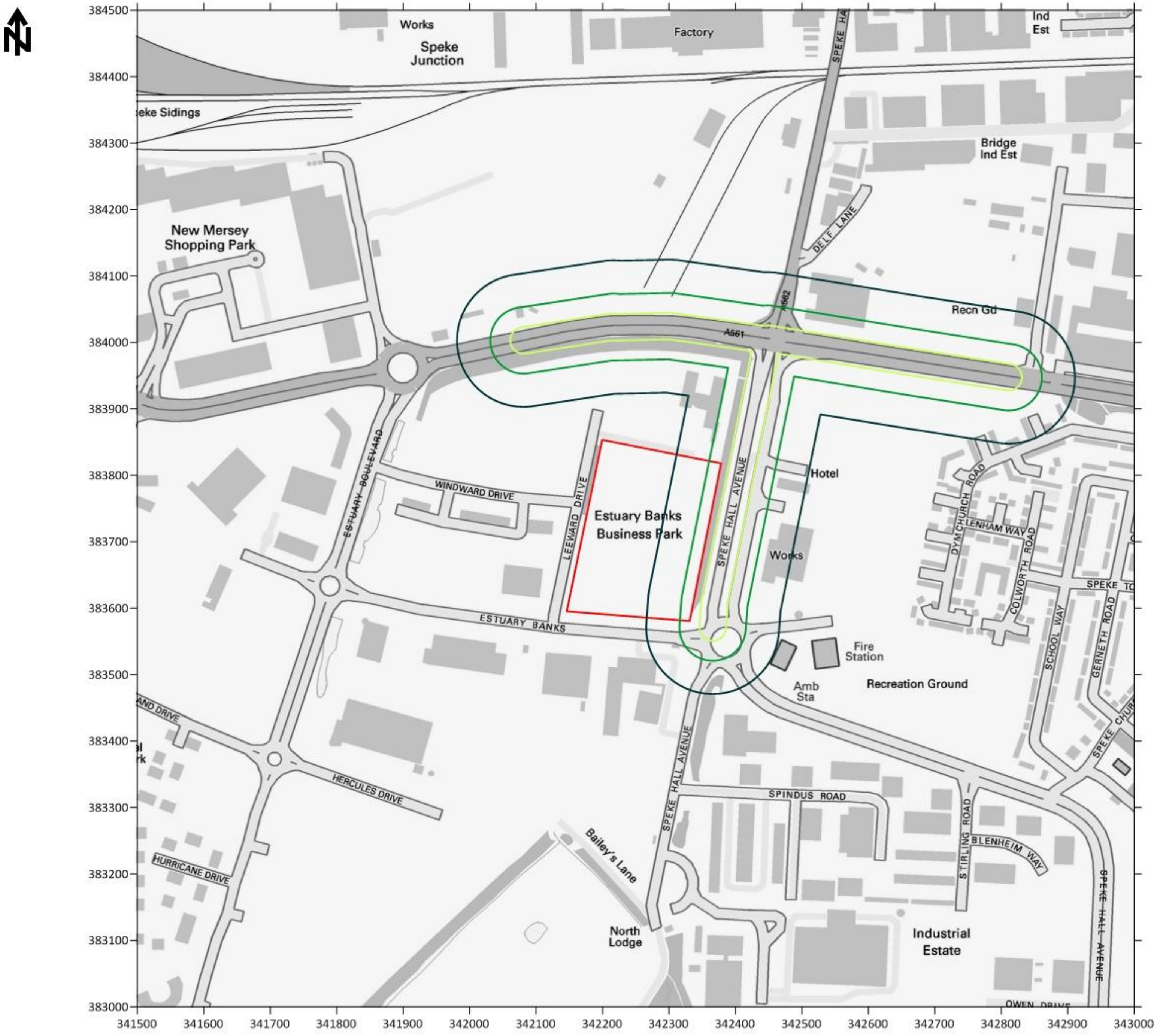

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Site Boundary

20m from Site Access Point

50m from Site Access Point

100m from Site Access Point

Title

Figure 4

Trackout Dust Buffer Zones

Project

Air Quality Assessment
Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

34593

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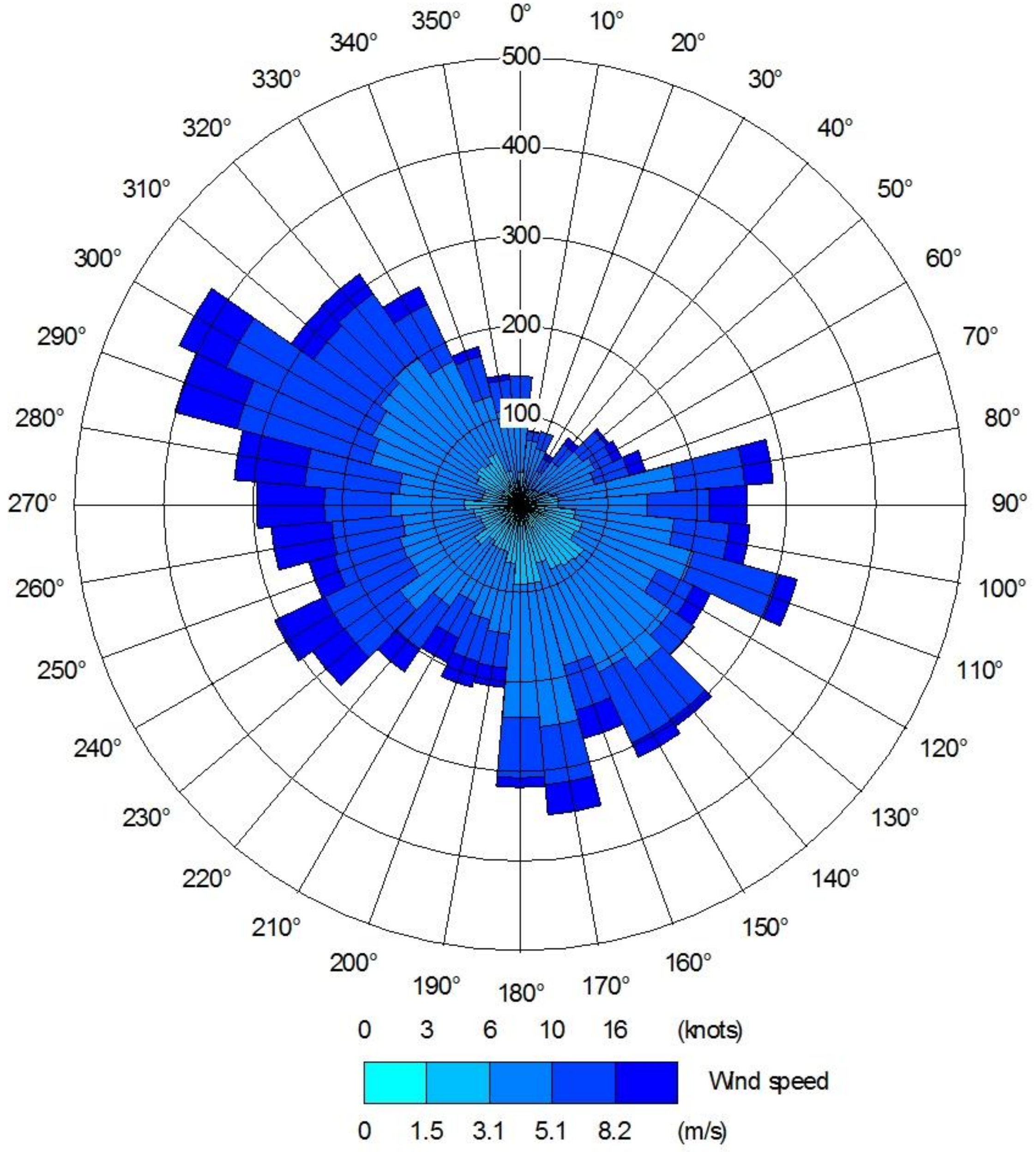

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Title

Figure 5

Wind Rose of 2013 Liverpool Meteorological Data

Project

Air Quality Assessment
Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

34593

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Police and Crime Commissioner for Merseyside Police

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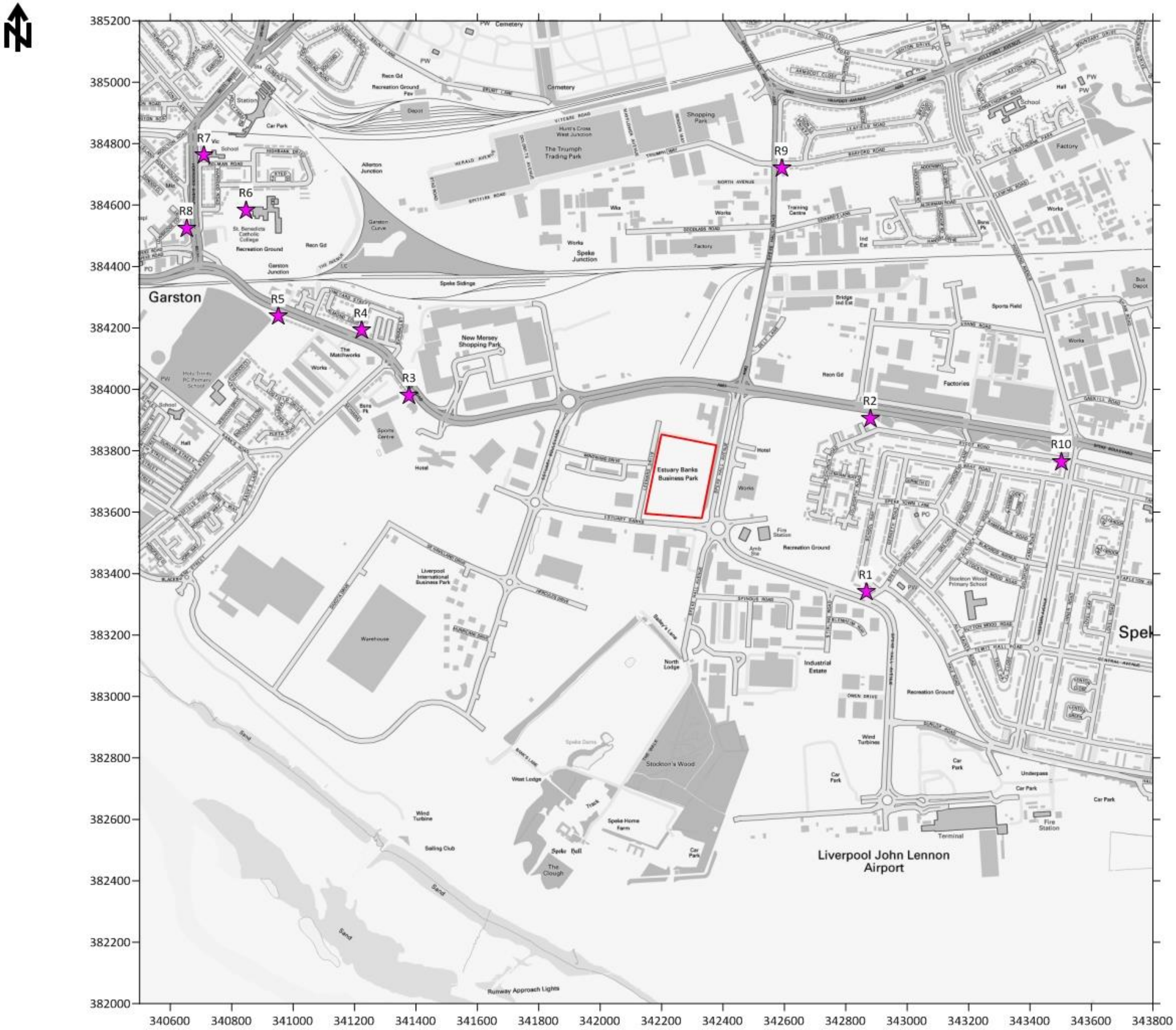

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Site Boundary

Sensitive Receptor Location

Title

Figure 6

Traffic Exhaust Emissions
Sensitive Receptor Locations

Project

Air Quality Assessment
Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

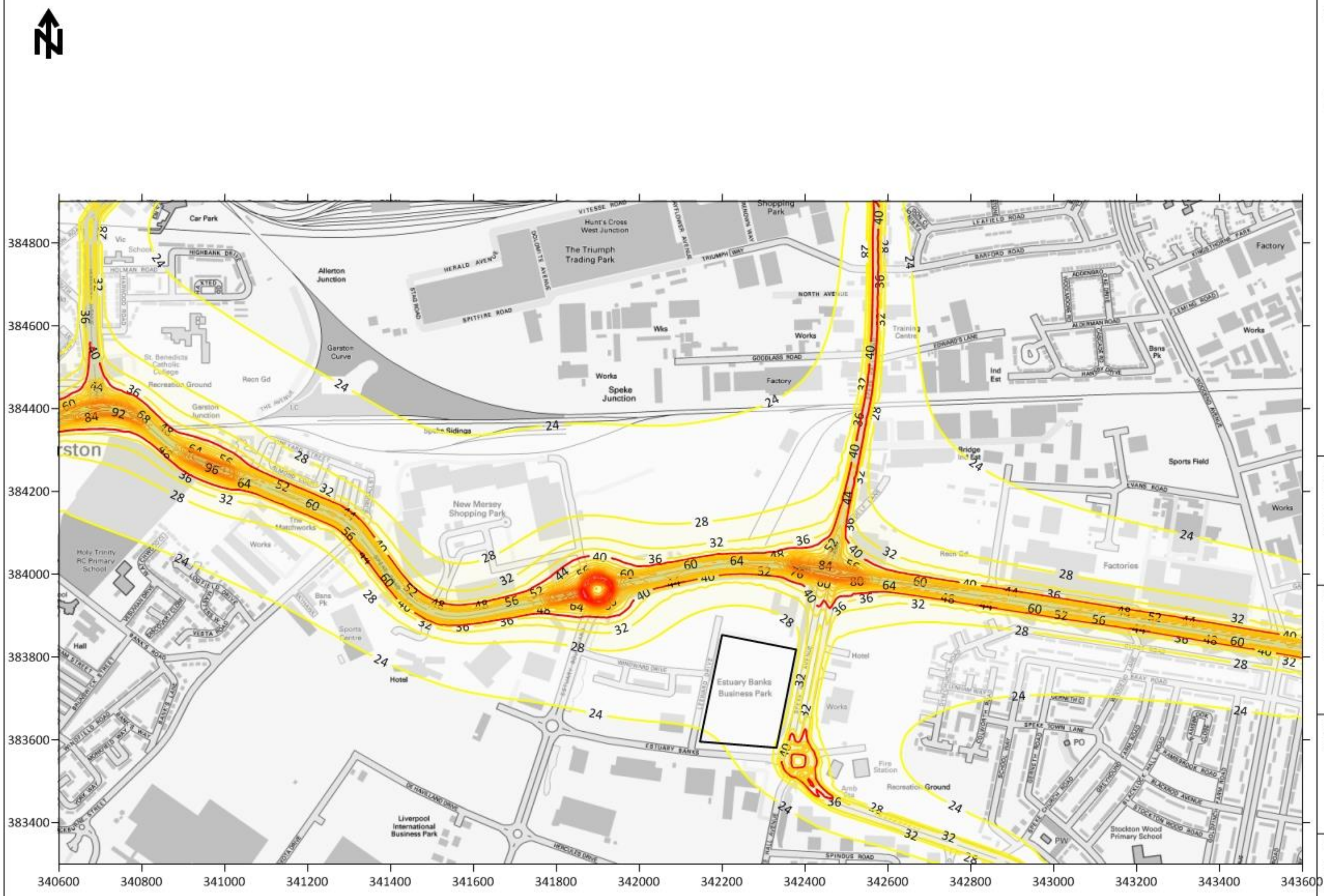
34593

Client

Police and Crime Commissioner for Merseyside Police

REC
Resource & Environmental Consultants Ltd
Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE

Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk



Legend

Site Boundary

136
128
120
112
104
96
88
80
72
64
56
48
40
32
24

Predicted Annual Mean NO_2 Concentration (µg/m³)

Title

Figure 7

Predicted Annual Mean NO_2 Concentrations (µg/m³) 2022 DM

Project

Air Quality Assessment

Operational Command Centre, Speke Hall Drive, Liverpool

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Client

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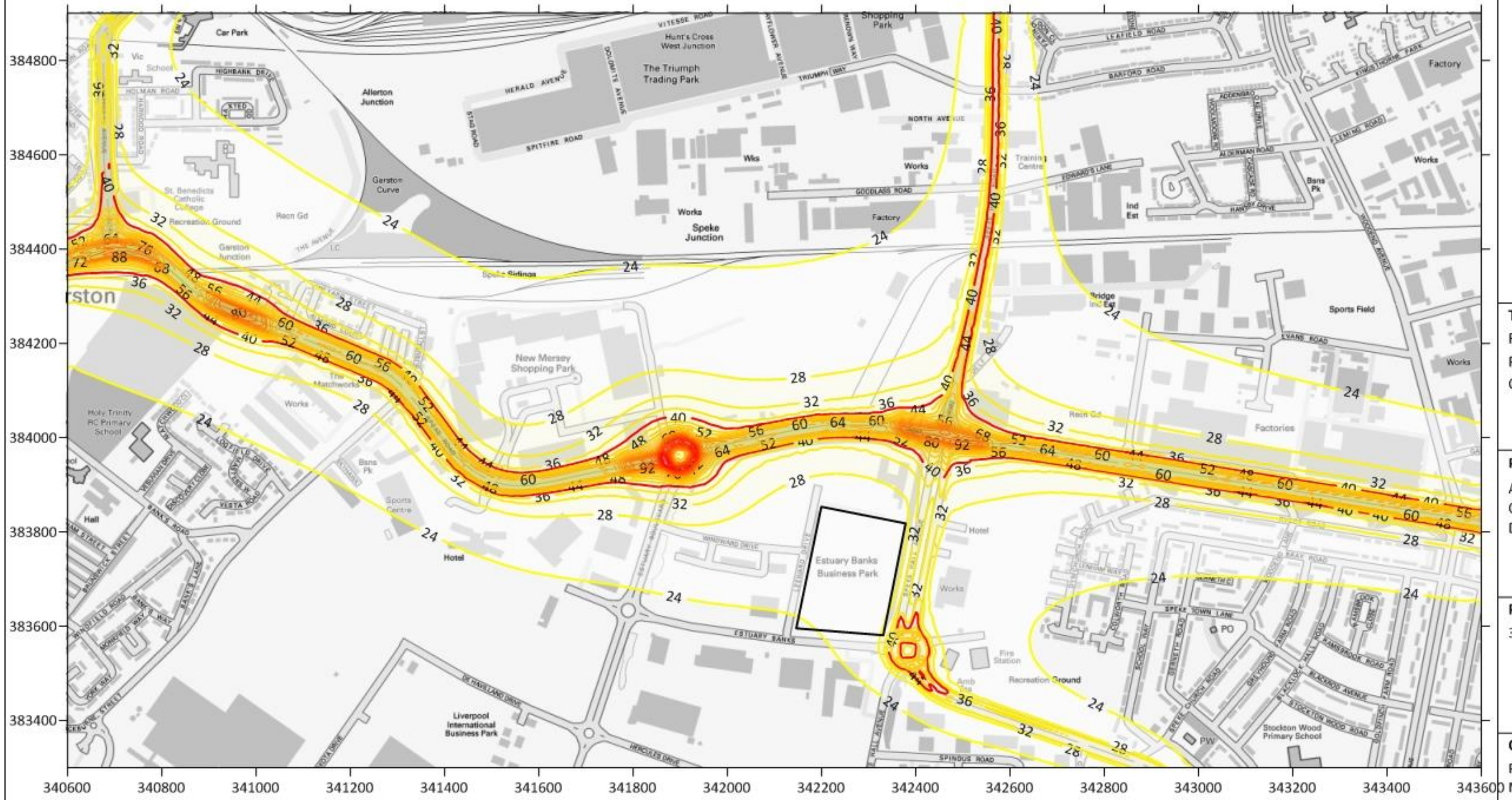

Legend

Site Boundary

136
128
120
112
104
96
88
80
72
64
56
48
40
32
24

Predicted Annual Mean NO_2 Concentration (μg/m³)

Title

Figure 8

Predicted Annual Mean NO_2 Concentrations (μg/m³) 2022 DS

Project

Air Quality Assessment

Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

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Client

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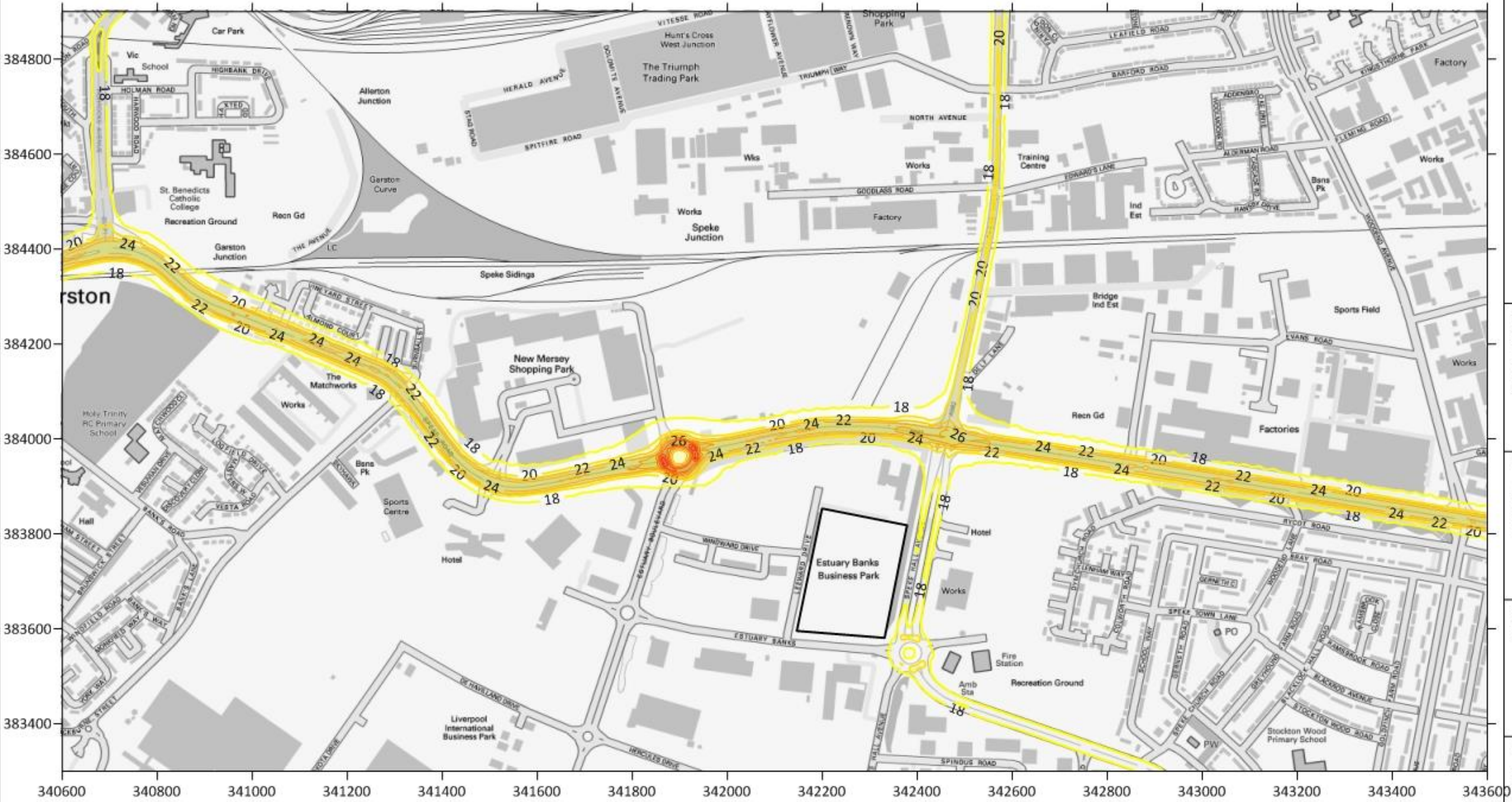

Legend

Site Boundary

36
34
32
30
28
26
24
22
20
18

Predicted Annual Mean PM_{10} Concentration (μg/m³)

Title

Figure 9

Predicted Annual Mean PM_{10} Concentrations (μg/m³) 2022 DM

Project

Air Quality Assessment

Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

34593

Client

Police and Crime Commissioner for Mersyside Police

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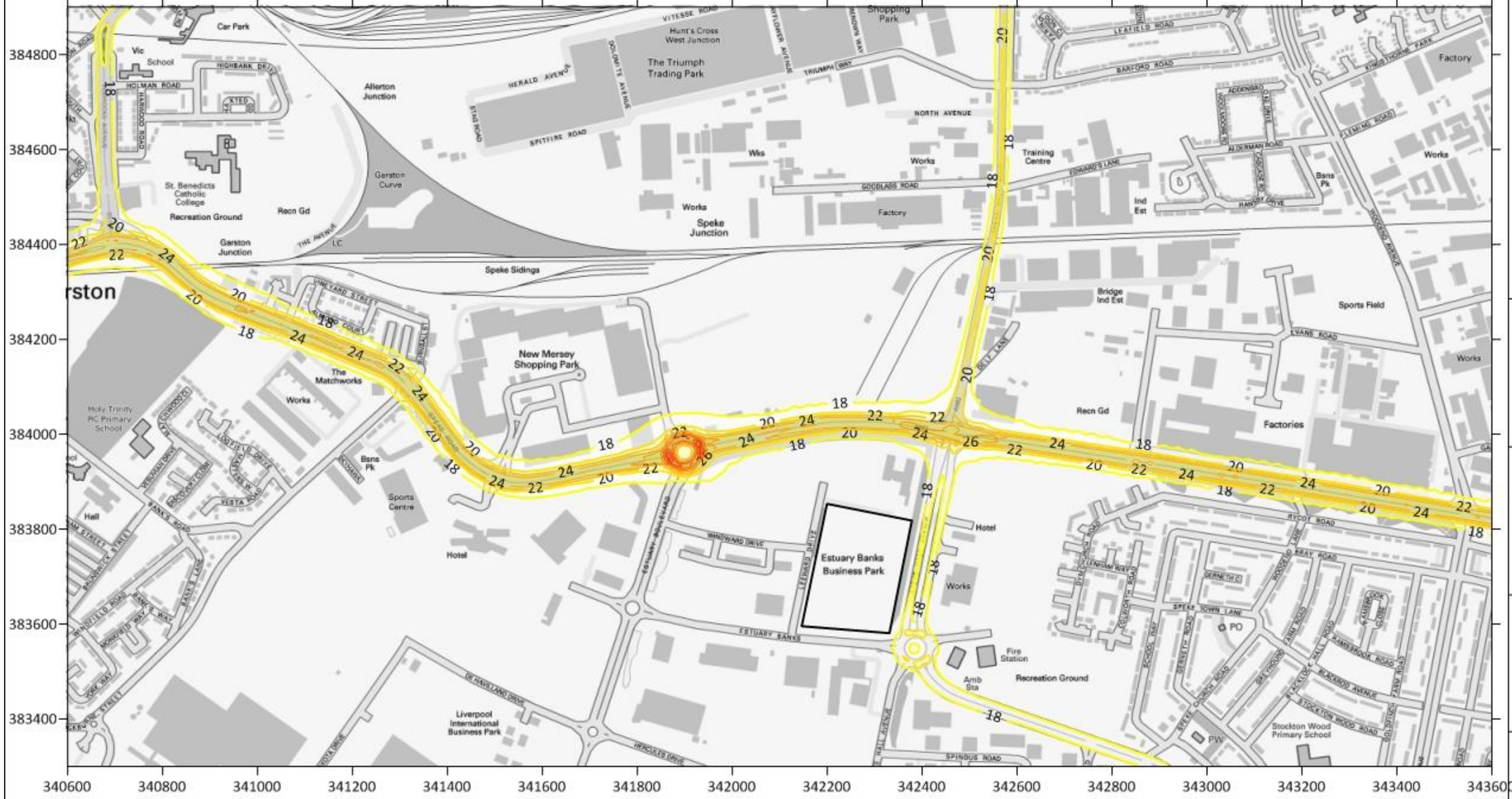

Legend

Site Boundary

Predicted Annual Mean PM_{10} Concentration ($\mu g/m^3$)

18, 20, 22, 24, 26, 28, 30, 32, 34, 36

Title

Figure 10

Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$) 2022 DS

Project

Air Quality Assessment

Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

34593

Client

Police and Crime Commissioner for Merseyside Police

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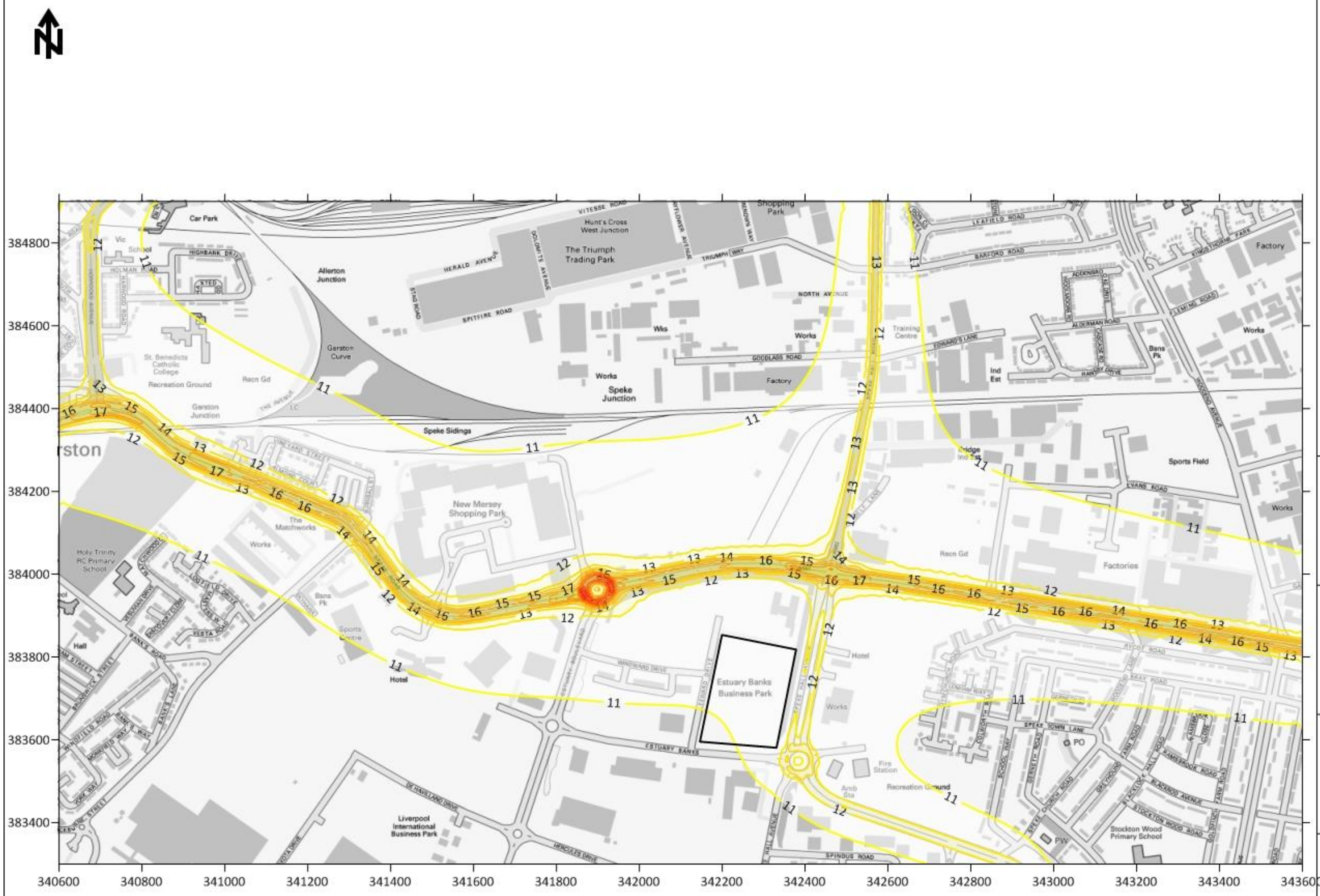

Legend

Site Boundary

24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11

Predicted Annual Mean $PM_{2.5}$ Concentration (μg/m³)

Title

Figure 11

Predicted Annual Mean $PM_{2.5}$ Concentrations (μg/m³) 2022 DM

Project

Air Quality Assessment
Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

34593

Client

Police and Crime Commissioner for Merseyside Police

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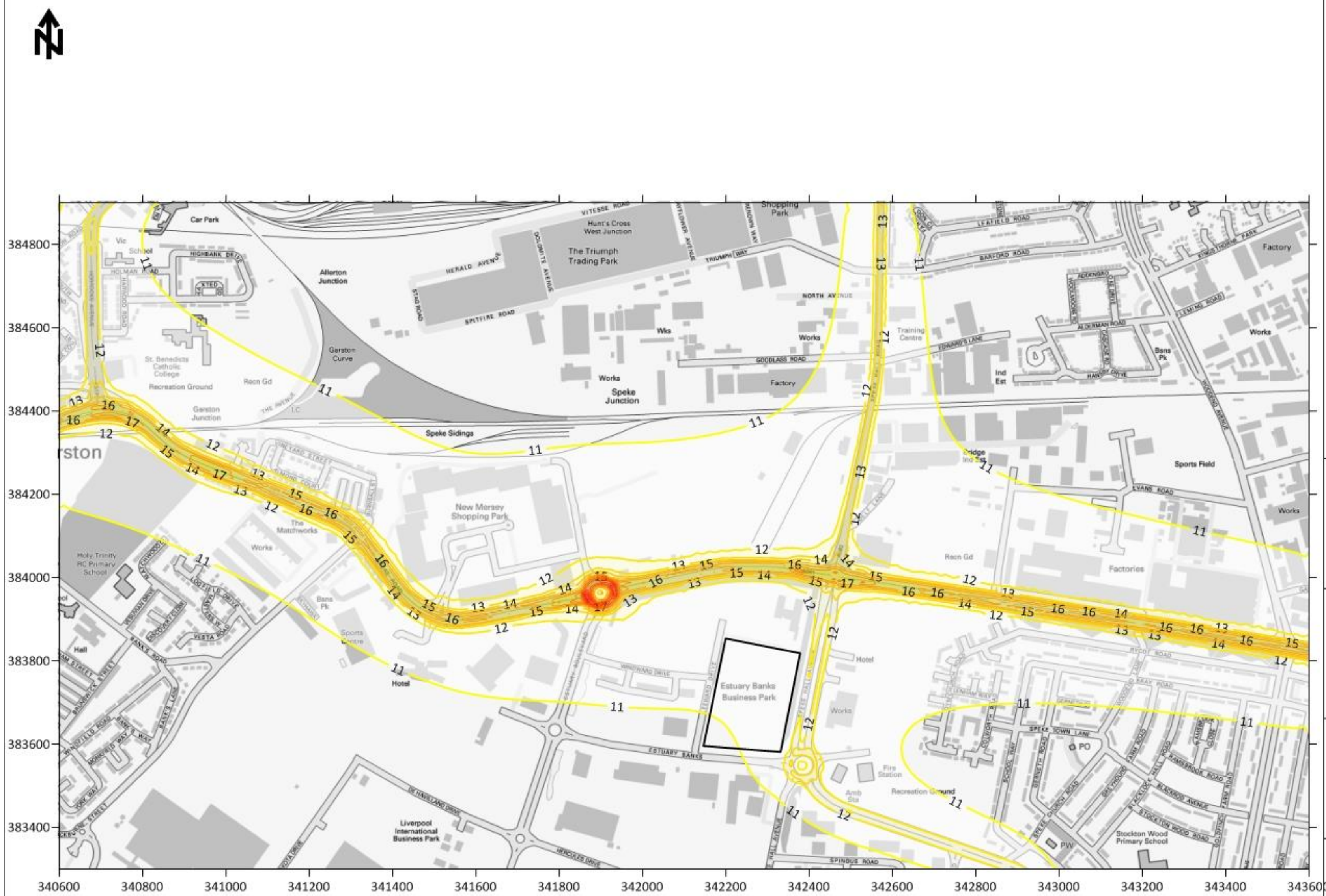

Legend

Site Boundary

Predicted Annual Mean $PM_{2.5}$ Concentration ($\mu g/m^3$)

24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11

Title

Figure 12

Predicted Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$) 2022 DS

Project

Air Quality Assessment

Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

34593

Client

Police and Crime Commissioner for Merseyside Police

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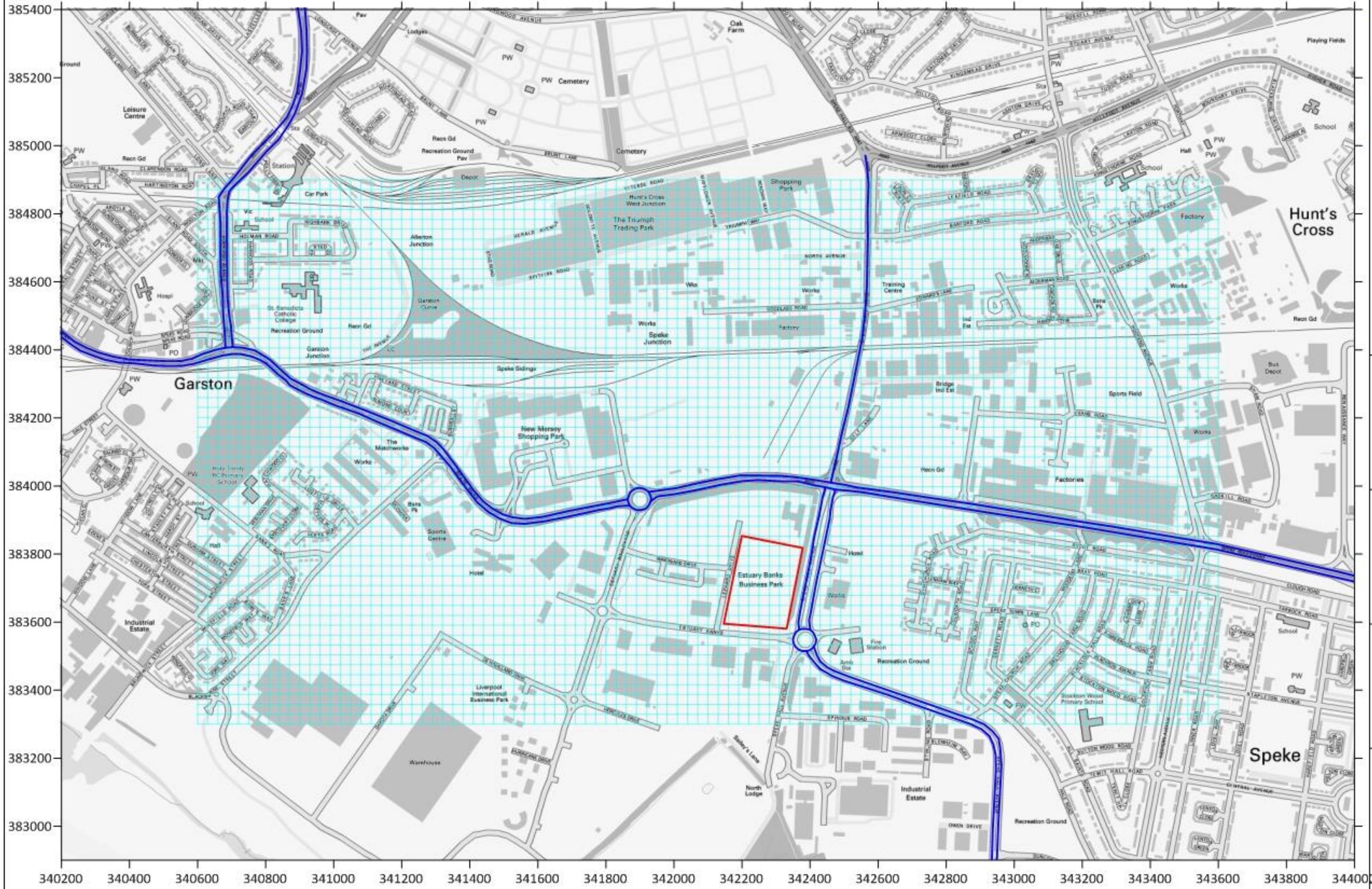

Legend

Site Boundary

Modelled Road Link

Cartesian Grid

Title

Figure 13

ADMS-Roads Input

Project

Air Quality Assessment
Operational Command Centre, Speke Hall Drive, Liverpool

Project Number

34593

Client

Police and Crime Commissioner for Mersyside Police

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APPENDIX II ASSESSMENT INPUT DATA

ASSESSMENT INPUTS

Vehicle trips associated with the scheme have the potential to result in air quality impacts as a result of increased traffic exhaust emissions. Dispersion modelling using ADMS-Roads was therefore undertaken to predict NO_2, PM_{10} and $PM_{2.5}$ concentrations at sensitive locations both with and without the development in order to consider potential changes as a result of the proposals.

The dispersion model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length; and,
- Monin-Obukhov length.

Assessment inputs are described in the following subsections.

Dispersion Model

Dispersion modelling was undertaken using the ADMS Roads dispersion model (version 3.4). ADMS Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

Assessment Area

Ambient concentrations were predicted over the area NGR: 340600, 383300 to 343600, 384900. A Cartesian grid was utilised within the model to produce data suitable for contour plotting using the Surfer software package.

Reference should be made to Figure 13 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Traffic data for use in the assessment, including 24-hour AADT flows and fleet composition as Heavy Duty Vehicle (HDV) proportion, was provided by Curtins, the Transport Consultants for the project.

The provided data did not include a number of roads within the surrounding road network. As such, 24-hour flows and fleet composition were downloaded from the Department for Transport (DfT) Matrix[15]. The Dft Matrix web tool enables the user to view and download traffic flows on every link

[15] www.dft.gov.uk/matrix.

of the A-road and motorway network in Great Britain for the years 1999 to 2013. It should be noted that the DfT matrix is referenced in DEFRA guidance LAQM.TG(09)[16] as being a suitable source of data for air quality assessments and is therefore considered to provide a reasonable representation of traffic flows in the vicinity of the site.

Data was factored to 2022 for the proposed opening year using the Trip End Model Presentation Program (TEMPRO)[17] version 6.2.

Road widths were estimated from aerial photography and UK highway design standards. Reference should be made to Figure 13 for a graphical representation of the road link locations. A summary of the traffic data used in the verification scenario is provided in Table AII.1.

Table AII.1 2013 Traffic Data

Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
1A1	A561 EB West of B571	7.3	19,178	7.06	60
1A2	A561 EB West of B571 Junction	13.5	19,178	7.06	15
1A3	A561 EB East of B571	10.0	19,178	7.06	60
1A4	A561 EB East of B571 Junction at Estuary Boulevard	12.5	19,178	7.06	15
1A5	A561 EB West of A562	7.3	19,178	7.06	60
1A6	A561 EB Junction at A562	17.2	19,178	7.06	15
1A7	A561 EB East of A562	7.3	19,178	7.06	60
1A8	A561 EB Crossing	13.5	19,178	7.06	5
1A9	A561 EB East of B571 Junction	10.0	19,178	7.06	60
1B1	A561 WB West of B571	8.5	19,178	7.06	60
1B2	A561 WB West of B571 Junction	8.1	19,178	7.06	15
1B3	A561WB East of B571	8.4	19,178	7.06	60
1B4	A561 WB East of B571 Junction at Estuary Boulevard	8.4	19,178	7.06	15
1B5	A561 WB West of A562	8.0	19,178	7.06	60
1B6	A561 WB Junction at A562	9.7	19,178	7.06	15
1B7	A561WB East of A562	7.3	19,178	7.06	60
1B8	A561 WB Crossing	13.5	19,178	7.06	5

[16] Local Air Quality Management Guidance LAQM.TG(09), DEFRA, 2009.
[17] https://www.gov.uk/government/collections/tempro.

Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
1B9	A561 WB East of B571 Junction	8.4	19,178	7.06	60
2A1	Horrocks Avenue SB	7.3	5,564	6.13	50
2A2	Horrocks Avenue SB Junction	10.1	5,564	6.13	15
2B1	Horrocks Avenue SB	7.3	5,564	6.13	50
2B2	Horrocks Avenue SB Junction	10.1	5,564	6.13	15
3A	Speke Hall Road	9.5	15,555	3.57	50
3B	Speke Hall Road Junction	21.3	15,555	3.57	15
4A1	Speke Hall Avenue NB	11.1	5,653	2.57	50
4A2	Speke Hall Avenue NB Junction at A561	18.3	5,653	2.57	15
4A3	Speke Hall Avenue NB Junction North of Estuary Bank	7.6	5,653	2.57	15
4A4	Speke Hall Avenue NB Junction South of Estuary Bank	5.9	5,653	2.57	15
4A5	Speke Hall Avenue NB South of Estuary Bank	6.3	5,653	2.57	50
4B1	Speke Hall Avenue SB	7.3	5,653	2.57	50
4B2	Speke Hall Avenue SB Junction at A561	8.1	5,653	2.57	15
4B3	Speke Hall Avenue SB Junction North of Estuary Bank	8.2	5,653	2.57	15
4B4	Speke Hall Avenue SB Junction South of Estuary Bank	6.7	5,653	2.57	15
4B5	Speke Hall Avenue SB South of Estuary Bank	5.4	5,653	2.57	50
RB1	A561 Roundabout	9.9	38,355	7.06	15
RB2	Speke Hall Avenue Roundabout	12.8	11,305	2.57	20

The road width and mean vehicle speed shown in Table AII.1 remained the same for the DM and DS scenarios. A summary of the 2022 traffic data is shown in Table AII.2.

Table AII.2 2022 Traffic Data

Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
1A1	A561 EB West of B571	20,069	7.06	20,347	6.96
1A2	A561 EB West of B571 Junction	20,069	7.06	20,347	6.96

Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
1A3	A561 EB East of B571	20,069	7.06	20,347	6.96
1A4	A561 EB East of B571 Junction at Estuary Boulevard	20,069	7.06	20,347	6.96
1A5	A561 EB West of A562	20,069	7.06	20,347	6.96
1A6	A561 EB Junction at A562	20,069	7.06	20,347	6.96
1A7	A561 EB East of A562	20,069	7.06	20,347	6.96
1A8	A561 EB Crossing	20,069	7.06	20,347	6.96
1A9	A561 EB East of B571 Junction	20,069	7.06	20,347	6.96
1B1	A561 WB West of B571	20,069	7.06	20,347	6.96
1B2	A561 WB West of B571 Junction	20,069	7.06	20,347	6.96
1B3	A561WB East of B571	20,069	7.06	20,347	6.96
1B4	A561 WB East of B571 Junction at Estuary Boulevard	20,069	7.06	20,347	6.96
1B5	A561 WB West of A562	20,069	7.06	20,347	6.96
1B6	A561 WB Junction at A562	20,069	7.06	20,347	6.96
1B7	A561WB East of A562	20,069	7.06	20,347	6.96
1B8	A561 WB Crossing	20,069	7.06	20,347	6.96
1B9	A561 WB East of B571 Junction	20,069	7.06	20,347	6.96
2A1	Horrocks Avenue SB	5,823	6.13	5,962	5.98
2A2	Horrocks Avenue SB Junction	5,823	6.13	5,962	5.98
2B1	Horrocks Avenue SB	5,823	6.13	5,962	5.98
2B2	Horrocks Avenue SB Junction	5,823	6.13	5,962	5.98
3A	Speke Hall Road	16,278	3.57	16,417	3.54
3B	Speke Hall Road Junction	16,278	3.57	16,417	3.54
4A1	Speke Hall Avenue NB	5,915	2.57	6,193	2.46
4A2	Speke Hall Avenue NB Junction at A561	5,915	2.57	6,193	2.46
4A3	Speke Hall Avenue NB Junction North of Estuary Bank	5,915	2.57	6,193	2.46
4A4	Speke Hall Avenue NB Junction South of Estuary Bank	5,915	2.57	6,193	2.46
4A5	Speke Hall Avenue NB South of Estuary Bank	5,915	2.57	6,193	2.46

Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
4B1	Speke Hall Avenue SB	5,915	2.57	6,193	2.46
4B2	Speke Hall Avenue SB Junction at A561	5,915	2.57	6,193	2.46
4B3	Speke Hall Avenue SB Junction North of Estuary Bank	5,915	2.57	6,193	2.46
4B4	Speke Hall Avenue SB Junction South of Estuary Bank	5,915	2.57	6,193	2.46
4B5	Speke Hall Avenue SB South of Estuary Bank	5,915	2.57	6,193	2.46
RB1	A561 Roundabout	40,139	7.06	40,694	6.96
RB2	Speke Hall Avenue Roundabout	11,831	2.57	12,386	2.46

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 6.0.2) released in November 2014, which incorporates updated vehicle emissions factors for NO_x and vehicle fleet information.

There is current uncertainty over NO_2 concentrations within the UK, with roadside levels not reducing as previously expected due to the implementation of new vehicle emission standards. Therefore, 2013 emission factors have been utilised for the prediction of pollution levels for all scenarios in preference to the development opening year in order to provide a robust assessment.

Meteorological Data

Meteorological data used in this assessment was taken from Liverpool meteorological station over the period 1st January 2013 to 31st December 2013 (inclusive). Liverpool meteorological station is located at NGR: 343595, 382055, which is approximately 2km south-east of the proposed development. DEFRA guidance LAQM.TG(09)[18] recommends meteorological stations within 30km of an assessment area as being suitable for detailed modelling.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 5 for a wind rose of utilised meteorological data.

Roughness Length

A roughness length (z_0) of 0.5m was used in this dispersion modelling study. This value of z_0 is considered appropriate for the morphology of the assessment area and is suggested within ADMS-Roads as being suitable for 'parkland, open surburbia'.

[18] Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.

A z_0 of 0.2m was utilised to represent the morphology of the meteorological station and is suggested as being suitable for 'agricultural areas (min)'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used in the dispersion modelling study. This value is considered appropriate for the nature of the assessment area and the meteorological station and is suggested within ADMS-Roads as being suitable for 'mixed urban / industrial'.

Background Concentrations

An annual mean NO_2 concentration of 21.35µg/m^3, PM_{10} concentration of 15.98µg/m^3 and $PM_{2.5}$ concentration of 10.76µg/m^3, as predicted by DEFRA, were used to represent background levels in the vicinity of the site.

Similarly to emission factors, background concentrations for 2013 were utilised in preference to development opening year. This provided a robust assessment and is likely to overestimate actual pollutant concentrations during the operation of proposal.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations from the dispersion model were converted to NO_2 concentrations using the spreadsheet provided by DEFRA, which is the method detailed within LAQM.TG(09) [19].

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of this assessment model verification was undertaken for 2013, using traffic data, meteorological data and monitoring results from this year.

LCC undertakes monitoring of NO_2 concentrations at one roadside location within the assessment

[19] Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.

extents. The road contribution to total NO_x concentration was calculated from the monitored NO_2 result for use in the verification process. This was undertaken following the methodology contained within DEFRA guidance LAQM.TG(09)[20]. The monitored annual mean NO_2 concentration and calculated roadside NO_x concentration are summarised in Table AII.3.

Table AII.3 2013 Monitoring Results

Monitoring Location		Monitored NO_2 Concentration (µg/m^3)	Calculated Roadside NO_x Concentration (µg/m^3)
S55	Speke Road Pelican Crossing	71.0	135.7

The dispersion model was run with the traffic input data previously detailed for 2013 to predict the NO_x concentration at the monitoring location. The results are shown in Table AII.4.

Table AII.4 Verification Results

Monitoring Location		Modelled Roadside NO_x Concentration (µg/m^3)
S55	Speke Road Pelican Crossing	53.4

The monitored and modelled NO_x road contribution concentrations were compared. This indicated a verification factor of **2.542** was required to be applied to all modelling results.

As PM_{10} and $PM_{2.5}$ monitoring is not undertaken within the assessment extents, a verification factor of **2.542** was also used to adjust model predictions of this pollutant in accordance with the guidance provided within LAQM.TG(09)[21].

[20] Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.
[21] Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.

APPENDIX III ASSESSOR'S CURRICULUM VITAE

SARAH CLINTON

Air Quality Consultant

BSc (Hons)

KEY EXPERIENCE:

Sarah is an Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments to the Department for Environment, Food and Rural Affairs (DEFRA), Environment Agency and Environmental Protection UK (EPUK) methodologies for clients from the residential, retail, infrastructure and commercial sectors.
- Detailed dispersion modelling of road vehicle emissions using ADMS-Roads. Studies have included impact assessment of pollutant concentrations at various floor levels and assessment of suitability of development sites for proposed end-use.
- Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- Production of air quality mitigation strategies for developments throughout the UK.
- Defining baseline air quality conditions and identification of sensitive areas.

QUALIFICATIONS:

- Bachelor of Science

SELECT PROJECTS SUMMARY:

Mixed Development, Parr Street, Hackney

Air Quality Assessment in support of a mixed-use development consisting of two commercial units and twenty four residential units. Construction phase assessment of fugitive dust emissions in accordance with IAQM methodology was undertaken. Additionally, dispersion modelling of road vehicle exhaust emissions was undertaken using ADMS-Roads to provide consideration of potential impacts to the surrounding area as a result of the proposals. Impacts were not predicted to be significant at any sensitive receptors in the vicinity of the site and no mitigation was required.

Residential Development, Mill Lane, Newbury

Air Quality Assessment in support of the development of 37 residential units. The site had the potential to create adverse impacts to sensitive receptors in the vicinity of the site during both the construction and operational phases. These impacts were assessed using the DMRB Calculation spreadsheet. The potential impacts on NO_2 and PM_{10} concentrations were assessed and determined to be negligible for both the construction and operational phases of the development. Therefore, air quality was not considered to be a constraint to planning consent.

Educational Development, Southwark Free Primary School, Sandgate Street, Southwark

Air Quality Assessment in support of the relocation of Southwark Free Primary School. The site is located within Southwark Air Quality Management Area and therefore, there were concerns that traffic generated by the scheme could have adverse effects to both the AQMA and sensitive receptors in the vicinity of the site. Dispersion modelling of road vehicle exhaust emissions was completed using ADMS Roads. Changes in pollutant concentrations were predicted to be negligible at all sensitive receptors and within the AQMA. Therefore air quality was not considered a planning constraint.

Residential Development, Bushey Road, Raynes Park

Air Quality Assessment in support of the development of seventeen residential units. The development was located within the London Borough of Merton AQMA. Residential units were proposed on each of the buildings three storeys. Therefore, there was potential for future residents to be exposed to elevated pollution concentrations. Dispersion modelling was undertaken over all floors using ADMS-Roads to consider site suitability for the proposed end-use. As a result of the modelling, suitable mitigation techniques, including mechanical ventilation was suggested for both the ground and first floor.

Residential Development, Land at the Former Crooked Billet Public House, Staines

Air Quality Assessment in support of change of use to twenty nine residential units. Dispersion modelling of road vehicle exhaust emissions was completed using ADMS-Roads. Due to the site location, within London, the AQO for NO_2 was exceeded on each of the developments three floors. Therefore, in order to protect future residents a mechanical ventilation system was suggested.

SARAH NAYLOR

Principal Air Quality Consultant

BSc (Hons), MIAQM, MIEnvSc

KEY EXPERIENCE:

Sarah is a Principal Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments to the Department for Environment, Food and Rural Affairs (DEFRA), Environment Agency and Environmental Protection UK (EPUK) methodologies for clients from the residential, retail, infrastructure and commercial sectors.
- Detailed dispersion modelling of road vehicle emissions using ADMS-Roads. Studies have included impact assessment of ground level pollutant concentrations and assessment of suitability of development sites for proposed end-use.
- Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- Production of air quality mitigation strategies for developments throughout the UK.
- Defining baseline air quality conditions and identification of sensitive areas.

QUALIFICATIONS:

- Bachelor of Science
- Member of IAQM
- Member of IES

PROJECTS SUMMARY:

Residential and Mixed Use Developments

Lea Bridge Road, London - Air Quality Assessment for 22 self-contained flats within an AQMA. Dispersion modelling was completed using ADMS-Roads. The AQO for NO_2 was exceeded on each of the five floors. Mechanical ventilation was recommended to protect future residents.

Queensgate, Farnborough - Air Quality Assessment in support of 26 residential units. Potential to create adverse impacts to sensitive receptors in the vicinity of the site. Construction fugitive dust assessment in accordance with the IAQM methodology. A DMRB screening assessment undertaken for operational impacts. Air quality impacts negligible for both phases.

Lowes Road, Bury - Air Quality Assessment in support of 27 residential units. Fugitive dust and odour construction emissions assessed. DMRB screening assessment of operational impacts. Air quality impacts determined to be negligible for both phases.

The Haven, Sydenham - Air Quality Assessment in support of 107 residential units. Construction phase assessment of fugitive dust emissions in accordance with GLA methodology. Impacts were negligible. Dispersion modelling was completed using ADMS-Roads to determine concentrations across the site. No exceedences were predicted.

Wilburn Basin, Salford - Air Quality Assessment in support of a mixed use development consisting of 4 blocks of residential units with commercial use at the ground floor. Dispersion modelling, using ADMS-Roads, predicted no exceedences at the site. Air quality impacts were predicted as negligible as a result of the development at sensitive locations within close proximity to the site. No mitigation was considered necessary.

Braes of Yetts, Kirkintilloch - Air Quality Assessment in support of the development of 135 residential units. Impacts were negligible for the operational phase of the development.

Dean Farm, Rochdale - Air Quality Assessment in support of 54 residential units. Dispersion modelling predicted exceedences of AQLV at the southern point of the site. No receptors to be located in this area. Mitigation not required.

Land North of Anderton Lane, Tavistock - Air Quality Environmental Impact Assessment in support of 120 residential units. Construction phase assessment of fugitive dust emissions in accordance with IAQM methodology. Dispersion modelling using ADMS-Roads was undertaken to determine concentrations at sensitive receptors. Impacts were predicted to be negligible at all receptors.

Commercial and Retail Developments

Marischal Square, Aberdeen - Air Quality Assessment in support of the development of a commercial development. This consists of a hotel, offices, restaurants, retail and outdoor public space. Construction phase assessment of fugitive dust emissions in accordance with IAQM methodology. Dispersion modelling using ADMS-Roads to determine concentrations across the site and at sensitive receptors. Impacts were predicted to be negligible at all receptors and no exceedences were predicted on the site.

Solar Array Generating Facility, West Drayton - Air Quality Assessment in support of the development of a solar array generating facility within an AQMA. Construction fugitive dust emissions assessed using GLA methodology. Operational impacts assessed using DMRB screening criteria. Air quality impacts were negligible for construction and operational phases.