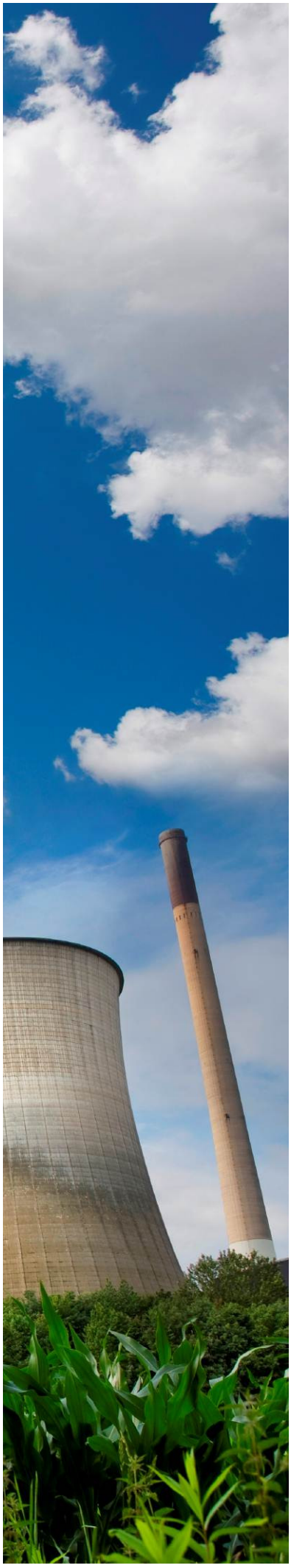
REC
Resource & Environmental Consultants Ltd

Air Quality Assessment
New Heys Comprehensive School, Liverpool

REC Report: 33250r1
Issued: 23rd November 2012

Prepared for: Redrow Homes NW



Osprey House, Pacific Quay, Broadway, Manchester, M50 2UE
Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk

REC Air Quality

SAFEcontractor APPROVED

GREEN ACHIEVER

National Consultancy, Locally Delivered

REPORT ISSUE

Issue/revision	Issue 1	Revision 2	Revision 3
Remarks	-		
Date	23/11/12		
Prepared by	Eleanor Mitchell		
Signature			
Position	Graduate Air Quality Consultant		
Authorised by	Jethro Redmore		
Signature			
Position	Air Quality Impact Group Manager		
Verified by	Paul Furmston		
Signature			
Position	Director		
Project number	33250		

EXECUTIVE SUMMARY

Resource and Environmental Consultants Ltd was commissioned by Redrow Homes NW to undertake an Air Quality Assessment in support of the planning application for a proposed residential development on the former New Heys Comprehensive School, Heath Road, Liverpool.

The proposed development consists of circa 73 low rise residential units with associated private gardens, driveways, estate roads and drainage infrastructure. There is the potential for air quality impacts during both the construction and operational phases of the development. These may include fugitive dust emissions associated with construction works and road vehicle exhaust emissions from traffic generated by new residents during the operational phase. As such, an Air Quality Assessment was required to assess impacts as a result of the proposals.

Potential construction phase air quality impacts were assessed as a result of fugitive dust emissions. Suitable mitigation techniques have been identified and, assuming these are implemented, impacts from construction activities are not considered to be significant.

Potential impacts during the operational phase of the development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. A screening assessment was therefore undertaken to consider changes in pollutant concentrations as a result of the proposals. This indicated air quality impacts associated with the development were not anticipated to be significant at any sensitive location in the vicinity of the site.

Based on the assessment results, it is considered that air quality should not be deemed a determining factor in granting planning consent for this development.

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Ltd was commissioned by Redrow Homes NW to undertake an Air Quality Assessment in support of the planning application for a proposed residential development on the former New Heys Comprehensive School, Heath Road, Liverpool.

Sensitive locations could potentially be affected by atmospheric emissions associated with the proposals during the construction and operational phases. 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 proposed development consists of circa 73 low rise residential units with associated private gardens, driveways, estate roads and drainage infrastructure on the site of the former New Heys Comprehensive School, Heath Road, Liverpool, Merseyside, at National Grid Reference (NGR): 340904, 386198. Reference should be made to Figure 1 for a location plan.

During the construction phase of the development there is potential for air quality impacts as a result of fugitive dust emissions from the site. Additionally, during the operational phase of the development there is the potential for air quality impacts as a result of road vehicle exhaust emissions associated with traffic generated by the scheme. An Air Quality Assessment was therefore undertaken in order to consider potential impacts on pollutant levels as a result of the proposals.

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 AIR QUALITY LEGISLATION AND POLICY

2.1 European Legislation

European Union (EU) air quality legislation is consolidated under 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 nitrogen dioxide (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 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. Table 1 presents the AQLVs for pollutants considered within this assessment.

Table 1 Air Quality Limit Values

Pollutant	Air Quality Limit Value	
	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

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 Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale.

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 Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 Dust

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

The National Planning Policy Framework (NPPF)[2] 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

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.
[2] National Planning Policy Framework, Department for Communities and Local Government, 2012.

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 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.

2.6 Local Planning Policy

The City of Liverpool Unitary Development Plan (UDP)[3] 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 LCC UDP indicated the following policies in relation to air quality that are relevant to this assessment:

"General Policy 8

The Plan aims to protect and enhance Liverpool's environment by:

ii. controlling uses which can contribute to the incidence of land, air, water pollution and light spillage;"

"Environmental Protection 11

POLLUTION

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

2. Where existing uses adversely affect the environment through noise, vibration, soot, grit, dust, smoke, fumes, smell, vehicle obstruction or other environmental problems, the City Council will:

   i. seek to reduce the problem on site;
   ii. refuse planning permission for development which would result in a consolidation or expansion of uses giving rise to environmental problems;
   iii. impose appropriate conditions on any permission which may be granted and/or obtain legal agreements in relation to such a permission, in order to regulate uses;
   iv. take enforcement action where appropriate;
   v. and

[3] Unitary Development Plan, LCC, 2002.

vi. in appropriate circumstances, compulsorily acquire the premises whilst endeavouring to assist in the relocation of the firm, where resources permit.

3. In the case of new development close to existing uses which are authorised or licensed under pollution control legislation, and which are a potential nuisance to the proposed development, planning permission will not be granted unless the City Council is satisfied that sufficient measures can and will be taken to protect amenity and environmental health."

The implications of these policies have been considered through the production of this Air Quality Assessment.

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 the Impacts of Construction on Air Quality and the Determination of their Significance'[4].

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

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

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 sensitive receptors be identified within 350m from the site boundary or 100m from the construction vehicle route up to 500m from the site entrance then the assessment should 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 assessed the risk of potential dust impacts. The site was allocated a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large; and,
- The proximity of receptors, considered separately for ecological and human receptors.

[4] Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance, Institute of Air Quality Management, 2011.

The magnitude of potential unmitigated dust emissions was determined based on the criteria shown in Table 2.

Table 2 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 50,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities greater than 20m above ground level
	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 • Piling • On site concrete batching • Sandblasting
	Trackout	• More than 100 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Demolition	• Total building volume 20,000m^3 to 50,000m^3 • Potentially dusty construction material • Demolition activities 10m to 20m above ground level
	Earthworks	• Total site area 2,500m^2 to 10,000m^2 • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m^3 to 100,000m^3 • Potentially dusty construction material (e.g. concrete) • Piling • On site concrete batching
	Trackout	• 25 to 100 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m

Magnitude	Activity	Criteria
Small	Demolition	• Total building volume under 20,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities less than 10m above ground level
	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 10,000 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 25 HDV trips per day • Surface material with low potential for dust release • Unpaved road length less than 50m

The risk category was then defined based upon the interaction between magnitude and receptor proximity. This is outlined in Table 3 for demolition activities.

Table 3 Dust Risk Category from Demolition

Distance to Nearest Receptor (m)		Dust Emission Magnitude		
Dust Soiling and PM_{10}	**Ecological**	**Small**	**Medium**	**Large**
Less than 20	-	Medium	High	High
20 - 100	Less than 20	Low	Medium	High
100 - 200	20 - 40	Low	Low	Medium
200 - 350	40 - 100	Negligible	Low	Medium

Table 4 outlines the dust risk category from earthworks and construction activities.

Table 4 Dust Risk Category from Earthworks and Construction

Distance to Nearest Receptor (m)		Dust Emission Magnitude		
Dust Soiling and PM_{10}	**Ecological**	**Small**	**Medium**	**Large**
Less than 20	-	Medium	High	High
20 - 50	-	Low	Medium	High

Distance to Nearest Receptor (m)		Dust Emission Magnitude		
Dust Soiling and PM_{10}	**Ecological**	**Small**	**Medium**	**Large**
50 - 100	Less than 20	Low	Medium	Medium
100 - 200	20 - 40	Negligible	Low	Medium
200 - 350	40 - 100	Negligible	Low	Low

Table 5 outlines the risk category from trackout.

Table 5 Dust Risk Category from Trackout

Distance to Nearest Receptor (m)		Dust Emission Magnitude		
Dust Soiling and PM_{10}	**Ecological**	**Small**	**Medium**	**Large**
Less than 20	-	Medium	Medium	High
20 - 50	Less than 20	Low	Medium	Medium
50 - 100	20 - 100	Negligible	Low	Low

3.1.3 Step 3

Step 3 required the identification of site specific mitigation measures to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. This was undertaken in accordance with the Greater London Authority 'Best Practice Guidance: The Control of Dust and Emissions from Construction and Demolition'[5].

For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required.

3.1.4 Step 4

The significance of potential dust impacts is defined within Step 4. The sensitivity of the receiving environment is first defined based on the criteria shown in Table 6.

Table 6 Construction Dust - Receptor Sensitivity

Sensitivity	Examples	
	Human Receptors	**Ecological Receptors**
Very high	• Very densely populated area • More than 100 dwellings within 20m • Local PM_{10} concentrations exceed the AQLV	• European designated site

[5] Best Practice Guidance: Control of Dust and Emissions from Construction and Demolition, Greater London Authority, 2006.

Sensitivity	Examples	
	Human Receptors	**Ecological Receptors**
	• Contaminated buildings present • Very sensitive receptors (e.g. oncology units) • Works continuing in one area of the site for more than one year	
High	• Densely populated area • 10 to 100 dwellings within 20m of site • Local PM_{10} concentrations close to the AQLV (e.g. annual mean 36 - 40µg/m^3) • Commercially sensitive horticultural land within 20m	• Nationally designated site
Medium	• Suburban or edge of town area • Less than 10 receptors within 20m • Local PM_{10} concentrations below the AQLV (e.g. annual mean 30 - 36µg/m^3)	• Locally designated site
Low	• Rural or industrial area • No receptors within 20m • Local PM_{10} concentrations well below the AQLV (less than 75%) • Wooded area between site and receptors	• No designations

The impact significance was defined based on the interaction between the sensitivity of the receiving environment and risk category, as shown in Table 7.

Table 7 Construction Dust - Significance of Impact

Sensitivity	Risk Category		
	Small	**Medium**	**Large**
Very high	Negligible	Slight adverse	Slight adverse
High	Negligible	Negligible	Slight adverse
Medium	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Negligible

It should be noted that the impact significance shown in Table 7 assumes that the mitigation measures identified within Step 3 are implemented at the site.

The final step was to determine the overall significance of the effects arising from the construction phase of a proposed development. This was based on professional judgement but took account of the significance of the effects for each of the potential dust generating activities.

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[6] guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix II.

3.2 Operational Phase Assessment

The development has the potential to impact on existing air quality as a result of road traffic exhaust emissions, such as NO_2 and PM_{10}, associated with vehicles travelling to and from the site. A screening assessment was therefore undertaken using the criteria contained within the Design Manual for Roads and Bridges (DMRB)[7] and Environmental Protection UK (EPUK) Development Control: Planning for Air Quality (2010 update)[8] guidance documents to determine the potential for trips generated by the development to affect local air quality.

The DMRB[9] provides the following criteria for determination of road links potentially affected by changes in traffic flow:

- Daily Annual Average Daily Traffic (AADT) flows change by 1,000 or more;
- Daily HDV AADT flows change by 200 or more;
- Daily average speed changes by 10km/hr or more; or,
- Peak hour speed changes by 20km/hr or more.

The EPUK Development Control: Planning for Air Quality (2010 update)[10] guidance document states the following criteria to help establish when an air quality assessment is likely to be considered necessary:

- Proposals that will generate or increase traffic congestion, where 'congestion' manifests itself as an increase in periods with stop start driving;
- Proposals that will give rise to a significant change in either traffic volumes, typically a change in AADT or peak traffic flows of greater than ±5% or ±10%, depending on local circumstances (a change of ±5% will be appropriate for traffic flows within an AQMA), or in vehicle speed (typically of more than ±10km/hr), or both, usually on a road with more than 10,000 AADT (5,000 if 'narrow and congested');
- Proposals that would significantly alter the traffic composition on local roads, for instance, increase the number of HDVs by 200 movements or more per day; or,
- Proposals that include significant new car parking, which may be taken to be more than 100 spaces outside and AQMA or 50 spaces inside an AQMA.

Should these criteria not be met, then the DMRB[11] and EPUK guidance[12] documents consider air quality impacts associated with a scheme to be **negligible** and no further assessment is required.

Should screening of the traffic data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the

---

6 Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance, Institute of Air Quality Management, 2011.
7 Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.
8 Development Control: Planning for Air Quality (2010 update), Environmental Protection UK, 2010.
9 Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.
10 Development Control: Planning for Air Quality (2010 update), Environmental Protection UK, 2010.
11 Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.
12 Development Control: Planning for Air Quality (2010 update), Environmental Protection UK, 2010.

predicted change in NO_2 and PM_{10} concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the EPUK guidance[13].

[13] Development Control: Planning for Air Quality (2010 update), Environmental Protection UK, 2010.

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 has indicated that annual mean NO_2 concentrations are above the AQLV at locations of relevant exposure. As such, an AQMA has been declared which is described as:

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

Review of the DEFRA website[14] indicated that the proposed development is located within the AQMA. As such, there is the potential for exposure to elevated pollutant concentrations for future residents and adverse impacts to existing pollution levels as a result of the scheme. 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 AQLVs and as such no further AQMAs have been designated.

4.2 Air Quality Monitoring

LCC undertakes monitoring of pollutant concentrations using continuous and periodic techniques throughout the city. A review of the most recent LAQM report[15] indicated that the closest continuous monitor to the proposed development is Speke, Liverpool at NGR: 343884, 383601. This is approximately 4.0km south-east of the site boundary at an urban background location. Recent monitoring results are shown in Table 8.

Table 8 NO_2 Continuous Monitoring Results

Analyser	Annual Mean NO_2 Concentration ($\mu g/m^3$)				
	2006	2007	2008	2009	2010
Speke	22	24	22	21	30

As indicated in Table 8, annual mean NO_2 concentrations were below the relevant AQLV during all years shown at the Speke analyser. As the monitoring site is located relatively close to the development with similar surrounding land uses it is considered that comparable concentrations would be anticipated at both locations.

LCC also utilise diffusion tubes to measure ambient levels of NO_2 within the area of their jurisdiction. There are three monitoring sites in the vicinity of the proposed development. Recent results are shown in Table 9, exceedences are highlighted in bold.

[14] http://aqma.defra.gov.uk/aqma-details.php?aqma_id=211.
[15] Air Quality Progress Report for LCC, Liverpool City Council, 2011.

Table 9 NO_2 Diffusion Tube Monitoring Results

Site	Site Type	NGR (m)		Distance to Site (km)	2010 Annual Mean NO_2 Concentration (µg/m^3)
		X	Y		
Speke DEFRA Site Tarbock Rd L24	Urban Background	343884	383601	4.0	31
Speke DEFRA Site Tarbock Rd L24	Urban Background	343884	383601	4.0	28
Speke DEFRA Site Tarbock Rd L24	Urban Background	343884	383601	4.0	25
Hillfoot Rd/Allerton Rd J Lamp LH p J C2507	Urban Roadside	341976	386333	1.2	**50**
Speke Rd 1st Dual Pelican Cross	Urban Roadside	340959	384247	1.9	**71**

As indicated in Table 9, annual mean pollutant concentrations were below the AQLV for NO_2 during 2010 at the background diffusion tube monitoring locations.

The two roadside results exceeded the AQLV. This would be expected due to their location on the A562 and A561, respectively, which are both main routes into south Liverpool within an AQMA. It is considered unlikely that the road network in close proximity to the development would have comparable traffic flows to the links where the diffusion tubes are located and therefore concentrations are likely to be lower at the proposed development.

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: 340500, 386500. Data for this location was downloaded from the DEFRA website[16] for the purpose of this assessment and is summarised in Table 10.

Table 10 Predicted Background Pollutant Concentrations

Pollutant	Predicted 2012 Background Concentration (µg/m^3)
NO_x	32.56
NO_2	21.70
PM_{10}	13.90

As shown in Table 10, background concentrations in the vicinity of the site are predicted to be relatively low, with no predicted exceedences of the relevant AQLVs. Comparison with monitoring results from roadside diffusion tubes indicates the significant contribution from traffic exhaust emissions to pollutant levels within the vicinity of the highway network within

[16] http://laqm.defra.gov.uk/maps/maps2010.html.

Liverpool.

4.4 Baseline Air Quality at the Development Site

Based on the information shown in the previous subsections, it is considered baseline air quality at the site is likely to be below the AQLVs. Although the development is located within an AQMA, all local highways are 'B' or minor roads, indicating relatively low daily traffic flows. As such, pollutant concentrations are anticipated to be close to background levels across the majority of the site area. It is therefore considered unlikely that the proposed development would cause new exposure to exceedences of the relevant AQLVs.

4.5 Sensitive Receptors

Receptors sensitive to potential dust impacts during demolition, 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 11.

Table 11 Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Residential Receptors	Approximate Number of Ecological Receptors
Less than 20	10 - 100	0
20 - 50	10 - 100	0
50 - 100	100 - 500	0
100 - 350	More than 500	0

The proposed site is located within a predominantly residential area and receptors surround the site to the north-west, west and south. The north-eastern and eastern boundary of the site comprises a golf course which will act as natural mitigation to dust emissions during the construction phase. Mature trees which line the south of the site will also act as a barrier to dust emissions in this direction.

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 12. 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. As such, it was assumed traffic may access the site from the B5180, Springwood Avenue and Allerton Road. This ensured the maximum potential trackout distance was considered.

Table 12 Trackout Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Residential Receptors	Approximate Number of Ecological Receptors
Less than 20	10 - 100	0
20 - 50	100 - 500	0
50 - 100	100 - 500	0

Based on the criteria shown in Table 6, the sensitivity of the receiving environment to potential dust impacts was considered to be **medium**. This was because although the development site is situated within a densely populated area, the predicted background PM_{10} concentrations are well below the AQLV and there are no ecological designations within the assessment extents.

5.0 IMPACT 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 demolition, construction, 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

Demolition

Demolition will be undertaken at the start of the construction phase and will involve clearance of existing buildings on the site.

It is estimated that the total building volume is greater than 50,000m^3, it is likely that the majority of works will be undertaken at a height of between 5m to 15m above ground level and will involve potentially dusty construction material. In accordance with the criteria outlined in Table 2, the magnitude of potential dust emissions from demolition is therefore **large**. Table 11 indicates there are a number of sensitive receptors within 20m of the site boundary. In accordance with the criteria outlined in Table 4, the development is considered to be a **high** risk site during demolition activities.

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 of over 10,000m^2. In accordance with the criteria outlined in Table 2, the magnitude of potential dust emissions from earthworks is therefore **large**. Figure 3 indicates a number of sensitive receptors within 20m of the site boundary. In accordance with the criteria outlined in Table 4, the development is considered to be a **high** risk site as a result of earthwork activities.

Construction

Due to the size of the proposed development site and the number of proposed residential units, the total building volume is predicted to be between 25,000m^3 and 100,000m^3. In accordance with the criteria outlined in Table 2, the magnitude of potential dust emissions from construction is therefore **medium**. Figure 3 indicates a number of sensitive receptors within 20m of the site boundary. In accordance with the criteria outlined in Table 4, the development is considered to be a **high** risk site 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 in excess of 100m. In accordance with the criteria outlined in Table 2, the magnitude of potential dust emissions from trackout is therefore **large**. Figure 3 indicates there are a number of sensitive receptors within 20m of the local highway network. In accordance with the criteria outlined in Table 5, the development is considered to be a **high** risk site as a result of trackout.

Summary of the Risk of Dust Effects

A summary of the risk from each dust generating activity is provided in Table 13.

Table 13 Summary of Potential Unmitigated Dust Risks

Source	Dust Soiling Effects	Ecological Effects	PM_{10} Effects
Demolition	High	None	High
Earthworks	High	None	High
Construction	High	None	High
Trackout	High	None	High

As indicated in Table 13, the potential risk of dust soiling and increases in PM_{10} concentrations is **high** from demolition, 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 Greater London Authority 'Best Practice Guidance: The Control of Dust and Emissions from Construction and Demolition' provides a number of potential mitigation measures to reduce potential impacts from **high** risk sites. These have been adapted for the proposed

site as summarised in Table 14. 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 14 Fugitive Dust Mitigation Measures

Issue	Control Measure
Site planning	• Erect solid barriers to site boundary • No bonfires • Plan site layout - machinery and dust causing activities should be located away from sensitive receptors • All site personnel to be fully trained • Trained and responsible manager on site during working times to maintain logbook and carry out site inspections • Hard surface site haul routes
Construction traffic	• All vehicles to switch off engines - no idling vehicles • Effective vehicle cleaning and specific wheel-washing on leaving site and damping down of haul routes • All loads entering and leaving site to be covered • No site runoff of water or mud • On-road vehicles to comply to set emission standards • All non-road mobile machinery (NRMM) to use ultra-low sulphur tax-exempt diesel (ULSD) where available • Minimise movement of construction traffic around site • Hard surfacing and effective cleaning of haul routes and appropriate speed limit around site
Demolition Works	• Use water as dust suppressant • Cutting equipment to use water as suppressant or suitable local extract ventilation • Use enclosed chutes and covered skips • Wrap building(s) to be demolished
Earth moving works	• Minimise dust generating activities • Use water as dust suppressant where applicable • Cover, seed or fence stockpiles to prevent wind whipping • Re-vegetate earthworks and exposed areas • If applicable, ensure concrete crusher or concrete batcher has permit to operate

5.1.4 Step 4

As indicated in Section 4.5 the receiving environment is considered to be of **medium** sensitivity to potential dust impacts. As such, assuming the relevant mitigation measures outlined in Table 14 are implemented, the residual significance of potential impacts from all dust generating activities is **negligible**, in accordance with the methodology outlined in Table 7.

5.2 Operational Phase Assessment

Any additional vehicle movements associated with the proposed development will generate exhaust emissions, such as NO_2 and PM_{10} on the local and regional road networks. Information on anticipated trip generation associated with the development was not available at the time of assessment. However, information utilised for similar schemes within the north-west indicated each unit is estimated to produce approximately six car journeys per day. Based on a development of 73 properties, this would result in a maximum change in daily traffic flow of 438, assuming all trips are generated on the same road link.

Based on the above information, the proposed development is not anticipated to result in a change in AADT flows of more than 1,000, produce over 200 HDV movements per day or significantly affect average speeds on the local road network. Additionally, it is unlikely that the proposed development will generate or increase traffic congestion, give rise to a significant change in AADT or peak traffic flows or in vehicle speed, significantly alter the traffic composition on local roads or include significant new car parking. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **negligible**, in accordance with the DMRB and EPUK screening criteria shown in Section 3.2

It should be noted that even using an extremely conservative trip generation of ten car journeys per unit per day, then the relative criteria are not exceeded. This therefore provides a degree of confidence in the assessment conclusion.

6.0 CONCLUSION

REC Ltd was commissioned by Redrow Homes NW to undertake an Air Quality Assessment in support of the planning application for a proposed residential development on the former New Heys Comprehensive School on Heath Road, Liverpool.

The proposed development consists of circa 73 low rise residential units with associated private gardens, driveways, estate roads and drainage infrastructure. Sensitive locations could potentially be affected by atmospheric emissions associated with the proposals during the construction and operational phases. As such, an Air Quality Assessment was required to quantify potential impacts in the vicinity of the site.

During the construction phase of the development there is 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**.

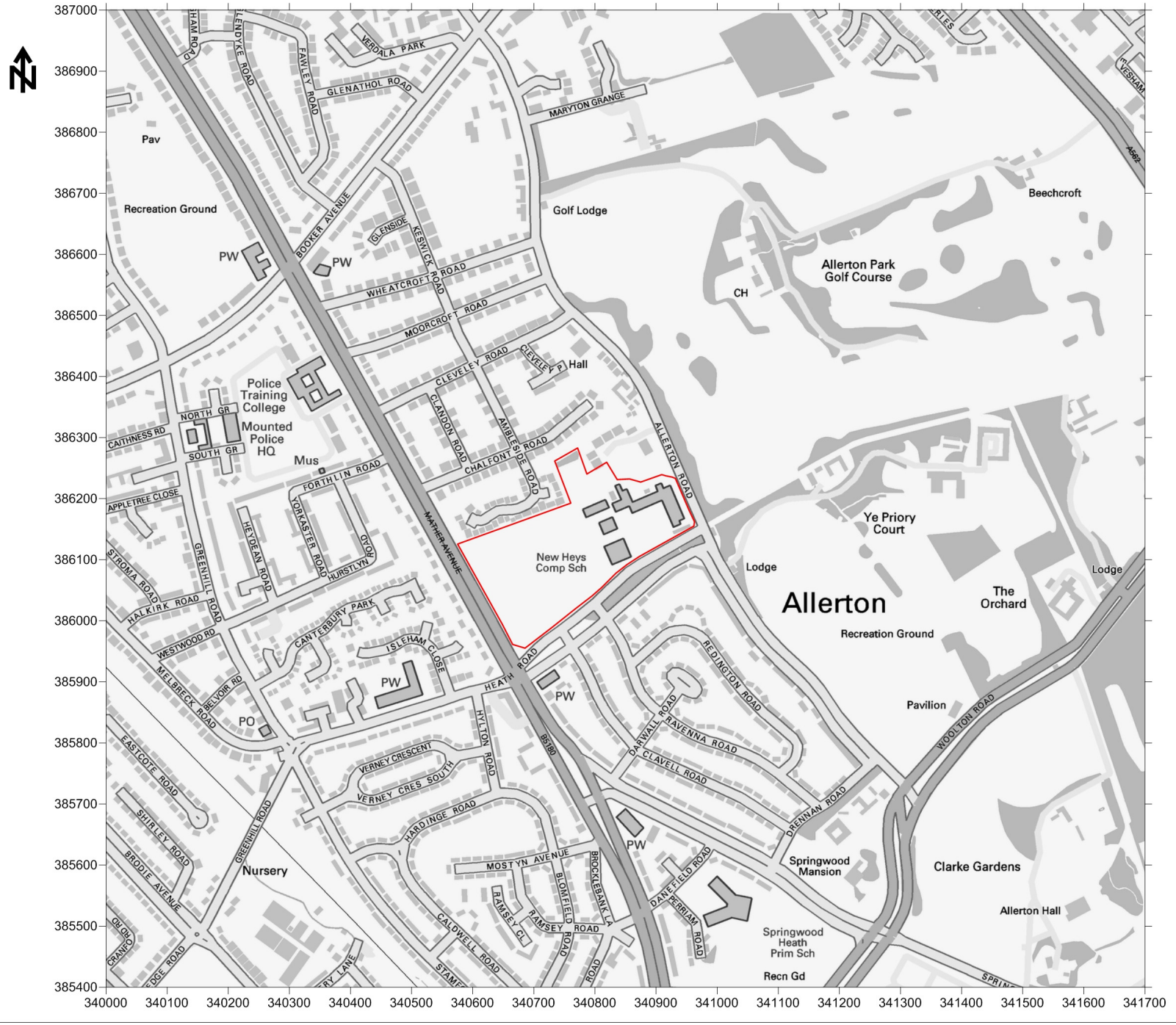
Potential impacts during the operational phase of the development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. An assessment was therefore undertaken using the DMRB and EPUK screening criteria to determine the potential for trips generated by the development to affect local air quality. This indicated that impacts are likely to be **negligible** throughout the operational phase.

Based on the assessment results, it is considered that air quality should not be deemed a determining factor in granting planning consent for this development.

7.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
DEFRA	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
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
LDF	Local Development Framework
LDV	Light Duty Vehicle
LP	Local Plan
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
$PM_{2.5}$	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
UDP	Unitary Development Plan

APPENDIX I FIGURES



Legend

Site Boundary

Title

Figure 1 - Site Location Plan

Project

Air Quality Assessment
New Heys Comprehensive School,
Liverpool

Project Number

33250

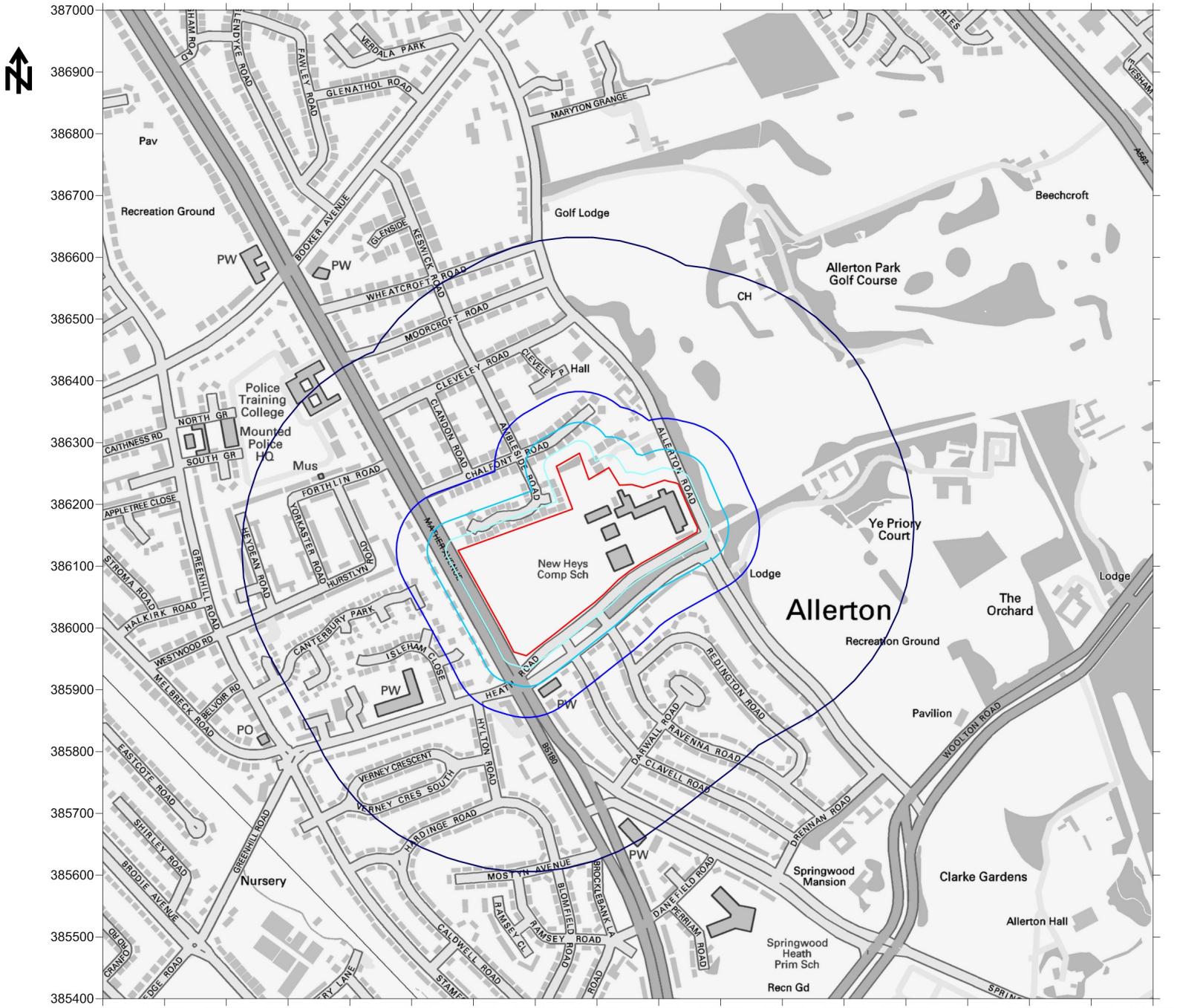
Client

Redrow Homes NW

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
- 20m from Site Boundary
- 50m from Site Boundary
- 100m from Site Boundary
- 350m from Site Boundary

Title

Figure 2 - Demolition, Earthworks and Construction Dust Sensitive Receptors

Project

Air Quality Assessment
New Heys Comprehensive School, Liverpool

Project Number

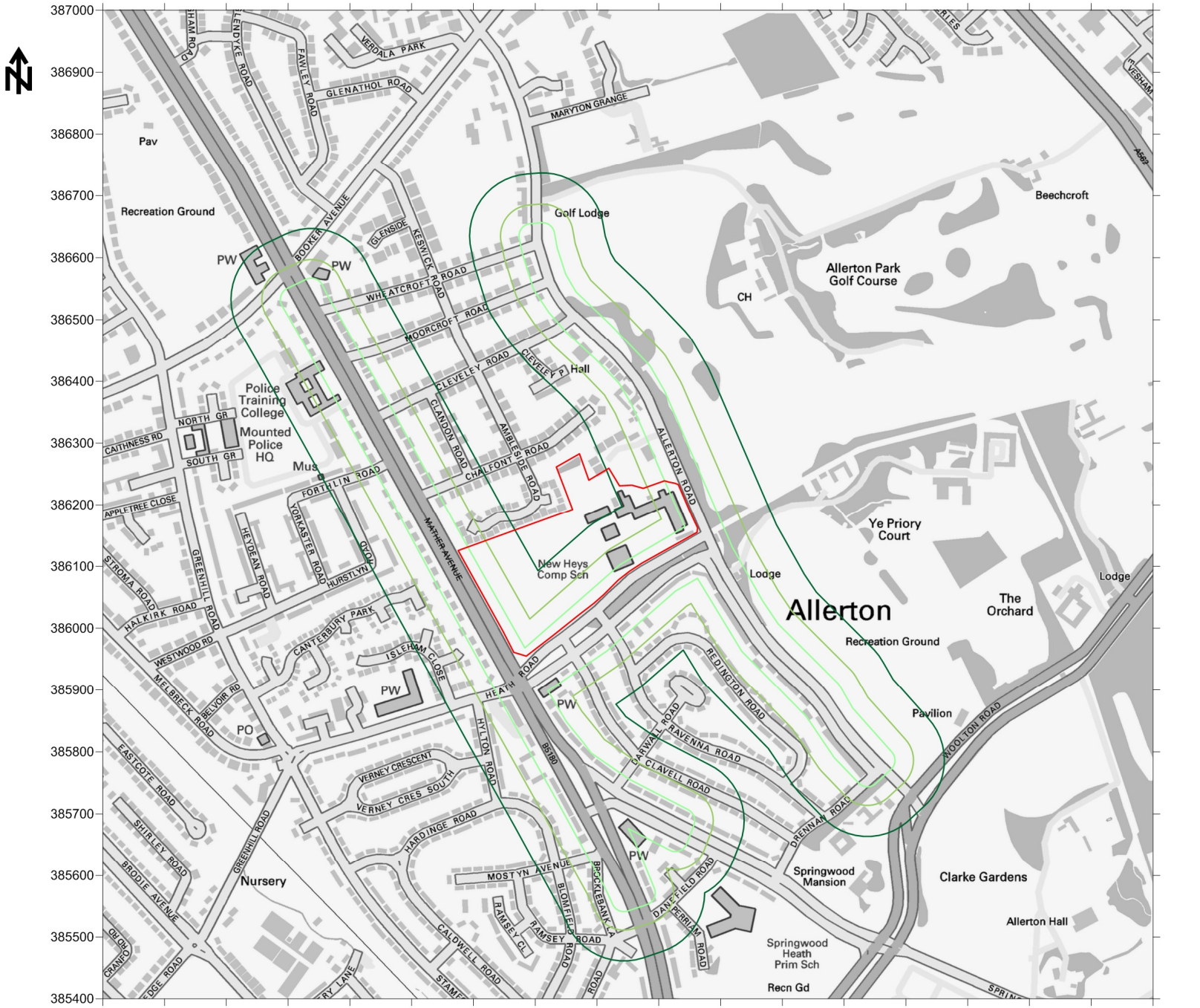
33250

Client

Redrow Homes NW

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
- 20m from Site Access Route
- 50m from Site Access Route
- 100m from Site Access Route

Title

Figure 3 - Trackout Dust Sensitive Receptors

Project

Air Quality Assessment
New Heys Comprehensive School, Liverpool

Project Number

33250

Client

Redrow Homes NW

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

APPENDIX II ASSESSOR'S CURRICULUM VITAE

JETHRO REDMORE

Manager - Air Quality Impact Group

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

KEY EXPERIENCE:

Jethro is a Chartered Environmentalist with specialist experience in the air quality and odour sector. His key capabilities include:

- Production and management of Air Quality and Odour Assessments to DEFRA, Environment Agency and EPUK methodologies for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Significant proportion of assessments produced as part of over-arching Environmental Statements (ES) for large developments throughout the UK.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-ROADS, ADMS-4, AERMOD-PRIME and BREEZE-ROADS. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of EIAs and scoping reports for developments throughout the UK.
- Design and project management of pollutant monitoring campaigns to define baseline conditions and inform future assessment in accordance with DEFRA and Environment Agency guidance.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies.

PROJECTS SUMMARY:

Residential Developments

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

Church Way Doncaster - mixed use scheme adjacent to AQMA.

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

Mill Street, Crewe - residential development in proximity of 2-AQMAs.

Wheatstone House, London - mixed use scheme in AQMA.

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Poplar Business Park, Tower Hamlets – AQA for residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre for EIA.

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

Temple Point Leeds - residential development adjacent to M1.

Bury Road, Bury - residential development in proximity of AQMA.

Commercial and Retail Developments

Pleasington Lakes, Blackburn - EIA for holiday village adjacent to M65.

Wakefield College - redevelopment of city centre campus in AQMA.

Pleckgate School, Blackburn - biomass boiler and odour assessment.

Deptford Terrace, Sunderland - AQA for mixed use development.

Pakeezah Gourmet, Bradford - AQA including DMRB for new food store.

Lidl, Honiton - Food store development close to AQMA.

Witton Park School, Blackburn - biomass boiler feasibility assessment.

Manchester Airport Cargo Shed - commercial development.

New Crown Wood School, Greenwich - biomass boiler emission assessment.

Basford West, Crewe - AQA of industrial and business park.

Farnworth Superstore - AQA in support of new food superstore.

Basford West, Crewe - mixed use development in proximity of AQMA.

Wild Rose Holiday Park, Cumbria - EIA for holiday park extension.

Coolmore Estates, Seaham - EIA in support of creative centre of excellence.

Morton District Shopping Centre, Carlisle - air quality EIA for commercial development.

Westwood Park, Wigan - air quality EIA for new business park.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

Preston East - EIA for employment park.

Industrial Developments

Blue Star Fibres, Grimsby - fibre manufacturing plant adjacent to SPA.

Maesgwyn Biomass Plant - AQA including ecological assessment.

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

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

Countrystyle Biomass Plant, Kent - EIA for biomass facility.

Beddington Heat and Power, London - biomass energy recovery plant.

Brook Bridge Poultry Farm - Ammonia dispersion modelling of quail farm.