Strategic Sites

Huddersfield Waterfront Quarter

Air Quality Assessment

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May 2008

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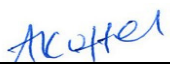
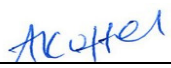
		Signature			
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Contents

1 Introduction

Ove Arup and Partners (Arup) has been commissioned to undertake an air quality assessment for a proposed new development in Huddersfield. The redevelopment will include a mix of office and residential buildings with some small cafes and restaurants. The proposed redevelopment is located to the south west of Huddersfield City Centre, in a triangle of land between the River Colne and Manchester Road, with Chapel Hill forming the eastern boundary.

Air quality studies are concerned with the presence or absence of airborne pollutants. This report outlines the relevant air quality management policy and legislation, describes the existing or 'baseline' air quality situation, and outlines the nature of the development and the air quality issues likely to be associated with its construction and operation. Where any potentially adverse effects on air quality are predicted, mitigation measures are outlined to ensure they are avoided or minimised.

The principal source of air pollution associated with the proposed development will be emissions from traffic travelling to and from the site; specifically the pollutants nitrogen dioxide (NO_2) and particulate matter (PM_{10}) generated from the additional vehicles and changing traffic volumes on the local road network.

2 Air Quality Standards and Guidelines

2.1 Air Quality Limit Objectives and Limit Values

Air quality limit values and objectives are quality standards for clean air. They can be used as assessment criteria for determining the significance of any potential changes in local air quality resulting from the development proposals.

European Union (EU) air quality policy sets the scene for national policy. The air quality 'framework' Directive on Ambient Air Quality Assessment and Management came into force in September 1996 and was intended as a strategic framework for tackling air quality consistently, through setting European-wide air quality limit values in a series of daughter directives, superseding and extending existing European legislation. The first four daughter directives have already been placed into national legislation. On the 9th April 2008 the Directive on Ambient Air Quality and Cleaner Air for Europe was introduced under the Thematic Strategy on Air Pollution[1]. The Directive consolidates and simplifies existing air quality legislation and introduces a new standard for particulate matter of $PM_{2.5}$.

In a parallel national process, the Environment Act was published in 1995[2]. The Act required the preparation of a national air quality strategy setting air quality standards and objectives for specified pollutants and outlining measures to be taken by local authorities (through the system of Local Air Quality Management (LAQM)) and by others '*to work in pursuit of the achievement*' of these objectives. A National Air Quality Strategy (NAQS) was published in 1997 and subsequently reviewed and revised in 2000, as the Air Quality Strategy for England, Scotland, Wales and Northern Ireland and an addendum to the Strategy was published in 2002. The objectives which are relevant to local air quality management have been set into Regulations (Air Quality Regulations 2000 and 2002). An updated Air Quality Strategy for England, Scotland, Wales and Northern Ireland was published in 2007.

Some pollutants have standards expressed as annual average concentrations due to the chronic way in which they affect health or the natural environment (i.e. effects occur after a prolonged period of exposure to elevated concentrations) and others have standards expressed as 24-hour, one-hour or 15-minute average concentrations due to the acute way in which they affect health or the natural environment (i.e. after a relatively short period of exposure). Some pollutants have standards expressed in terms of both long-term and short-term concentrations (e.g. NO_2 and PM_{10}).

Table 1 sets out these EU air quality limit values and national air quality objectives for the pollutants relevant to this study. Performance against these objectives is monitored where people are regularly present and might be exposed to air pollution and it is the responsibility of each local authority to undertake such duties. Each local authority is required to undertake a review and assessment of local air quality (see section 5.2).The process considers the current air quality situation and the likely future air quality situation, assessing whether the prescribed objectives are likely to be achieved by their target dates.

[1] Directive on Ambient Air Quality and Cleaner Air for Europe
[2] The Environment Act, 1995, HMSO

Table 1: EU Air Quality Limit Values and National Air Quality Objectives for Relevant Pollutants

Pollutant	Averaging Period	Objective/ Limit Value	Compliance Date	Basis
Nitrogen dioxide (NO_2)	1 hour mean	200 µg/m^3, not to be exceeded more than 18 times a year (99.8th percentile)	31st Dec 2005	National
			1st Jan 2010*	EU
	Annual mean	40 µg/m^3	31st Dec 2005	National
			1st Jan 2010*	EU
Particulate matter (PM_{10}) Measurement technique: Gravimetric	Daily mean	50 µg/m^3, not to be exceeded more than 35 times a year (90.4th percentile)	31st Dec 2004	National
			None specified	EU
	Annual mean	40 µg/m^3	31st Dec 2004	National
			None specified	EU

* Changes have been proposed but are not yet included in the Regulations.

2.2 Dust Nuisance

Dust is the generic term which the British Standard document BS 6069 (Part Two) used to describe particulate matter in the size range 1 – 75 µm (micrometers) in diameter. Dust nuisance is the result of the perception of the soiling of surfaces by excessive rates of dust deposition. Under provisions in the Environmental Protection Act 1990, dust nuisance is defined as a statutory nuisance. There are currently no standards or guidelines for the nuisance of dust in the United Kingdom, nor are formal dust deposition standards specified. This reflects the uncertainties in dust monitoring technology, and the highly subjective relationship between deposition events, surface soiling and the perception of such events as a nuisance. However an informal criterion of 200-250 mg/m²/day (as a 30 day average) is often applied in the UK as an indicator of potential nuisance.

3 Policies and Guidance

The land use planning process is a key means of improving air quality, particularly in the long term, through the strategic location and design of new developments. Any air quality consideration that relates to land use and its development can be a material planning consideration in the determination of planning applications, dependent upon the details of the proposed development.

3.1 National Planning Policy and Air Quality Guidance

Planning policies particularly relevant to air quality management are set out in PPG13 – Transport[3], PPS23 - Planning and Pollution Control[4], the Local Air Quality Management guidance note on Air Quality and Land Use Planning[5] and the NSCA guidance[6,7].

3.1.1 PPG13: Transport (2001)

PPG13 (Transport)[3] was published in March 2001 and provides the Government's transport planning policies, with the objectives of delivering an integrated transport policy, extending transport choices and securing mobility in a way that supports sustainable development. The aim is to integrate planning and transport at a number of levels to promote more sustainable transport choices (for people and freight), to promote accessibility to services and to reduce the need to travel, especially by car. PPG13 states that local air quality is a key consideration in the integration of planning and transport. This is particularly relevant in areas where the Government's national air quality objectives are not expected to be met and air quality action plans are formulated. The PPG advises that well designed traffic management measures are able to contribute to reducing local air pollution and in improving the quality of local neighbourhoods.

3.1.2 PPS23: Planning and Pollution Control (2004)

PPS23: Planning and Pollution Control is intended to complement the new pollution control framework under the Pollution Prevention and Control Act 1999 and The Pollution Prevention and Control (England and Wales) Regulations 2000. PPS23 sets out the Government's core policies and principles on land use planning. It contains an Annex on 'Pollution Control, Air and Water Quality' which considers the links between the land use planning and pollution control systems and how the interaction should be dealt within planning. Policies and advice contained within PPS23 (including Annexes) should be taken into account in preparing policies for the development and use of land in the region by Regional Planning Bodies, Regional Spatial Strategies and Local Planning Authorities and in determining applications for planning permission. PPS23 also makes reference to proposed development within designated Air Quality Management Areas (AQMAs). It states that whilst it is important that the possible impact on air quality to or in an AQMA are considered, it is not the case that all planning applications for development inside or adjacent to AQMAs should be refused if the developments would results in a deterioration of local air quality as this could sterilise development.

3.1.3 Local Air Quality Management Policy Guidance LAQM.PG(03)

Policy guidance note LAQM.PG(03) provides additional guidance on the links between transport and air quality. PG(03) describes how road transport contributes to local air pollution and how transport measures may bring improvements in air quality. Key transport related Government initiatives are set out, including regulatory measures and standards to reduce vehicle emissions and improve fuels, tax-based measures and the development of an integrated transport strategy.

[3] HMSO (2001) Planning Policy Guidance Note 13: Transport.
[4] HMSO (2004) Planning and Policy Statement 23: Planning and Pollution Control.
[5] DEFRA (2003) Part IV of the Environment Act 1995: Local Air Quality Management: Policy Guidance, LAQM.PG(03), Department for Environment, Food and Rural Affairs, February 2003.
[6] NSCA (2004) Development Control: Planning for Air Quality, November 2004.
[7] NSCA (2006) Development Control: Planning for Air Quality, 2006 Update.

LAQM.PG(03) also provides guidance on the links between air quality and the land use planning system. The guidance advises that air quality considerations should be integrated within the planning process at the earliest stage, and is intended to aid local authorities in developing action plans to deal with specific air quality problems and create strategies to improve air quality generally. It summarises the main ways in which land use planning system can help deliver air quality objectives. The objectives relevant to this assessment are detailed in section 2.1.

3.1.4 National Society for Clean Air (NSCA) Guidance – Development Control: Planning for Air Quality

The NSCA guidance note 'Development Control: Planning for Air Quality[7] responds to the need for closer integration between air quality and development control. It provides a framework for air quality considerations within local development control processes, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes a method for assessing the significance of the impacts of development proposals in terms of air quality and how to make recommendations relevant to the development control process in light of this assessment. The need for early and effective dialogue between the developer and local authority is identified to allow air quality concerns to be addressed as early in the development control process as possible. The guidance also provides some clarification as to when air quality constitutes a material consideration. The approach for assessing significance of air quality assessments associated with a given development has been used in this assessment, and is outlined in section 4.

3.2 Regional Planning Policy

3.2.1 West Yorkshire Local Transport Plan 2006 – 2011

The West Yorkshire Local Transport Plan[8] sets out a programme for a wide range of improvements to the five West Yorkshire District Council's local transport over the period 2006-2011. Section 6.13 is concerned with Air Quality and Noise. The Local Transport Plan aims to:

- Deliver a more sustainable transport system, with growth in the use of alternatives to the private car including bus and train use;
- Provide improved accessibility to jobs and key facilities such as hospitals;
- Improve road safety and reduce road casualties;
- Reduce vehicle emissions and improve air quality in those areas worst affected by pollution;
- Improve journey safety and security;
- Deliver better travel information through the use of modern technology;
- Provide better facilities for pedestrians and cyclists; and
- Pmprove the condition of the local highways and bridges.

[8] West Yorkshire Local Transport Plan, 2006 – 2011, March 2006

3.2.2 Greater London Authority Best Practice Guidance

The London Best Practice Guidance[9] document provides guidance for the control of dust and emission from construction and demolition activities. This document is a London focussed document to provide consistent best practice for demolition and construction sites across London, although the principles of best practice can be applied to other areas outside of London. The guide builds on existing guidance and takes into account the latest best practice and new techniques. This is further discussed in sections 4.2.1 and 6.1.3.

3.3 Local Planning Policy

3.3.1 Kirklees Council Unitary Development Plan

Section 8.2 of the Kirklees Unitary Development Plan (UDP)[10] discussed the environment in the context of transport planning, and recognises the need to develop a more sustainable transport system with increasing emphasis on the provision of public transport. The proposals put forward in the West Yorkshire Local Transport Plan are also referred to.

[9] London Best Practice Guidance (2006): The Control of dust and emissions from construction and demolition.
[10] Kirklees Council Unitary Development Plan, February 2008

4 Assessment Methodology

4.1 Approach

The overall approach to the air quality study includes:

- A review of the existing or baseline air quality in the area;
- An assessment of the potential changes in air quality arising from the construction and operation of the proposed development; and
- Formulation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised.

The construction effects have been assessed through an assessment of potential sources of air pollutant emissions from construction activities and through the formulation of appropriate mitigation and control measures to be placed within a formal Code of Construction Practice. An environmental site evaluation of construction impacts has been carried out using the guidance provided in the Draft London Best Practice Guidance[9].

The impacts of traffic travelling to and from the development once it is operational have been assessed using a modelling approach in line with government guidance TG(03)[11]. Traffic-related air quality effects have been assessed using the DMRB screening tool[12], which is considered to be a suitable assessment method given the ambient air quality and likely scale of impact of the proposed development. The DMRB screening tool is used in this assessment to calculate the likely changes in air quality at nearby sensitive receptors as a result of the changes in traffic flows. Calculations have been undertaken for a baseline year (2007), and the proposed year of opening (2010) with and without the proposed development for two pollutants; NO_2 and PM_{10}. The Huddersfield Narrow Canal has been designated a Site of Scientific Interest by Kirklees Council. However, the canal does not fall within the criteria specified for a 'Designated Site' within the DMRB guidance[13]. Changes in NO_x emissions have therefore not been calculated for this assessment.

4.2 Significance Criteria

4.2.1 Construction Assessment Significance Criteria

The Greater London Authority Best Practice Guidance provides criteria that can be used by the developer and local planning authority to assess the risk posed by a demolition or construction site. The site evaluation guidelines are characterised as low, medium or high risk sites according to the size of the development, the number of properties being developed and the potential impact for emissions and dust on sensitive receptors, as shown below in Table 2.

[11] Defra Local Air Quality Management Technical Guidance 03 – Review and Assessment
[12] Design Manual for Roads and Bridges (2003) Volume 11: Environmental Assessment – Section 3: Environmental Assessment Techniques, Model version 1.03c (July 2007)
[13] Design Manual for Roads and Bridges (2003) Volume 11: Environmental Assessment – Section 3: Chapter 3 and Annex F, Model version 1.03c (July 2007)

Table 2: Site Evaluation Guidelines (Source: Best Practice Guidance – The control of dust and emissions from construction and demolition[9])

Low risk sites • Development of up to 1,000 square metres of land and; • Development of up to one property and up to a maximum of ten and; • Potential for emissions and dust to have an infrequent impact on sensitive receptors.
Medium risk sites • Development of between 1,000 and 15,000 square metres of land and; • Development of between ten to 150 properties and; • Potential for emissions and dust to have an intermittent or likely impact on sensitive receptors.
High risk sites • Development of over 15,000 square metres of land, or: • Development of over 150 properties or; • Major Development referred to the Mayor/ and or the London Development Agency, or; • Major development defined by a London borough (or local planning authority) or; • Potential for emissions and dust to have significant impact on sensitive receptors.

4.2.2 Operational Assessment Significance Criteria

In terms of operational impacts the NSCA guidance[6] provides an approach for assessing the significance of air quality impacts associated with a given development. This approach uses textual descriptors of significance which are contained within Figure 1.

The approach assumes that the air quality impacts have been assessed and quantified. The significance of the impacts is then assessed through a series of questions with closed (yes and no) answers. Each question is addressed in descending order until the arrow points to one of the outcomes in the right hand column. This gives the relative priority which air quality considerations should be afforded with respect to the development proposal.

The updated NSCA guidance provides further clarification on how to describe the significance of the impacts predicted from the air quality modelling, specifically for the pollutants NO_2 and PM_{10} (in this assessment the DMRB screening tool has been used to predict existing and future pollutant concentrations).

Two tables are presented that set out examples of descriptors for magnitude of change and significance (as shown below in Tables 3 and 4). The first step is to identify the descriptor of change in ambient concentrations for NO_2 and PM_{10} (Table 3) according to the percentage change in annual mean concentrations (for both NO_2 and PM_{10}) and change in the forecast number of days greater than $50\mu g/m^3$ for PM_{10}. The descriptor can then be used to assess the impact significance for the two pollutants in relation to changes in the absolute concentration forecast from the modelling with the proposed development in place (Table 4).

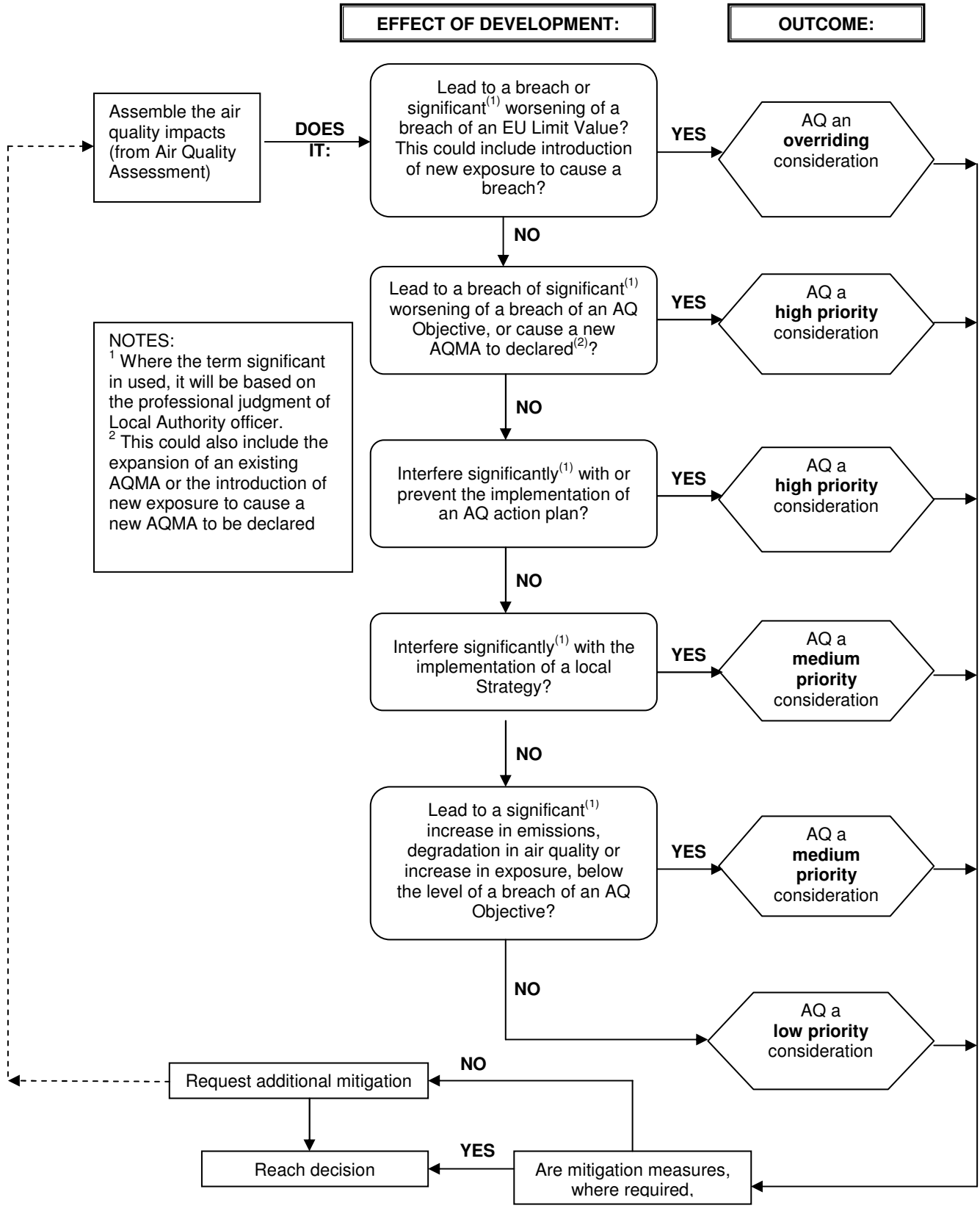
Table 3: Descriptors for Changes in Ambient Concentrations of NO_2 and PM_{10} (taken from the NSCA 2006 guidance update)

Magnitude of Change	Annual Mean NO_2	Days PM_{10}>50 ug/m^3
Very large	Increase/decrease > 25%	Increase/decrease > 25 days
Large	Increase/decrease 15-25%	Increase/decrease 15 -25 days
Medium	Increase/decrease 10-15%	Increase/decrease 10-15 days
Small	Increase/decrease 5-10%	Increase/decrease 5-10 days
Very Small	Increase/decrease 1-5%	Increase/decrease 1-5 days
Extremely Small	Increase/decrease < 1%	Increase/decrease < 1 days

Table 4: Descriptors for Impact Significance for NO_2 and PM_{10} (taken from the NSCA 2006 guidance update)

Air Quality Impact Significance Criteria						
Absolute Concentration in Relation to Standard	Extremely Small	Very Small	Small	Medium	Large	Very Large
Decrease with scheme						
Above Standard with scheme	Slight beneficial	Slight beneficial	Large beneficial	Large beneficial	Very large beneficial	Very large beneficial
Above Standard without scheme Below with scheme	Slight beneficial	Moderate beneficial	Large beneficial	Large beneficial	Very large beneficial	Very large beneficial
Below Standard without scheme, but not Well Below	Negligible	Slight beneficial	Slight beneficial	Moderate beneficial	Moderate beneficial	Large beneficial
Well Below Standard without scheme	Negligible	Negligible	Slight beneficial	Slight beneficial	Slight beneficial	Moderate beneficial
Increase with scheme						
Above Standard without scheme	Slight adverse	Slight adverse	Large adverse	Large adverse	Very large adverse	Very large adverse
Below Standard without scheme Above with scheme	Slight adverse	Moderate adverse	Large adverse	Large adverse	Very large adverse	Very large adverse
Below Standard with scheme, but not Well Below	Negligible	Slight adverse	Slight adverse	Moderate adverse	Moderate adverse	Large adverse
Well Below Standard with scheme	Negligible	Negligible	Slight adverse	Slight adverse	Slight adverse	Moderate adverse
Well Below standard = <75% of the standard level. 'Standard' in the context of this table relates to specific air quality objective or Limit Value in question						

Figure 1: Assessment of Significance of Air Quality Impacts



4.3 Key Pollutants

The common air pollutants legislated for in the UK and associated with road traffic are: particles; nitrogen oxides (including nitrogen dioxide); benzene; 1,3-butadiene; carbon monoxide, and lead. The analysis presented in Table 4 below indicates that Air Quality Management Areas have been designated in the UK for PM_{10}, NO_2 , sulphur dioxide and benzene. Of these, road traffic was responsible for Air Quality Management Areas designated for PM_{10} and NO_2 only. These findings lead to the conclusion that the assessment of road traffic schemes can be limited to NO_2 and PM_{10} only.

Table 5: Reasons for Designation of Air Quality Management Areas (AQMAs)

Pollutant	Associated with Road Traffic	Number of local authorities with AQMAs designated for this pollutant	Reason for designation
Particles (as PM_{10})	✓	73	Road traffic, industry
Nitrogen dioxide (NO_2)	✓	187	Road traffic, industry
Sulphur dioxide (SO_2)		11	Industry, domestic emissions
Benzene	✓	1	Industry
1,3-butadiene	✓	0	-
Carbon monoxide	✓	0	-
Lead		0	-
As reported on www.airquality.co.uk, July 2007			

4.4 Consultation

Consultation has been undertaken with Kirklees Council Environmental Scientific Services. It was agreed to use the DMRB screening tool with an assessment of significance in accordance with NSCA guidance to assess local air quality impacts at sensitive receptors within the local vicinity of the proposed development. Existing background air quality monitoring data was also provided by the EHO.

5 Existing Situation

Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment – these are present from various sources, such as industrial processes, commercial and domestic activities, agriculture, traffic and natural sources. This section describes the existing ambient air quality situation in the area of the proposed development.

The following data sources have been employed in this assessment:

- Kirklees Council local air quality monitoring data;
- Environment Agency website;
- The UK Air Quality Archive (www.airquality.co.uk);
- Correspondence with Kirklees Council EHO; and
- Kirklees Council Updating and Screening Assessment, 2006.

5.1 Air Pollution Sources

5.1.1 Industrial Processes

The main industrial sources of air pollution wereprincipally controlled through the Integrated Pollution Control (IPC) and Local Air Pollution Control (LAPC) regimes established by the Environmental Protection Act 1990. These existing regimes were gradually replaced by the new Integrated Pollution Prevention and Control (IPPC) regime established by the Pollution Prevention and Control Act 1999, covering a wider range of processes and requiring additional environmental aspects to be controlled, and phased in from September 2000. In April 2008 the Environmental Permitting (2007) Regulations[14] came into force. These regulations combine Pollution Prevention and Control and Waste Management Licensing, and aim to make existing legislation more efficient. The new regulations maintain the previous two-tiered system of control by the Environment Agency (EA) over industrial processes with installations falling within their remit: the major 'Part A' processes are regulated for releases to air, water and land; and, the smaller 'Part B' processes are regulated for releases to air only. The processes and pollutants covered ('prescribed') by the regimes are detailed under regulations indicating the type and scale of processes designed for control and the key pollutants for control.

The closest Part A process, an incinerator operated by SITA, is located approximately 2.1km to the north east of the proposed development, and is considered unlikely to affect local air quality in the vicinity of the development. No Part B processes were identified during consultation with Kirklees Council.

5.1.2 Road Traffic

Emissions from road traffic have previously been discussed in Section 4.3 above. Kirklees Council has identified NO_2 and PM_{10} as the key pollutants of concern in their area. NO_2 and PM_{10} are therefore the pollutants of relevance to this assessment.

5.2 Local Authority Review and Assessment of Air Quality

Under the NAQS local authorities are required to review and assess the air quality within their areas. Where it is unlikely that the objectives and target dates for various pollutants will be met, the local authority must declare an Air Quality Management Area (AQMA). Under section 84(2) of the Environment Act 1995, where an AQMA is declared the local authority must agree an Air Quality Action Plan (AQAP) containing measures to be taken to work towards securing air quality objectives.

[14] SI 2007 No 3538

Kirklees Council has published an Updating and Screening Assessment (USA) in 2006, which reviews the situation in Kirklees following the last USA in 2003. The report concludes that air quality standards for carbon monoxide, lead, benzene, and 1-3 butadiene will be met and that no area of Kirklees requires further detailed investigation. However, further investigation of NO_2 and PM_{10} may be required in areas where there are busy roads and junctions. Kirklees Council has not designated any AQMAs.

5.3 Local Air Quality Monitoring

Kirklees Council have provided monitoring information for continuous monitoring stations in Huddersfield. Of these, the monitoring station at Huddersfield University is the closest monitoring point to the site for NO_2, and Trailer 1 the most applicable for background PM_{10}. Annual averages for 2005, 2006 and 2007 are given in Table 6 below.

Table 6: Annual Mean Air Pollution Concentrations for Local Continuous Monitoring Points (information provided by Kirklees Council)

Monitoring Site	Pollutant Monitored	Approximate Distance from Development Site	Results (µg/m³)		
			2005	2006	2007
Huddersfield University	NO_2	300m to the North	28	30	31
Trailer 1	PM_{10}	2.5km to the North East	27	30	27

Monitoring results provided by Kirklees Council show concentrations below the national annual mean objectives (40µg/m³) for both NO_2 and PM_{10} for 2005, 2006 and 2007.

5.4 Background Pollution Concentrations

In the National Air Quality Archive operated by the National Environmental Technology Centre (NETCEN), DEFRA has produced estimated background air pollution data for 2004 and projections for other years for nitrogen oxides (NOx), NO_2 and PM_{10}. Estimated pollutant concentrations at the proposed development site for 2005, 2007 and 2010 (proposed opening year of the development) are shown in Table 7. These concentrations are well within the national air quality objectives.

Table 7: Background Annual Mean Air Pollution Concentrations at Proposed Development Site (grid references: 414500, 416500 and 413500, 426500)

Pollutant	Background concentration (µg/m³)					
	2005		2007		2010	
NOx	48.8	47.4	45.01	43.72	40.7	39.4
NO_2	28.8	28.2	27.38	26.81	25.7	25.1
PM_{10}	23.9	23.2	23.15	22.27	22.0	21.05

6 Assessment of Construction Effects

Atmospheric emissions from construction activities will depend on a combination of the potential for emission (the type of activities) and the effectiveness of control measures. In general terms, there are two sources of emissions that will need to be controlled to minimise the potential for adverse environmental effects:

- Exhaust emissions from site plant, equipment and vehicles; and
- Fugitive dust emissions from site activities

6.1 Exhaust Emissions

The operation of vehicles and equipment powered by internal combustion engines results in the emission of waste exhaust gases containing the pollutants NOx, PM_{10}, VOCs, and CO. The quantities emitted depend on factors such as engine type, service history, pattern of usage and composition of fuel. The operation of site equipment, vehicles and machinery would result in emission to the atmosphere of unquantified levels of waste exhaust gases but such emissions are unlikely to be significant - particularly in comparison to levels of similar emissions from road traffic.

The traffic effect of construction of the development would be along the traffic routes employed by haulage vehicles, construction vehicles and employees. The principal construction activities with transportation implications are:

- Removal of materials;
- Delivery of materials for new development; and
- Movement of heavy plant.

6.2 Fugitive Dust Emissions

Fugitive dust emissions from construction activities are likely to be variable and would depend upon type and extent of the activity, soil conditions (soil type and moisture), road surface condition and weather conditions. Soils are inevitably drier during the summer period and periods of dry weather combined with higher than average winds have the potential to generate the most dust. The construction activities that are the most significant sources of fugitive emissions are:

- Earth moving, due to the handling, storage and disposal of soil and subsoil materials;
- Construction aggregate usage, due to the transport, unloading, storage and use of dry and dusty materials (such as cement powder and sand);
- Movement of heavy site vehicles on dry untreated or hard surfaced surfaces; and
- Movement of vehicles over surfaces contaminated by muddy materials brought off the site - for example, over public roads.

Fugitive dust arising from construction activities is generally of particle size greater than the human health-based PM_{10} fraction. The former relates to the amount of dust falling onto and soiling surfaces (or rate of dust deposition) and the latter to the concentration of dust in suspension in the atmosphere. If not effectively controlled, fugitive dust emissions can lead to dust nuisance. Most of the dust emitting activities outlined above respond well to appropriate dust control/mitigation measures and adverse effects can be greatly reduced or eliminated. The sensitivity of different land uses and facilities to dust can be categorised from low to high - examples are shown in Table 8[15].

15 Ireland, M. (1992) Dust: Does the EPA go far enough? Quarry Management, pp 23-24, August 1992.

Table 8: Examples of Dust Sensitive Facilities

High Sensitivity	Medium Sensitivity	Low Sensitivity
Hospitals and Clinics	Schools	Farms
High-tech industries	Residential areas	Light and heavy industry
Painting and finishing	Food Retailers	Outdoor storage
Food processing	Greenhouses and nurseries	
	Horticultural land	
	Offices	

The dust sensitive properties within the vicinity of the proposed development are medium sensitivity facilities comprised of residential housing to the north and south, and low sensitivity facilities consisting of light and heavy industry to the east and west of the development.

Airborne dust has a limited ability to remain airborne and readily drops from suspension as a deposit. Research undertaken for the Department of the Environment[16] concluded that large particulate matter (particles over 30 µm in diameter), return to the surface quite rapidly. Under average wind conditions (mean wind speed of 2-6 m/sec), these particles, which comprise around 95% of total dust emissions were found to return to the surface within 60-90m of the emission source[17]. However, this potential risk can be reduced by effective use of dust control measures with the result that adverse effects are unlikely. The dust control measures proposed are outlined in section 8.

6.3 GLA Best Practice Guidance

The London Best Practice Guidance for the control of dust and emissions from construction and demolition is outlined in section 3.2.2.

The guide recommends that a Site Evaluation is carried out for the site, to establish if the site is a low, medium or high risk site in terms of its potential to create dust nuisance. The criteria given in the report identify the Waterfront Quarter site as a **high** risk site in terms of air quality. This rating has been achieved on virtue of the size of the development and proximity to sensitive receptors. The London Best Practice Guidance recommends mitigation measures specific to high risk sites – following the application of the mitigation measures recommended the potential impact of the construction activities should be reduced to a **medium** or even **low** risk.

[16] Study by Arup Environmental for Department for Environment, Environmental Effects of Dust from Surface Mineral Workings, HMSO, 1995
[17] Cowheard *et al.*, (1990) Control of Fugitive and Hazardous Dusts, Pollution Technology Review, Noyes Data Corporation.

7 Assessment of Operational Effects

7.1 Main Sources of Emissions

7.1.1 Traffic

The main effects during operation of the development will be from vehicles travelling to and from the site. This will comprise residents, employee traffic, delivery and service vehicles. The effects of these traffic movements on local air quality in the vicinity of the development have been assessed using the modelling approach described below.

7.1.2 Facility Emissions

The proposed development buildings may generate small levels of emissions to atmosphere from extraction systems and general utility plant, including boiler plant. However these systems are not likely to cause significant emissions and have therefore not been assessed further.

7.2 Approach to the Assessment of Operational Effects

Operational road traffic effects have been assessed using the screening method outlined in Volume 11 of the Design Manual for Roads and Bridges (DMRB), version 1.02. This method places emphasis upon the extent of predicted changes in air quality as a result of the proposed development.

Pollutant concentrations are forecast at specific receptor locations along roads that are anticipated to experience the greatest change in traffic flows as a result of the scheme. The method indicates that, at locations beyond 200m from a road, the effects on local air quality of traffic emissions from a road will not be significant due to the decline in traffic-related air pollution with distance from the source.

The DMRB recommends that five key pollutants be examined as part of the screening assessment: NO_2; CO; benzene; 1,3-butadiene and PM_{10}. As discussed in section 5.1.2 of this report the pollutants of concern in this assessment are NO_2 and PM_{10}. The screening exercise is designed to estimate air pollutant concentrations to highlight any sites at which there may be a potential air quality problem as a result of the proposed development. The method takes into account any changes in traffic flows and speeds on the local network together with any difference in the number of heavy goods vehicles (HGVs).

The screening model was run for the following scenarios:

- Baseline 2007 scenario;
- Do-minimum 2010 scenario (without the proposed development);
- Do-something 2010 scenario (with the proposed development);

7.2.1 Properties Assessed

Pollutant concentrations have been forecast at selected properties (from hereon referred to as receptors), where exposure of residents to traffic emissions from vehicles travelling to the site is potentially the greatest, related to operational phase traffic. Pollutant concentrations decrease significantly with distance from a road source and, provided there are no other major sources nearby, are therefore lower at properties located further than the receptors from the roads.

The receptor locations chosen for this study are listed below in Table 9, and have been selected to be representative of the various types of properties found within the surrounding vicinity, with the exception of Receptor 6 (Building B) which is part of the new development. The receptor locations are shown on Figure 2 in Appendix 1.

Table 9: Location of Receptors Modelled

Receptor Number	Receptor Location	Grid Reference
1	Manchester Road (1)	413897, 416208
2	Bankfield Road	414074, 416187
3	Manchester Road (2)	414197, 416189
4	Rashcliffe Hill Road	414115, 415859
5	Chapel Hill	414308, 416066
6	Buildling B (proposed new residential building)	414023, 416143

7.2.2 Traffic Data and Assumptions

Sanderson Associates has provided traffic information relating to the local road network that surrounds the proposed development site. Traffic data has been received in Annual Average Daily Traffic (AADT) format. HGV levels were unavailable for the roads local to the site, and have been estimated using information provided on the Department for Transport website[18]. Speeds have been estimated based on speed limits in the area.

The traffic flows were supplied as baseline flows for 2007 and the year of opening (2010) without ("do minimum" scenario) and with ("do something" scenario) the proposed development.

7.2.3 Background Concentrations

The modelling procedure requires a value for background pollutant concentrations to be added to the model results to take account of emissions from sources other than vehicles on the roads modelled in the assessment. This allows model results to be compared against the relevant air quality objectives and limit values to determine if there are likely to be any exceedences.

Background concentrations have been taken from the Air Quality Archive for the relevant grid squares in which each of the selected receptors are located, as described in Section 5.4.

7.2.4 Predicted Pollutant Concentrations

Forecast pollutant concentrations from the DMRB screening are presented in Table 10 for all modelled receptors, for comparison with relevant air quality objectives and limit values.

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

Table 10: Summary of Results of the DMRB Screening Assessment for Modelled Receptors

Pollutant	Nitrogen Dioxide	Fine Particulate Matter (PM_{10})	
Objective/Value	**Annual mean**	**Annual mean**	**Days > 50 µg/m^3**
	µg/m^3	**µg/m^3**	**µg/m^3**
National	40 by 12/2005	40 by 12/2004	35 by 12/2004
EU	40 by 01/2010	40 by 01/2005	
Manchester Road (1)			
2007 Baseline	33.04	25.79	14
2010 Do Minimum	30.28	23.90	10
2010 Do Something	30.46	23.98	10
Bankfield Road			
2007 Baseline	34.59	26.62	17
2010 Do Minimum	31.75	24.58	11
2010 Do Something	32.34	24.87	12
Manchester Road (2)			
2007 Baseline	33.79	26.18	15
2010 Do Minimum	31.05	24.25	11
2010 Do Something	31.59	24.51	11
Rashcliffe Hill Road			
2007 Baseline	30.37	24.46	11
2010 Do-Minimum	28.20	22.99	8
2010 Do-Something	28.28	23.03	8
Chapel Hill			
2007 Baseline	35.22	26.95	18
2010 Do-Minimum	32.19	24.79	12
2010 Do-Something	32.39	24.89	12
Building B			
2007 Baseline	32.13	25.33	13
2010 Do-Minimum	29.59	23.59	9
2010 Do-Something	29.71	23.64	9

The results for the DMRB assessment indicate the following:

Nitrogen Dioxide – the NO_2 annual mean concentrations are forecast to be within the national objective and EU limit value in all years at all receptors. In terms of the change in NO_2 concentrations as a result of the proposed development, concentrations are forecast to increase slightly (up to 0.59 µg/m^3) at all receptors in future years once the new development is open.

The DMRB screening method does not calculate hourly mean concentrations. However, given that the NO_2 annual mean concentration target is met at all receptors in future assessment years, it is highly unlikely that the NO_2 hourly mean objective of 200 µg/m^3 will be exceeded. The DMRB Guidance states that the relationship between hourly exceedences and the annual mean is very weak, and that the annual mean will almost always be exceeded first[19].

Fine Particulate Matter – the PM_{10} annual mean concentrations are forecast to be within the national objective and EU limit value in all years at all receptors. In terms of the change in PM_{10} concentrations as a result of the proposed development, concentrations are again forecast to remain unchanged or increase slightly (up to 0.29 µg/m^3) at all receptors in future years.

With regard to the daily mean PM_{10} objective (50 µg/m^3), the number of predicted exceedences is forecast to remain well within the allowable number of exceedences (35 allowable exceedences) for all scenarios at all receptors.

7.2.5 Assessment of Significance

Considering the significance of the air quality impacts according to the NSCA guidance[6], this can be assessed as follows:

- The development would be unlikely to interfere with or prevent the implementation of actions within an AQAP (should Kirklees Council be required to implement one in the area);
- The development does not lead to a breach of an EU limit value;
- The development does not lead to a breach of an air quality objective or cause a new AQMA to be declared;
- It is not anticipated that the proposed development would interfere with the implementation of a local air quality strategy; and
- The proposed development does not lead to a significant increase in emissions, degradation in air quality or increase in exposure below the level of a breach of an air quality objective.

Based on this, it is therefore concluded that in the case of the proposed development, air quality would be a **low priority** consideration.

As detailed in Tables 3 and 4, the NSCA guidance (2006)[7] also provides descriptive examples of magnitude of change and significance criteria to be used within air quality assessments. In the case of the Huddersfield Waterfront Development, the forecast increases for NO_2 and PM_{10} are *very small* (1-5%). This descriptor can then be used to assess the impact significance for the two pollutants in relation to the absolute concentration forecast from the assessment. In the case of both pollutants the forecast concentrations (i.e. the 'do something' scenario) are *below standard with scheme, but not well below,* and therefore this is identified as a **slight adverse** impact on ambient air quality.

[19] DMRB Model version 1.03c (July 2007), paragraph C4.10

8 Mitigation

8.1 Construction Mitigation

The dust emitting construction activities detailed in section 6.1.2 respond well to appropriate dust control/mitigation measures and any adverse effects can be greatly reduced or eliminated. Effective dust mitigation measures prevent dust becoming airborne or contain dust within enclosures to prevent dispersion beyond the emission source.

Prior to commencement of construction activities, agreement will be reached with Kirklees Council to ensure the potential for adverse environmental effects on local receptors is minimised with agreed measures included in the Code of Construction Practice (CoCP). This includes measures to control traffic routing, site access points and hours of noisy operations. It is particularly important that construction traffic routing and access is considered at this stage given that it has not been possible to consider such impacts in this assessment (as such information is not yet available).

It is recommended that the following measures for controlling dust and general pollution nuisance from the site construction operations are included within the CoCP. These are the specific mitigation measures recommended for high risk sites as detailed in the London Best Practice Guidance[9].

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;

• Use nearby rail or waterways for transportation to/from site;

• Put in place real-time dust monitors across site;

Construction traffic

• All vehicles to switch off engines – no idling vehicles;

• Effective vehicle cleaning and specific fixed 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 taxexempt diesel (ULSD) where available and be fitted with appropriate exhaust after-treatment from the approved list;

• On-road vehicles to comply with the requirements of a possible future Low Emission Zone (LEZ) as a minimum;

• 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;

Site Activities

• 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; and

• If applicable, ensure concrete crusher or concrete batcher has permit to operate.

These controls should be applied throughout the construction period to ensure that dust emissions are mitigated. Thus the construction activities would be controlled to reduce as far as possible the potential environmental effects.

Overall, construction effects on air quality would be minimised through the implementation of mitigation measures through the CoCP. This would significantly reduce the amount of dust that escapes the site boundary. Any construction effects on air quality would be temporary during the construction period.

8.2 Operational Mitigation

The predicted effects on local air quality as a result of the proposed development are small, therefore no mitigation measures are proposed with respect to operational traffic.

9 Summary and Conclusions

An assessment has been carried out to determine the likely changes in air quality as a result of the construction and operation of the proposed Huddersfield Waterfront Quarter redevelopment. The assessment examines the existing air quality in the area and then identifies the potential changes in local air quality resulting from the construction and operation of the development.

The main potential air quality impact during construction of the proposed development will be from emissions of dust. If released in sufficient quantities, this could result in a nuisance at nearby properties. Dust emissions from the site will, however, be controlled using mitigation measures detailed in an approved Code of Construction Practice, ensuring that potential adverse impacts are minimised or avoided.

A screening method has been used to predict the changes in air quality as a result of the traffic changes in the area due to the proposed development. The pollutants assessed were nitrogen dioxide and fine particulate matter. These have been forecast at selected locations for the baseline 2007 situation and 2010 (proposed year of opening) with and without the proposed development in place. This modelling has shown that the potential impacts of the traffic changes on local air quality are small with predicted pollutant concentrations forecast to increase slightly with the proposed development in place.

Overall, no significant effects on local air quality are predicted to result from the proposed development. The assessment has demonstrated that the environmental risk in terms of air quality associated with the construction of the proposed development will be low to medium (with appropriate mitigation in place), while with regard to the operational effects of the development, air quality is viewed to be a 'low priority' consideration (according to the NSCA significance guidance) with the development having only slight adverse impacts on local air quality.

A1 Traffic Data

Road name	Traffic flows (AADT)			Average speed	% HGV
	2007	2010 no development	2010 with development		
A62 Castlegate	44460	46065	48403	30mph	4.8%
A62 Queensgate	34310	35548	37478	30mph	4.8%
Chapel Hill	30906	32022	33880	30mph	4.8%
Manchester Road One Way	11306	11714	13177	30mph	4.8%
Outcote Bank One Way	9217	9549	10724	30mph	4.8%
Manchester Road Two Way	19920	20639	22162	30mph	4.8%
St Thomas Road (B6432)	12989	13458	14142	30mph	4.8%
Lockwood Road (A616)	36116	37420	38799	30mph	4.8%
Colne Road (B6432)	10925	11319	12589	30mph	4.8%