



# **South Wales Metro**

Task Order 028-I – Taffs Well Depot Outline  
Planning – Air Quality Assessment

March 2018

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Transport for Wales

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# 1 Introduction

## 1.1 Project Description & Scope of Works

Mott MacDonald has been commissioned by Transport for Wales (TfW) to provide planning and technical support during the current procurement phase for the next 'Wales and Borders Rail Service' which will include the development of the South Wales Metro Phase 2, focusing specifically on the Core Valley Lines (CVL). This programme of works, funded by the Welsh and UK Governments and the European Commission, will transform the rail network involving extensive investment in new rolling stock, stations and associated infrastructure. It will deliver a step change in the public transport offer bringing about improved connectivity between the CVL and Cardiff and providing a much needed modern, reliable and efficient public transport system.

As part of the investment required to transform the rail network, additional depot and stabling facilities are required to accommodate the new fleet of rolling stock. As such, Welsh Government undertook a comprehensive site search process to find suitable and available land. This has resulted in Welsh Government acquiring the former 'Forgemasters' building and associated land at Garth Works Industrial Estate in Taffs Well. The whole site area, including the associated works to Taffs Well Station, extends to some 5.4 hectares and is shown on drawing number 367590-28I-XX-DR-C-0005.

In order to ensure early delivery of investment for the CVL and minimise risk to the preferred bidder (who will be named the Operator and Development Partner (ODP) once the procurement process is concluded, Welsh Government and TfW are seeking to secure outline planning permission for the depot and associated works.

In order to accommodate the specific operational requirements of the preferred ODP, the planning permission needs to have flexibility and as such, a 'Hybrid' Planning Application for the depot and associated works is being sought from Rhondda Cynon Taf County Borough Council (RCTCBC) as the Local Planning Authority. The hybrid planning application will seek full planning permission for the demolition of the existing buildings within the industrial estate and outline planning permission for construction of the depot and associated works. This approach provides flexibility for TfW in allowing demolition and site clearance works to commence in advance of works for the main depot and then the detailed design of the depot and associated works being dealt with through a Reserved Matters Planning Application. It is anticipated however, that the outline element of the planning permission for the depot and associated works will be subject to maximum parameters in terms of built floorspace, car parking and general alignment of highway infrastructure. These parameters and principles will then need to be reflected in the preferred ODP's detailed design solution through any Reserved Matters application.

An indicative masterplan (Drawings 367590-28I-XX-DR-C-0002 and 0003) of the Taffs Well Depot (hereafter proposed development) has been prepared which indicates the construction of the following:

- A new rolling stock depot comprising of:
  - Multiple stabling lines.
  - A maintenance workshop with offices above.
  - A rolling stock washing facility.
  - A sand replenishment plant.

- A delivery track where rolling stock will be delivered on HGVs and lifted onto the depot tracks.
- A substation.
- Staff parking and increased park and ride spaces.
- Associated works will include:
  - Local highways and rail infrastructure improvements.
  - A new footbridge over Taffs Well Station.
  - Extension to the existing Taffs Well Station western platform.
  - Improvements to the Taff Trail cycle and pedestrian path.

The key parameters for the proposed development are listed below:

- Whole site area is 5.4 hectares. This includes all land within the red line boundary (Drawing number 367590-28I-XX-DR-C-0004) which includes the associated works at and around Taffs Well Station.
- Developable site area is 3.6 hectares. This is the main depot site between the A470 and Ffordd Bleddyn, as shown on drawing 367590-28I-XX-DR-C-0005.
- Total approximate floor space will be as below:
  - 3770m<sup>2</sup> of workshop floor space.
  - 2372m<sup>2</sup> of office floor space over two floors.
  - 400m<sup>2</sup> and 100m<sup>2</sup> of storage buildings floor space.
  - Combined this comes to a total of approximately 6642m<sup>2</sup>.
- The tallest building is the maintenance workshop with offices above at 13.5m tall, smaller than the existing 15m tall Forgemasters building.
- The design of the depot allows for different types and sizes of rolling stock and power options including electric and diesel.

The full proposed development description for the project is as follows:

- Hybrid Planning Application for the construction of the Taffs Well Depot on land at the Garth Works Industrial Estate in Taffs Well.
- Part A: Full planning application for the demolition and site clearance works associated with existing buildings and structures on the Garth Works Industrial Estate.

Part B: Outline planning application with all matters reserved for the construction of the Taffs Well Depot including: multiple stabling lines; a maintenance workshop with offices above; a rolling stock washing facility; a sand replenishment plant; a delivery track; a substation; staff parking and increased park and ride spaces; highways and rail infrastructure improvements; modifications to Taffs Well Station and landscaping. The above is hereafter referred to as the 'proposed development'.

Local Authorities, as planning authorities, are tasked with determining local planning applications against a wide range of social, economic and environmental criteria. The proposed development has the potential to cause dust effects during the construction phase which could lead to nuisance and/or loss of amenity. It also has the potential to influence traffic flows and as a result affect air quality within the surrounding area. This air quality assessment addresses these potential effects.

This report provides an assessment of the key impacts associated with the proposed development. During the construction phase, the proposed development could potentially

introduce new emission sources in the form of construction traffic and construction plant and involve potentially dust generating activities such as earth moving. A qualitative assessment has therefore been undertaken in accordance with best practice guidance published by the Institute of Air Quality Management (IAQM) '*Guidance on the assessment of dust from demolition and construction*'<sup>1</sup>, 2014.

In relation to the operational phase impacts of the proposed development, traffic data supplied by Mott MacDonald traffic team was interrogated to identify the requirement for an operational phase assessment. Screening thresholds set out in Environmental Protection UK (EPUK) and IAQM's '*Land-use planning & development control: planning for air quality*'<sup>2</sup>, 2017 were used to identify the need for an operational assessment. Changes in traffic flow resulting from the proposed development are below these screening thresholds, and as such, no assessment of the operational phase traffic is therefore required. The proposed development also falls below the requirement for operational modelling of rail emissions under screening criteria set out in Department for Environment, Food and Rural Affairs (Defra) '*Local Air Quality Management – Technical Guidance (TG16)*', emissions from rail are therefore not considered further. Further detail on the scoping out of an operational phase assessment is provided in Section 3.3.

The proposed development is not located within an Air Quality Management Area (AQMA). The nearest AQMA is located 2.1 kilometres (km) north of the proposed development at Nantgarw, and is unlikely to be affected by the proposed development.

## 1.2 Site Location

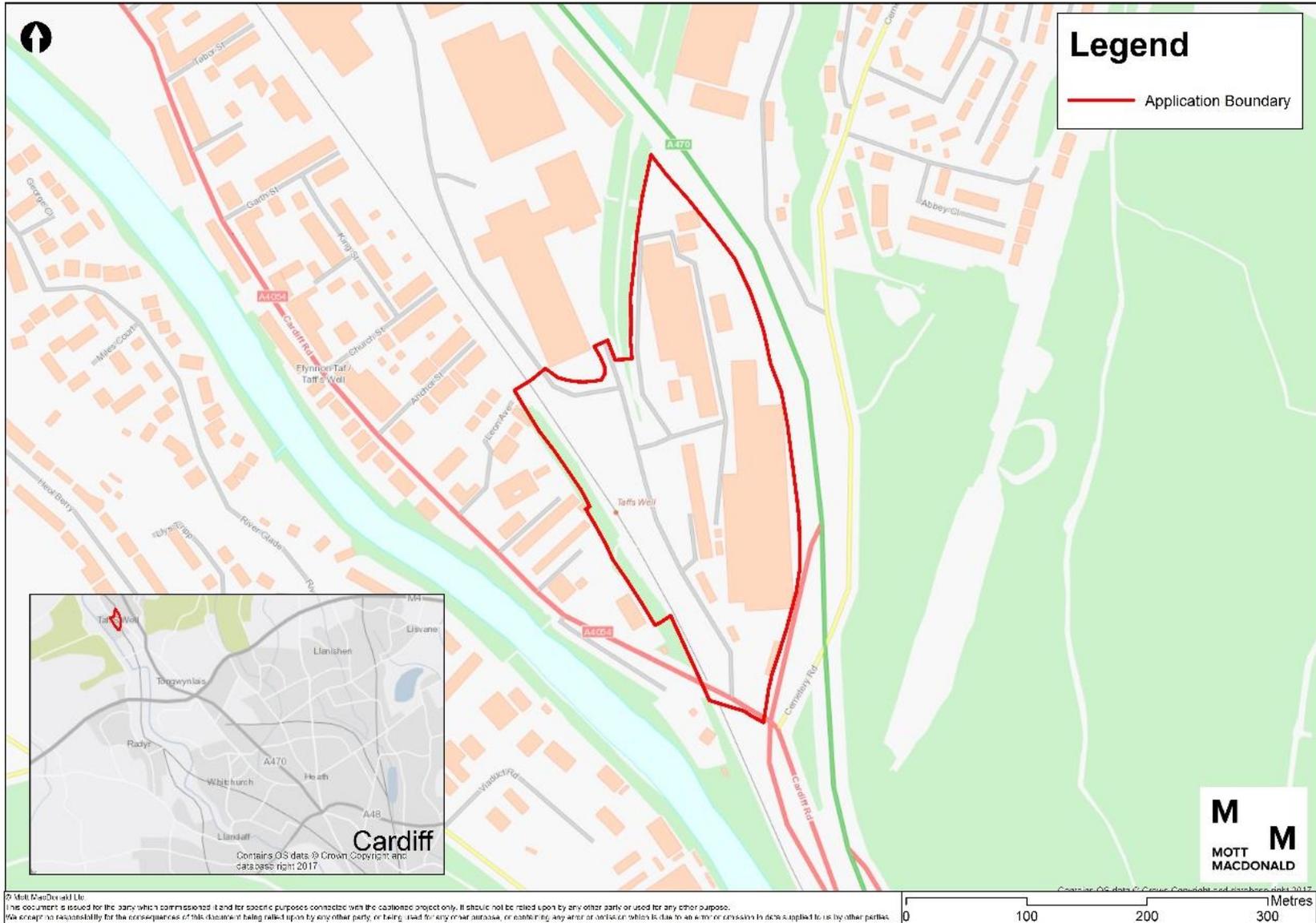
The proposed development is located on land bound by Rombourne Industrial Centre to the north, the A470 to the east, Cardiff Road to the south with businesses and residential properties located off of Cardiff Road to the west in Taffs Well, Cardiff. The site boundary is presented below in Figure 1. There are residential receptors located to the immediate west of the site, these include properties on Llys Hafn and Leon Avenue.

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<sup>1</sup> Institute of Air Quality Management (2014). '*Guidance on the assessment of dust from demolition and construction.*'

<sup>2</sup> Environmental Protection UK and Institute of Air Quality Management (January 2017), '*Land-Use Planning and Development Control: Planning for Air Quality*' version 1.2'

Figure 1: Proposed Development Location



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## 1.3 Key Pollutants

The assessment considers concentrations of NO<sub>2</sub> and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) only as these are the key pollutants of concern associated with the study area. A description of these pollutants is provided below.

### 1.3.1 Oxides of Nitrogen

Oxides of nitrogen is a term used to describe a mixture of nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>), referred to collectively as NO<sub>x</sub>. These are primarily formed from atmospheric and fuel nitrogen as a result of high temperature combustion. The main sources in the UK are road traffic and power generation.

During the process of combustion, atmospheric and fuel nitrogen is partially oxidised via a series of complex reactions to NO. The process is dependent on the temperature, pressure, oxygen concentration and residence time of the combustion gases in the combustion zone. Most NO<sub>x</sub> exhausting from a combustion process is in the form of NO, which is a colourless and tasteless gas. It is readily oxidised to NO<sub>2</sub>, a more harmful form of NO<sub>x</sub>, by chemical reaction with ozone and other chemicals in the atmosphere. NO<sub>2</sub> is a yellowish-orange to reddish-brown gas with a pungent, irritating odour and is a strong oxidant.

### 1.3.2 Particulate Matter

Particulate matter is a complex mixture of organic and inorganic substances present in the atmosphere. Sources are numerous and include power stations, other industrial processes, road transport, domestic coal burning and trans-boundary pollution. Secondary particulates, in the form of aerosols, attrition of natural materials and, in coastal areas, the constituents of sea spray, are significant contributors to the overall atmospheric loading of particulates. In urban areas, road traffic is generally the greatest source of fine particulate matter, although localised effects are also associated with construction and demolition activity.

## 2 Legislation and Policy

### 2.1 Introduction

This section summarises the relevant international and national legislation, policy and planning guidance in relation to air quality for the proposed development. In addition, UK regional and local planning policy guidance has been reviewed in order to identify relevant air quality policy implications related to the proposed development.

### 2.2 Legislation

#### 2.2.1 European Union

EU Framework Directive 96/62/EEC on ambient air quality and cleaner air for Europe was adopted in May 2008<sup>3</sup>. This Directive defines limit values and times by which they are to be achieved for the purpose of protecting human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants.

Directive 2008/50/EC sets out that the Limit Values apply everywhere with the exception of:

- any locations situated within areas where members of the public do not have access and there is no fixed habitation
- in accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply
- on the carriageway of roads; and on the central reservations of roads except where there is normally pedestrian access to the central reservation

Defra assesses and reports on the compliance with the Air Quality Directive for each of the 43 zones and agglomeration across the UK.

#### 2.2.2 Wales

##### 2.2.2.1 Air Quality

The Air Quality Standards (Wales) Regulations 2010<sup>4</sup> came into force in June 2010; they implement EU Directive 2008/50/EC on ambient air quality.

Part IV of the Environment Act 1995<sup>5</sup> requires that every local authority shall periodically carry out a review of air quality within its area, including likely future air quality. As part of this review, the authority must assess whether air quality objectives are being achieved, or likely to be achieved within the relevant periods. Any parts of an authority's area where the objectives are not being achieved, or are not likely to be achieved within the relevant period must be identified and declared as an 'air quality management area (AQMA)'. Once such a declaration has been made, authorities are under a duty to prepare an action plan which sets out measures to pursue the achievement of the air quality objectives within the AQMA.

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<sup>3</sup> European Union. (1996), 'Ambient air quality assessment management', Framework Directive 96/62/EC.

<sup>4</sup> Statutory Instrument. (2010), 'The Air Quality Standards (Wales) Regulations', No. 1433 (W.126). Queen's Printer of Acts of Parliament.

<sup>5</sup> Department for Environment Food and Rural Affairs. (2003), 'Part IV of the Environment Act 1995 Local Air Quality Management', Department for Environment Food and Rural Affairs.

The air quality objectives specifically for use by local authorities in carrying out their air quality management duties are set out in the Air Quality (Wales) Regulations 2000<sup>6</sup> and the Air Quality (Wales) (Amendment) (Wales) Regulations 2002<sup>7</sup>. In most cases, the air quality objectives are numerically synonymous with the limit values specified in the EU directives although compliance dates differ.

The Environment Act 1995 also requires that the UK Government produces a national ‘air quality strategy’ (AQS) containing standards, objectives and measures for improving ambient air quality and to keep these policies under review. Further details of the AQS are presented in Section 2.3.1.

#### 2.2.2.2 Statutory Nuisance

Section 79(1)(d) of the Environmental Protection Act 1990<sup>8</sup> defines one type of ‘statutory nuisance’ as “*any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance*”. Where a local authority is satisfied that a statutory nuisance exists, or is likely to occur or recur, it must serve an abatement notice. Failure to comply with an abatement notice is an offence. However, it is a defence if an operator employs the best practicable means to prevent or to counteract the effects of the nuisance.

### 2.3 Policy

#### 2.3.1 UK Air Quality Strategy

As described above, the Environment Act 1995 requires the UK Government to produce a national AQS. The AQS establishes the UK framework for air quality improvements. Measures agreed at the national and international level are the foundations on which the strategy is based. The first Air Quality Strategy was adopted in 1997<sup>9</sup> and replaced by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland published in January 2000.<sup>10</sup> The 2000 Strategy has subsequently been replaced by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007.<sup>11</sup>

The Environment Act 1995 requires that the Environment Agency has regard to the AQS in exercising its pollution control functions. Local Authorities are also required to work towards the Strategy’s objectives prescribed in regulations for that purpose.

The air quality objectives in the AQS are a statement of policy intentions and policy targets. As such, there is no legal requirement to meet these objectives except in as far as they mirror any equivalent legally binding Limit Values in EU Directives and English Regulations.

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<sup>6</sup> Statutory Instrument. (2000), ‘Air Quality (Wales) Regulations’, No. 1940 (W.138). Queen’s Printer of Acts of Parliament.

<sup>7</sup> Statutory Instrument. (2002), ‘Air Quality (Amendment) (Wales) Regulations’, No. 3180 (W.298). Queen’s Printer of Acts of Parliament.

<sup>8</sup> Parliament of the United Kingdom. (1990), ‘Environmental Protection Act’, Chapter 43. Queen’s Printer of Acts of Parliament.

<sup>9</sup> Department for Environment Food and Rural Affairs. (March 1997), ‘The United Kingdom National Air Quality Strategy’, Cm 3587, Department for Environment Food and Rural Affairs.

<sup>10</sup> Department for Environment Food and Rural Affairs. (January 2000), ‘The Environment Strategy for England, Scotland, Wales and Northern Ireland – Working Together for Clean Air’, Cm 4548, Department for Environment Food and Rural Affairs.

<sup>11</sup> Department for Environment Food and Rural Affairs. (July 2007), ‘The Air Quality Strategy for England, Scotland, Wales and Northern Ireland’, Cm 7169, Department for Environment Food and Rural Affairs.

### 2.3.2 National Planning Policy

Planning Policy Wales (PPW) Edition 9<sup>12</sup> sets out the land use planning policies of the Welsh Assembly. The planning system has been implemented to regulate development of land in Wales to protect public interest, protect natural and historic environments and support sustainable development. PPW notes that:

*“Where pollution considerations, which may be relevant to a pollution control authorisation or licence or result from the need to comply with any statutory environmental quality standards or objectives, affect the use and development of land they can be material planning considerations. This provision extends to air quality objectives set out under Part IV of the Environment Act 1995 and the local authority’s action plans for Air Quality Management Areas”.*

PPW places development controls on air as an attempt to improve air quality. PPW states that any air quality consideration that relates to land use and its development is capable of being a material planning consideration. However, it specifies that compliance with statutory air quality objectives is a material planning consideration and notes that effects on air quality are likely to be particularly important with respect to:

- “Location, taking into account such considerations as the reasons for selecting the chosen site itself
- Impact on health and amenity
- The risk and impact of potential pollution from the development, insofar as this might have an effect on the use of other land and the surrounding environment (the environmental regulatory regime may well have an interest in these issues, particularly if the development would impact on an air quality management area or a SAC)
- Prevention of nuisance
- Impact on the road and other transport networks, and in particular on traffic generation
- The need, where relevant, and feasibility of restoring the land (and water resources) to standards sufficient for an appropriate after use. (Powers under the Pollution Prevention and Control Act 1999 require an operator to return a site to a satisfactory state on surrender of an Integrated Pollution Prevention and Control Permit).”

PPW is supplemented by 21 topic based Technical Advice Notes (TANs). TAN 18: Transport<sup>13</sup> paragraph D.14 states that the Transport Implementation Strategy (TIS) should:

*“Contribute towards the aims of the development plan. This includes any specific development plan objectives to overcome particular localised difficulties e.g. ... an air quality management area.”*

### 2.3.3 Local Planning Policy

#### 2.3.3.1 Rhondda Cynon Taf County Borough Council (RCTCBC) Local Development Plan 2006-2021

The RCTCBC Local Development Plan 2006-2021<sup>14</sup> is the local development framework for the area and was formally adopted on 2<sup>nd</sup> March 2011. The plan contains one policy relating to air quality, this is Policy AW10 – Environmental Health and Public Health, this policy states:

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<sup>12</sup> Welsh Assembly Government. (November 2016), ‘Planning Policy Wales’, Edition 9. [<http://gov.wales/docs/desh/publications/160104planning-policy-wales-edition-8-en.pdf>]

<sup>13</sup> Welsh Assembly Government. (March 2007). Planning Policy Wales Technical Advice Note 18: Transport. The Publications Centre, National Assembly for Wales.

<sup>14</sup> Rhondda Cynon Taf (2011), Local Development Plan 2006-2021.

*“Development proposals will not be permitted where they would cause or result in a risk of unacceptable harm and / or local amenity because of:-*

1. *Air Pollution;*
2. *.....*

*unless it can be demonstrated that measures can be taken to overcome any significant adverse risk to human health, the environment and / or impact upon local amenity.”*

## 2.4 Summary

This Section has identified the legislation and policy framework relevant to the assessment. On the basis of the above, applicable numerical standards are summarised in Table 1. It should be noted that the air quality objectives only apply in locations of relevant exposure i.e. where members of the public might reasonably be exposed to pollutants for the respective averaging periods. Table 2 provides details of where the objectives should and should not apply and therefore the types of receptors that are relevant to the assessment.

**Table 1: Relevant air quality standards**

Pollutant	Averaging period	Air quality standards	Attainment date	Pollutant
		Concentration	Allowance	
Nitrogen dioxide (NO <sub>2</sub> )	1 hour	200µg/m <sup>3</sup>	18 per calendar year <sup>(e)</sup>	31 December 2005 <sup>(a)(b)</sup> 1 January 2010 <sup>(c)</sup>
	Annual	40µg/m <sup>3</sup>	-	31 December 2005 <sup>(a)(b)</sup> 1 January 2010 <sup>(c)(d)</sup>
Particulates (PM <sub>10</sub> )	24 hour	50µg/m <sup>3</sup>	35 per calendar year <sup>(f)</sup>	31 December 2004 <sup>(a)(b)</sup> 1 January 2005 <sup>(c)</sup>
	Annual	40µg/m <sup>3</sup>	-	31 December 2004 <sup>(a)(b)</sup> 1 January 2005 <sup>(c)(d)</sup>
Particulates (PM <sub>2.5</sub> )	Annual	25µg/m <sup>3</sup>	-	2020 <sup>(b)(g)</sup> 2010 <sup>(c)(h)</sup>

- Notes:
- <sup>(a)</sup> Air Quality (Wales) Regulations 2000 as amended.
  - <sup>(b)</sup> Air Quality Strategy 2007.
  - <sup>(c)</sup> EU Directive 2008/50/EEC on ambient air quality and cleaner air for Europe and The Air Quality Standards Regulations 2010.
  - <sup>(d)</sup> Derogations (time extensions) to 1 January 2015 were agreed by the EU for meeting the NO<sub>2</sub> limit values in some zones/agglomerations. In March 2011, the Commission agreed the UK's revised application for a time extension for meeting the daily PM<sub>10</sub> limit value, granting a "temporary and conditional exemption" for the Greater London urban area.
  - <sup>(e)</sup> Can be expressed as the 99.79th percentile of 1 hour means.
  - <sup>(f)</sup> Can be expressed as the 90.41st percentile of 24 hour means.
  - <sup>(g)</sup> Also a 'Target' of 15% reduction in annual mean concentrations at urban background between 2010 and 2020.
  - <sup>(h)</sup> Also a 'Target' of 20% reduction in annual mean concentrations at urban background between 2010 and 2020.

**Table 2: Locations where the air quality objectives apply**

Averaging period	Objectives should apply at:	Objectives should not apply at:
Annual	<p>All locations where members of the public might be regularly exposed.                      Building façades of residential properties, schools, hospitals, care homes etc.</p>	<p>Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence.                      Gardens of residential properties.                      Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.</p>
24 hour	<p>All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.</p>	<p>Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.</p>
1 hour	<p>All locations where the annual mean and 24 and 8-hour mean objectives apply.                      Kerbside sites (for example, pavements of busy shopping streets).                      Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more.                      Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.</p>	<p>Kerbside sites where the public would not be expected to have regular access.</p>

Source: LAQM TG16<sup>15</sup>

<sup>15</sup> Department for Environment, Food and Rural Affairs (2016), Local Air Quality Management – Technical Guidance (16).

## 3 Methodology

### 3.1 Overview

This Section sets out the approach for the assessment of impacts on air quality during the construction phase for the proposed development. As discussed within Section 1.1, there are no operational impacts associated with the proposed development.

### 3.2 Construction Phase

#### 3.2.1 Overview

At this time, it is anticipated that the construction phase is expected to last approximately 2 and a half years (9 months for demolition and under 2 years for construction).

Construction activities can result in temporary effects from dust. 'Dust' is a generic term which usually refers to particulate matter in the size range 1-75 microns in diameter; the most common impacts from dust emissions are soiling and increased ambient PM<sub>10</sub> concentrations<sup>15</sup>. Dust can be mechanically transported either by wind or re-suspension by vehicles. It can also arise from wind erosion on material stock piles and earth moving activities. Further details on the construction dust assessment methodology can be found within Section 3.2.2, below.

#### 3.2.2 Construction Dust Assessment

Guidance from the IAQM<sup>1</sup> recommends splitting the construction phase into four separate source categories and determining the dust risk associated with each of these individually. This assessment has determined the risk of each of the following source categories:

- Demolition;
- Earthworks;
- Construction; and
- Track out (the transport of dust and dirt onto the public road network).

The risk of each source for dust effects is described as 'Negligible', 'Low Risk', 'Medium Risk' or 'High Risk' depending on the nature and scale of the construction activities and the proximity of sensitive receptors to the construction site boundary. The assessment is used to define appropriate mitigation measures to reduce the level of effects such that they are not significant.

The assessment considers three separate effects from dust:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM<sub>10</sub>.

Step 1 of the assessment applies screening criteria to the proposed development which states that an assessment will normally be required where there is:

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

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

No further assessment is required if there are no receptors within the defined boundaries.

Step 2A of the assessment is to determine the overall dust-raising magnitude (‘small’, ‘medium’ or ‘large’) from each of the dust sources identified (demolition, earthworks, construction and trackout) in accordance with the criteria outlined in Table 10 in Appendix A.

Step 2B of the assessment involves defining the sensitivity of receptors (as high, medium or low) for each dust effect (dust soiling, human health and ecosystem impacts) in accordance with the criteria presented within Table 11 in Dust Assessment.

The sensitivity of the surrounding area is then determined for each dust effect by considering the criteria in Table 12, Table 13 and Table 14 in Appendix A. Criteria presented in these tables are based on the distance of the source to the closest receptors, the receptor sensitivity, and in the case of PM<sub>10</sub> effects, the local background concentration. The highest level of area sensitivity defined for each dust effect has been used in the assessment.

The final step of the assessment (Step 2C) combines the dust emission magnitude and the sensitivity of the area, to determine the overall dust risk category for each dust source and for each dust effect. The criteria used to define the dust risk category for each dust source and effect is presented within Table 15, Table 16, Table 17 and Table 18 in Appendix A.

The dust risk category defined for each dust source and effect is then used to determine appropriate development specific mitigation measures to be adopted. It should be noted that in line with the recommendations of IAQM guidance, significance is only assigned to construction effects following mitigation.

At the time of assessment, no detailed construction information was available, as such reasoned assumptions were used to conduct the assessment. These assumptions were based on the size of the existing structures on site, the proposed development site area, the development proposals and estimations of Heavy Duty Vehicle (HDV) movements.

Results of the construction phase assessment are presented in Section 5.

### 3.2.3 Construction Site Plant Emissions

Construction work requires the use of a range of site plant, such as excavators, piling equipment, cranes and on-site generators. All construction plants have an energy demand and some may result in direct emissions to air from exhausts. Guidance from the IAQM<sup>1</sup> notes that effects from exhaust emissions from on-site plant are unlikely to be significant. Given the local and temporary nature of site plant, effects of plant emissions on local air quality are considered to be of negligible significance relative to the surrounding road traffic contributions on the local road network. Construction plant emissions have therefore not been assessed further.

Nevertheless, mitigation measures to reduce the effect of site plant on local air quality are presented in Section 6.

### 3.2.4 Construction Road Traffic Emissions

EPUK and IAQM<sup>2</sup> guidance indicates that assessment of traffic emissions is only likely to be required for large, long-term construction sites that will generate an additional annual average daily traffic flow of 500 Light Duty Vehicles (LDV) movements or greater per day or changes in

Heavy Duty Vehicle (HDV) movements greater than 100 per day. Based upon the size of the proposed development, it is not anticipated that LDV or HDV flows would exceed these thresholds at any point during the construction phase. On this basis, no further consideration has been given to the effects of off-site construction traffic on ambient air quality.

### 3.3 Operational Phase

Traffic data supplied by Mott MacDonald traffic team was interrogated to identify the requirement for a traffic operational phase assessment. Screening thresholds set out in Environmental Protection UK (EPUK) and IAQM's '*Land-use planning & development control: planning for air quality*'<sup>1</sup>, 2017 were used to identify if an operational assessment was required. Changes in traffic flow resulting from the proposed development are below these screening thresholds, and as such, no assessment of the operational phase traffic is therefore required.

The proposed development could potentially contain stationary and moving diesel locomotives. Defra's Local Air Quality Management: Technical Guidance (LAQM (TG16))<sup>5</sup> provides criteria to determine whether a specific assessment of emissions from stationary or moving locomotives should be carried out and are summarised as:

- for stationary locomotives:
  - locations where diesel or steam locomotives are regularly (for three or more times a day) stationary for periods of 15 minutes or more; and
  - there is the potential for relevant exposure of individuals within 15 metres of the locomotives.
- for moving locomotives:
  - relevant exposure within 30 metres of the railway tracks; and
  - background annual mean NO<sub>2</sub> concentration is above 25 µg/m<sup>3</sup>.

The proposed development could potentially contain locations where diesel locomotives are stationary for 15 minutes or more, three times a day. There will not however be any relevant exposure within 15 m.

With regards to moving locomotives, 2017 background data from the Defra AIR website indicates that the background NO<sub>2</sub> is less than 17 µg/m<sup>3</sup> and therefore below the level requiring further assessment. There is also no relevant exposure within 30 m.

No further assessment of locomotive emissions has therefore been carried out for the proposed development.

## 4 Baseline Conditions

### 4.1 Overview

Information on air quality within the UK is available from a variety of sources including Local Authorities, national network monitoring sites and other published sources. The primary sources of data examined in this assessment are from RCTCBC, Cardiff City Council (CCC) and Defra. The CCC borough is in close proximity to the development site, the data has therefore been examined along with RCTCBC data.

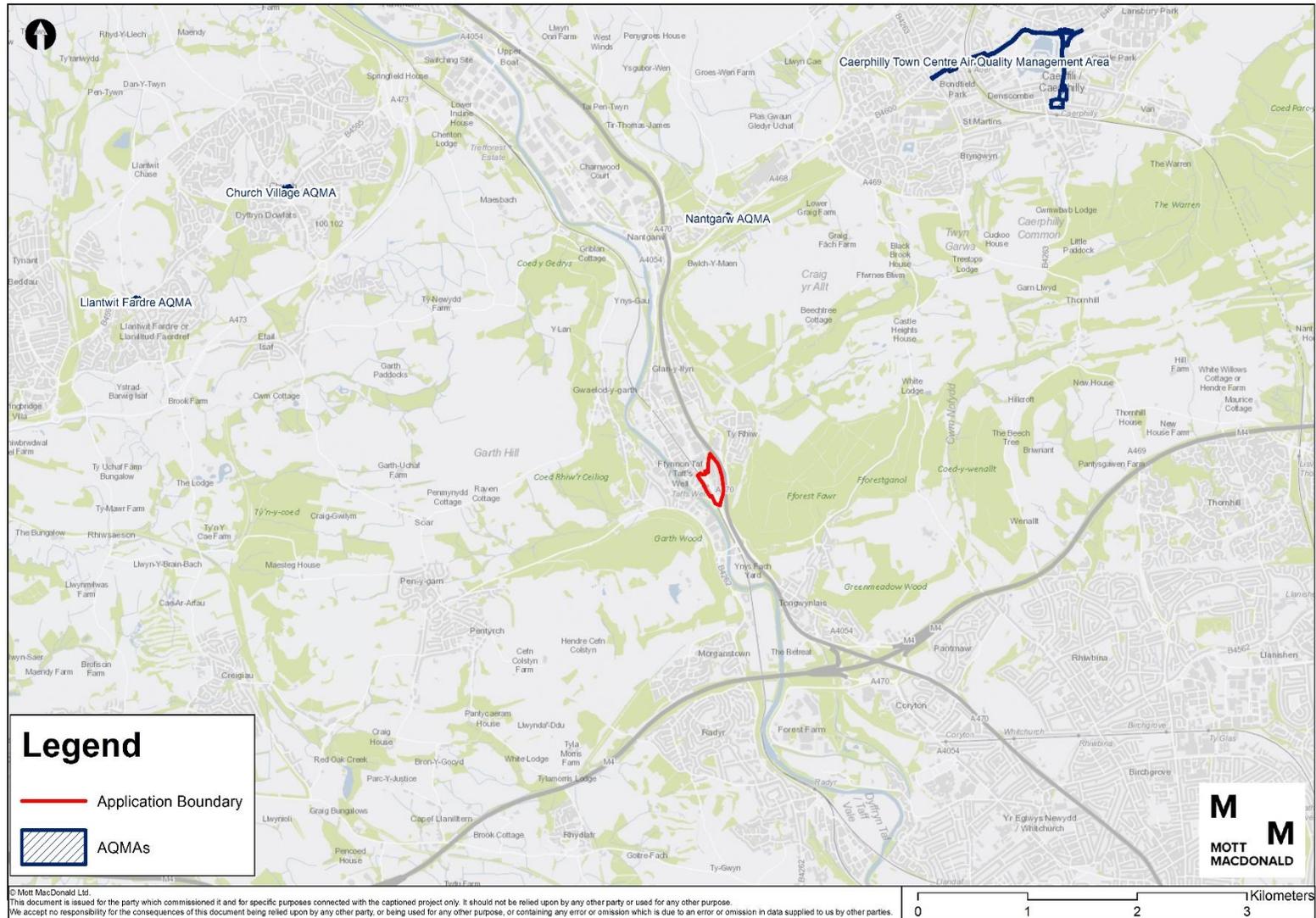
### 4.2 Local Authority Review and Assessment

RCTCBC began their Review & Assessment process back in 1998. Early rounds of assessment concluded that no exceedances of the relevant national air quality objectives were identified. Since 2007, AQMAs for breaches of the NO<sub>2</sub> annual mean objective and the NO<sub>2</sub> 1-hour mean have been designated and expanded. There are now currently 15 AQMAs declared within RCTCBC, the closest of which is the Nantgarw AQMA, approximately 2.1 km north.

CCC began reviewing air quality within their district in 2000. Since this time, various rounds of Review & Assessment work have taken place and a number of problem areas identified. Focus of this work however has been undertaken in the central areas of Cardiff. There are now currently four AQMAs declared within CCC, the nearest of which is the Llandaff AQMA approximately 5.3 km south east.

Figure 2 presents the closest AQMAs to the proposed development.

**Figure 2: Location of Nearest AQMAs to the Proposed Development**



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## 4.2.1 Local Authority Automatic Monitoring

### 4.2.1.1 Overview

RCTCBC undertakes automatic monitoring for NO<sub>2</sub> at four sites within the district and PM<sub>10</sub> at four other sites within the district. The majority of these sites are located further than 8 km from the proposed development site and are not considered representative of site conditions and they are not considered further. The GEAES/NO<sub>x</sub> and RCTCBC/31/PM<sub>10</sub> monitoring stations are located approximately 2.5 km north of the proposed development, the results from these monitoring stations are presented within Section 4.2.1.2 and Section 4.2.1.3, below.

CCC undertakes automatic monitoring for NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, CO and O<sub>3</sub> at one monitoring site, this site is located on Frederick Street in Cardiff City Centre. This site is not considered to be representative of site conditions and is therefore not considered further.

### 4.2.1.2 Nitrogen Dioxide

The results from the GEAES/NO<sub>x</sub> monitoring station for the NO<sub>2</sub> annual mean and 1-hour mean objective are presented in Table 3 below.

**Table 3: Automatic Monitoring Data for Annual Mean and 1-hour NO<sub>2</sub> Objectives**

Site Name	Site Classification	Within AQMA	Distance to Proposed Development (km)	National Grid Reference		Annual Mean NO <sub>2</sub> Concentration (µg/m <sup>3</sup> ) (Values in brackets shows number of hours above 200 µg/m <sup>3</sup> in line with 1-hour mean objective) <sup>(a)</sup>		
				X	Y	2014	2015	2016
GEAES/NO <sub>x</sub>	Roadside	No	2.5	313031	185931	34.7 (-) <sup>(c)</sup>	31.8 (0)	13.3 (0) <sup>(b)</sup>

Source: <sup>(a)</sup> RCTCBC Air Quality Progress Report (2016) and via email from RCTCBC

Note: <sup>(b)</sup>Annual data capture is 99.3%, concentration lower than expected and RCTCBC indicate a fault is suspected with the analyser.

<sup>(c)</sup>Insufficient data capture (below 85%)

Bold indicates and exceedance of an objective

The monitoring results from the GEAES/NO<sub>x</sub> monitoring station show that NO<sub>2</sub> annual mean concentration is below the objective and has shown a decline in concentrations from 2014 to 2016. The concentration measured for 2016 however is substantially lower than the previous years and RCTCBC have indicated that they believe there has been a fault with the monitoring station.

There were no monitored exceedances of the 1-hour NO<sub>2</sub> objective at the GEAES/NO<sub>x</sub> monitoring station in 2015 or 2016, the data also shows there were no hours above 200 µg/m<sup>3</sup>. There was insufficient data capture at the monitoring station in 2014 to assess compliance with the 1-hour objective.

### 4.2.1.3 Particulate Matter (PM<sub>10</sub>)

PM<sub>10</sub> monitoring is undertaken at the RCTCBC/31/PM<sub>10</sub> monitoring station, the results for the PM<sub>10</sub> annual mean and 24-hour mean objectives are presented in Table 4 below.

**Table 4: Automatic Monitoring Data for Annual Mean and 24-hour Mean PM<sub>10</sub> Objectives**

Site Name	Site Classification	Within AQMA	Distance to Proposed Development (km)	National Grid Reference		Annual Mean NO <sub>2</sub> Concentration (µg/m <sup>3</sup> ) (Number of days above 50µg/m <sup>3</sup> ) <sup>(a)</sup>		
				X	Y	2014	2015	2016
RCTCBC/31/PM <sub>10</sub>	Roadside	No	2.5	313026	185940	22.9 (3)	24.1 (13)	23.9 (3) <sup>(b)</sup>

Source: <sup>(a)</sup> RCTCBC Air Quality Progress Report (2016) and via email from RCTCBC

Note: <sup>(b)</sup> Annual Data Capture for 2016 is 42.5%

Bold indicates an exceedance of the objective

There were no exceedances of the annual mean or 24-hour mean objectives for PM<sub>10</sub> in 2014, 2015 and 2016. Data capture for 2016 for the RCTCBC/31/PM<sub>10</sub> station was only 42.5%, however the results measured are similar to those recorded in 2014 and 2015.

#### 4.2.2 Local Authority Diffusion Tube Monitoring

RCTCBC undertakes diffusion tube monitoring at 67 sites within the district. Table 5 presents the most recent results for diffusion tubes within the proposed development study area.

**Table 5: Diffusion Tube Monitoring Data for NO<sub>2</sub>**

Site ID	Site Name	Site Classification	Distance to Proposed Development	Data Capture 2016	Within AQMA	National Grid Reference		Annual Mean Concentration (µg/m <sup>3</sup> )		
						X	Y	2014	2015	2016
76	Heol-y-Gors Nantgarw	Roadside	2.1	91.7	N	312620	185620	34.4	32.9	37.2
8	Parc-Y-Nant, Nantgarw	Roadside	2.1	100	Y	312623	185607	<b>43.1</b>	<b>43.9</b>	<b>46.7</b>
129	Main Road, Church Village	Roadside	4.5	100	N	308687	185905	29.2	30.9	36.9
103	Ty Mawr Farm, Efail Isaf	Rural	3.6	66.7	N	308817	183891	8.4	8.9	11.7 <sup>(c)</sup>

Source: <sup>(a)</sup> RCTCBC Air Quality Progress Report (2016) and via email from RCTCBC

Note: <sup>(a)</sup> All results have been bias adjusted

<sup>(c)</sup> Data has been annualised

Bold indicates exceedance of objectives

There is currently no monitoring undertaken by RCTCBC adjacent to the proposed development. The nearest diffusion tubes to the proposed development are located at Heol-y-

Gors Nantgarw (ID 76) and Parc-Y-Nant, Nantgarw (ID 8) approximately 2.1 km north of the site. Table 5 highlights that the concentrations at Heol-y-Gors (ID 76) are below the NO<sub>2</sub> annual mean objective and the concentrations at Parc-Y-Nant (ID 8), located within the Nantgarw AQMA, exceeds the NO<sub>2</sub> annual mean objective. Parc-Y-Nant (ID 8) is located close to a busy junction with the A468 (Caerphilly Road) and is therefore not representative of the proposed development.

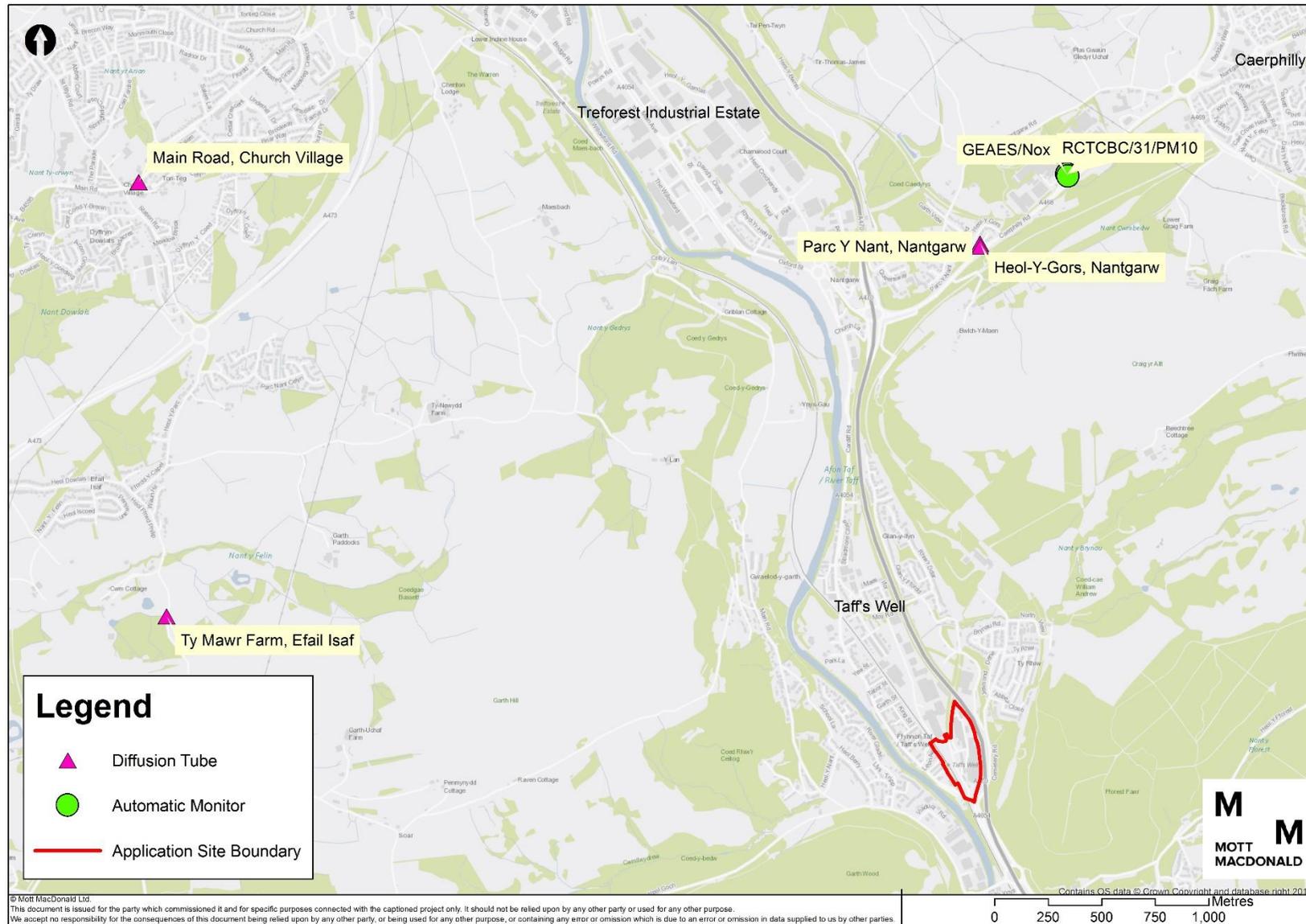
Ty Mawr Farm, Efail Isaf (ID 103) is a rural site located 3.6 km west of the proposed development, the concentrations from this tube are well below the NO<sub>2</sub> annual mean objective. Main Road, Church Village (ID 129) is located approximately 4.5 km north west of the proposed development. Main Road, Church Village (ID 129) is considered to be the most representative in its setting and proximity to major roads to the proposed development and concentrations are below the NO<sub>2</sub> annual mean objective.

A three-month project specific diffusion tube survey has been commissioned around the proposed development between July 2017 and September 2017. At time of writing however, no data is available.

CCC undertakes diffusion tube monitoring at 78 locations within the Cardiff borough, these tubes are all located within the main arterial road network of Cardiff and are therefore not representative of site conditions, these tubes have not been considered further.

Figure 3 shows the locations of the monitoring sites used to characterise the baseline.

Figure 3: RCTCBC Monitoring Locations



### 4.3 Defra Projected Background Concentrations

Defra provides estimates of background pollution concentrations for NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> across the UK for each 1 km grid square for every year from 2013 to 2030. Future year projections have been developed from the base year of the background maps, which is currently 2013. The maps include a breakdown of background concentrations by emission source, including road and industrial sources which have been calibrated against 2013 UK monitoring data.

The background concentrations for the 1 km grid square containing the proposed development in 2017 are presented in Table 6 below. The data shows background concentrations are all below the relevant objectives.

**Table 6: Defra projected background concentrations of NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> for proposed development site in 2017 (µg/m<sup>3</sup>)**

1km Grid Square Location (OS Grid Reference)		2017			
X	Y	NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
312,500	183,500	23.4	16.5	15.7	11.0

Source: <https://uk-air.defra.gov.uk/data/laqm-background-maps>

#### 4.3.1 Summary

There is no RCTCBC monitoring carried out close to the proposed development, however review of nearby, representative monitoring concludes that there are unlikely to be any exceedances of the NO<sub>2</sub> or PM<sub>10</sub> in close proximity to the proposed development. The Defra predicted background concentrations are also low in the area and confirm that concentrations do not exceed the relevant pollutant objectives.

## 5 Potential Impacts

### 5.1 Overview

This Section presents the potential impacts predicted to occur during the construction and demolition phases of the proposed development.

### 5.2 Construction

#### 5.2.1 Construction Dust Assessment

The first step is to identify the dust emission magnitude from the proposed development. The magnitude and sensitivity descriptors that have been applied to assess the overall effect of the construction phase are presented in Appendix A.

Table 7 presents a summary of the dust emission magnitude assigned to each construction activity based on the descriptors presented in Table 10 in Appendix A.

**Table 7: Dust Emission Magnitude**

Activity	Dust Emission Magnitude	Justification
Demolition	Large	Existing structure building volumes estimated to be 153,068 m <sup>3</sup> .
Earthworks	Large	Site area is approximately 36,750 square metres.
Construction	Medium	Potential for dusty construction materials. Building volume unlikely to be greater than 100,000m <sup>3</sup> .
Trackout	Medium	Heavy duty vehicles (HDVs) estimated at between 10-50 movements per day (annual daily average).

The next step is to determine the sensitivity of receptors to dust soiling and PM<sub>10</sub>. This is carried out by counting the number of receptors within a range of distance bands and defining the annual mean PM<sub>10</sub> concentration. Figure 4 presents the dust assessment buffers used for determining the proximity of sensitive receptors to the proposed development. There are no ecological receptors within 50 m of the proposed development or 50 m of the route used by construction vehicles on the public highway, therefore construction effects on ecological receptors have not been considered further.

Figure 4: Construction Dust Assessment Buffers

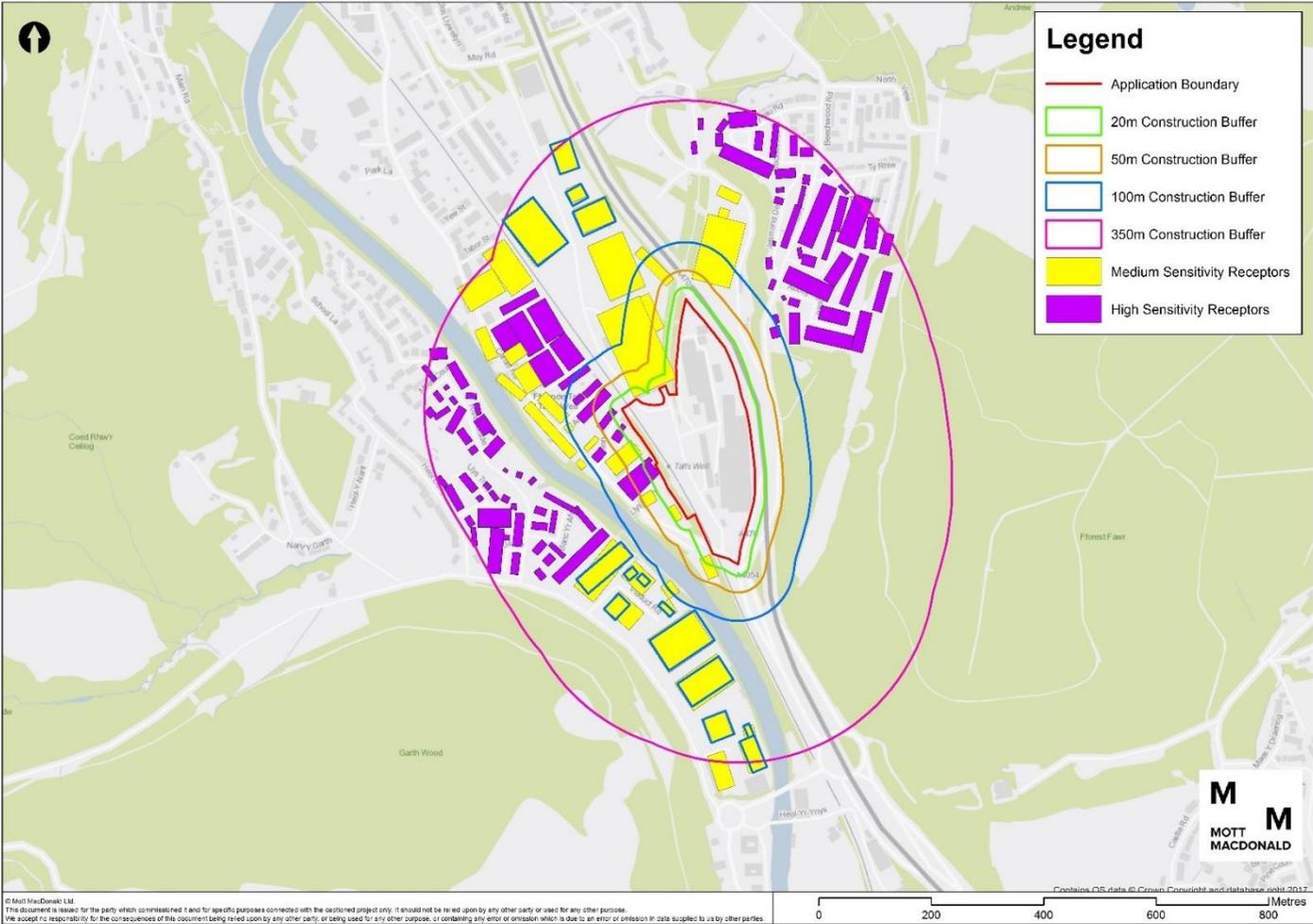
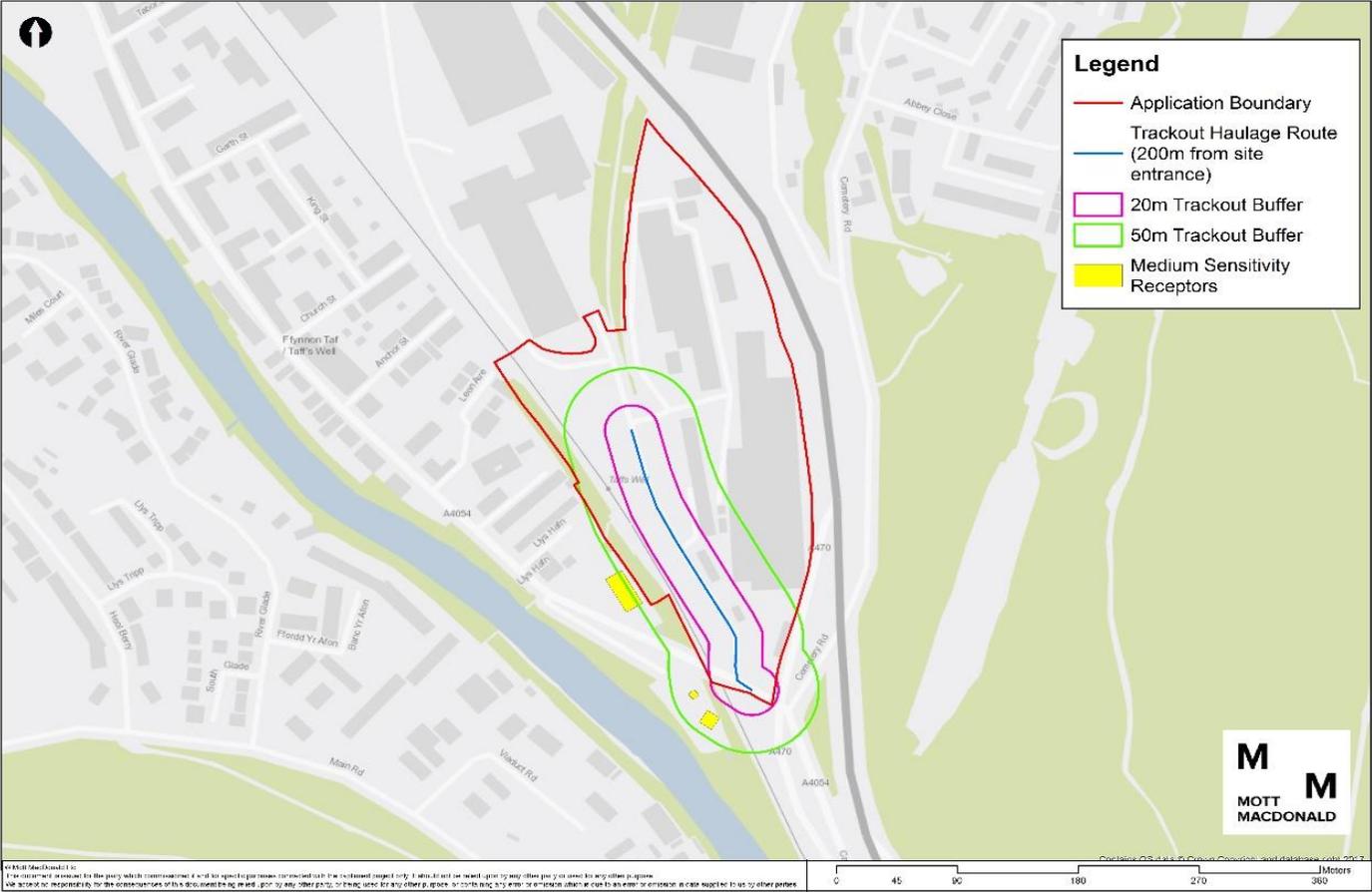


Figure 5: Construction Dust Trackout Buffers



Note: Designated haulage route assumed to be south along Fford Bleddyn to junction with A4054, then south along the A4054 to junction with A470 (towards the M4)

Table 8 presents the sensitivity of the area to effects caused by construction activities and is based on the criteria presented in Table 11, Table 12 and Table 13 presented within Appendix A.

**Table 8: Area Sensitivity**

Activity	Dust soiling		Health effects of PM <sub>10</sub>	
	Sensitivity	Comment	Sensitivity	Comment
Demolition	Medium	1-10 high sensitivity receptors (residential dwellings) less than 20m from the proposed site boundary	Low	Background annual mean PM <sub>10</sub> concentration on site is less than 24µg/m <sup>3(a)</sup> . There are 1-10 high sensitivity receptors (residential dwellings) less than 20m from the proposed site boundary
Earthworks	Medium		Low	
Construction	Medium		Low	
Track Out	Low	>1 medium sensitivity receptors (places of work) less than 50m from the proposed trackout boundary	Low	Background annual mean PM <sub>10</sub> concentration on site is less than 24µg/m <sup>3(a)</sup> . There are 1-10 medium sensitivity receptors (places of work) less than 50m from the proposed trackout boundary

<sup>(a)</sup> Annual mean PM<sub>10</sub> concentration taken from Defra background pollutant concentrations presented in Table 6.

The overall risk of receptors to dust soiling effects and PM<sub>10</sub> effects are presented in Table 9. Risk is based on the criteria presented in Appendix A.

**Table 9: Summary of the Risk of Construction Effects**

Activity	Dust Soiling Effects	PM <sub>10</sub> Effects
Demolition	High Risk	Medium Risk
Earthworks	Medium Risk	Low Risk
Construction	Medium Risk	Low Risk
Track Out	Low Risk	Low Risk

As presented in Table 9, dust soiling effects for the proposed development are assessed to be ‘High Risk’ for demolition only, with ‘Medium Risk’ for earthworks and construction phases with ‘Low Risk’ for track out. PM<sub>10</sub> effects are deemed to be ‘Medium Risk’ for demolition and ‘Low Risk’ for earthworks, construction and trackout without mitigation. Mitigation measures appropriate for the proposed development have been presented in Section 6 and should be incorporated within a Construction Environmental Management Plan (CEMP) to reduce the predicted risk to ‘Low – Negligible’.

## 6 Mitigation Measures

### 6.1 Construction Phase

In terms of dust soiling the construction phase activities are predicted to have a 'High Risk' for demolition, a 'Medium Risk' for earthworks and construction and a 'Low Risk' for trackout without mitigation. In terms of PM<sub>10</sub> effects activities are predicted to have a Medium Risk for demolition and a Low Risk for earthworks, construction and trackout. Best practice mitigation measures should be introduced to reduce the risk to 'Low - Negligible and should include techniques such as those outlined in IAQM guidance. These are presented below:

- General
  - Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
  - Display the name and contact details of person(s) accountable for air quality and dust issues on the application site boundary.
  - Display head or regional office contact information.
  - Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the local authority.
  - Record all dust and air quality complaints, identify causes and take appropriate action and record measures to reduce emissions.
  - Make the complaints log available to local authority when asked.
  - Carry out regular on and off-site inspections, especially where receptors are to monitor dust and record inspection results. An inspection log should be made available to the local authority when asked.
  - Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions.
  - Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.
  - Plan site layout so that machinery and dust causing activities are away from receptors, as far as is possible.
  - Erect solid screens or barriers around dusty activities or the application site boundary that are at least as high as any stockpiles on site. Keep clean using wet methods.
  - Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
  - Avoid site runoff of water or mud. A record of any site run off should be kept and actions to prevent reoccurrence.
  - Keep site fencing, barriers and scaffolding clean using wet methods.
  - Cover, seed or fence stockpiles to prevent wind whipping.
  - Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques.
  - Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water supply where possible).

- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages.
- No burning of waste.
- Reuse and recycle waste to reduce dust from waste materials.
- Operating vehicle/machinery
  - Ensure all vehicles switch off engines when stationary - no idling vehicles.
  - Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
  - Impose and signpost a maximum speed limit.
  - Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
  - Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing).
- Demolition
  - Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
  - Ensure effective water suppression is used during demolition operations.
  - Avoid explosive blasting, using appropriate manual or mechanical alternatives.
  - Bag and remove any biological debris or damp down material before demolition.
- Earthworks
  - Use Hessian, mulches or trackifiers where it is possible to re-vegetate or cover with topsoil, as soon as practicable.
  - Only remove the cover in small areas during work and not all at once.
- Construction
  - Avoid scabbling (roughening of concrete surfaces) if possible.
  - Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
  - Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overflowing during delivery.
- Trackout
  - Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
  - Avoid dry sweeping of large areas.
  - Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.
  - Record all inspections of haul routes and any subsequent action in a site log book.
  - Implement a wheel washing system.

## 6.2 Operation Phase

No mitigation measures are required for the operation of the proposed development.

## 7 Conclusion

This report provides an air quality assessment of the construction phase of the proposed development.

The baseline conditions on site have been characterised using monitoring data obtained from RCTCBC and 2016 Air Quality Progress Reports, [www.welshairquality.co.uk](http://www.welshairquality.co.uk) and via email from RCTCBC and CCC air quality officers. The proposed development is not located in an AQMA, closest one is the Nantgarw AQMA which is 2.1 km north and based on a review of available monitoring data, there are unlikely to be any exceedances of the NO<sub>2</sub> or PM<sub>10</sub> in close proximity to the proposed development.

A qualitative assessment of construction dust effects including the identification of existing sensitive receptors has been undertaken for the proposed development. This qualitative assessment predicts a 'High Risk' to nearby sensitive receptors for dust soiling during demolition works but overall cause a 'Low to Medium Risk' for the earthworks, construction and trackout phases of construction. However, following the appropriate implementation of the mitigation measures listed in Section 6.1, dust risk will likely reduce to 'Low – Negligible'.

Traffic changes associated with the proposed development are below the screening thresholds set out in the EPUK and IAQM guidance, and as such, no assessment of the operational phase is therefore required. With regards to potential emissions from rolling stock, there is no relevant exposure and therefore has not been considered within this assessment.

The proposed development is not considered to conflict with any national, regional or local planning policy within RCTCBC.

## A. Dust Assessment

**Table 10: Determination of dust raising magnitude**

Source	Large	Medium	Small
Demolition	Total building volume > 50,000m <sup>3</sup> , potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities > 20m above ground	Total building volume 20,000m <sup>3</sup> - 50,000m <sup>3</sup> , potentially dusty construction material, demolition activities 10-20m above ground level	Total building volume <20,000m <sup>3</sup> , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months
Earthworks	Total site area >10,000m <sup>2</sup> , potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100,000 tonnes	Total site area 2,500m <sup>2</sup> – 10,000m <sup>2</sup> , moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4m – 8m in height, total material moved 20,000 tonne – 100,000 tonne	Total site area <2,500m <sup>2</sup> , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <10,000tonne, earthworks during wetter months
Construction	Total building volume >100,000m <sup>3</sup> , piling, on site concrete batching; sandblasting	Total building volume 25,000m <sup>3</sup> – 100,000m <sup>3</sup> , potentially dusty construction material (e.g. concrete), piling, on site concrete batching	Total building volume <25,000m <sup>3</sup> , construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout	>100 HDV (>3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m	25-100 HDV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m	<25 HDV (>3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50m

Source: IAQM

**Table 11: Receptor sensitivity**

Sensitivity of Effect	High	Medium	Low
Sensitivities of people to dust soiling effects	Users can reasonably expect an enjoyment of a high level of amenity; or The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks <b>(B)</b> and car showrooms.	Users would expect a to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or The appearance, aesthetics or value of their property could be diminished by soiling; or The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Indicative examples include parks and places of work.	The enjoyment of amenity would not reasonably be expected <b>(A)</b> ; or Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or There is transient exposure, where the people or Property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.

Sensitivity of Effect	High	Medium	Low
Sensitivities of people to the health effects of PM <sub>10</sub>	<p>Locations where members of the public are exposed over a time period relevant to the air quality objective for PM<sub>10</sub> (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).<b>(C)</b></p> <p>Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.</p>	<p>Locations where the people exposed are workers <b>(D)</b>, and exposure is over a time period relevant to the air quality objective for PM<sub>10</sub> (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).</p> <p>Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM<sub>10</sub>, as protection is covered by Health and Safety at Work legislation.</p>	<p>Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks b and roads.</p> <p>Locations where human exposure is transient <b>(E)</b></p> <p>Indicative examples include public footpaths, playing fields, parks and shopping streets.</p>
Sensitivities of receptors to ecological effects <b>(F)</b>	<p>Locations with an international or national designation and the designated features may be affected by dust soiling; or</p> <p>Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain <b>(G)</b>.</p> <p>Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.</p>	<p>Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or</p> <ul style="list-style-type: none"> <li>• Locations with a national designation where the features may be affected by dust deposition.</li> <li>• Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.</li> </ul>	<p>Locations with a local designation where the features may be affected by dust deposition.</p> <p>Indicative example is a local Nature Reserve with dust sensitive features.</p>
A	People's expectations will vary depending on the existing dust deposition in the area		
B	Car parks can have a range of sensitivities depending on the duration and frequency that people would be expected to park their cars there, and the level of amenity they could reasonably expect whilst doing so. Car parks associated with work place or residential parking might have a high level of sensitivity compared to car parks used less frequently and for shorter durations, such as those associated with shopping. Cases should be examined on their own merits.		
C	This follows Defra guidance as set out in LAQM.TG(09).		
D	Notwithstanding the fact that the air quality objectives and limit values do not apply to people in the workplace, such people can be affected to exposure of PM10. However, they are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children are not normally workers. For this reason workers have been included in the medium sensitivity category.		
E	There are no standards that apply to short-term exposure, e.g. one or two hours, but there is still a risk of health impacts, albeit less certain.		
F	A Habitat Regulation Assessment of the site may be required as part of the planning process, if the site lies close to an internationally designated site i.e. Special Conservation Areas (SACs), Special Protection Areas (SPAs) designated under the Habitats Directive (92/43/EEC) and RAMSAR sites.		
G	Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.		

**Table 12: Sensitivity of the area to dust soiling effects on people and property**

Receptor Sensitivity	Number of Receptors	Distance from the source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

**Table 13: Sensitivity of the area to human health impacts**

Receptor Sensitivity	Annual Mean PM <sub>10</sub> Concentration	Number of Receptors	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m <sup>3</sup>	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m <sup>3</sup>	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m <sup>3</sup>	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg/m <sup>3</sup>	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

**Table 14: Sensitivity of the area to ecological impacts**

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

**Table 15: Risk of dust impacts - demolition**

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

**Table 16: Risk of dust impacts - earthworks**

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
Low	Low Risk	Low Risk	Negligible

**Table 17: Risk of dust impacts - construction**

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

**Table 18: Risk of dust impacts – trackout**

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

