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GLADMAN DEVELOPMENTS LTD

Land off Bangor Road, Johnstown

Air Quality Assessment

May 2013

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Air Quality Assessment

May 2013

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1 INTRODUCTION

- 1.1.1 By written instruction dated 02nd April 2012, Wardell Armstrong LLP were commissioned to undertake an air quality assessment to support an outline planning application for a proposed residential development adjacent to Bangor Road, Johnstown, Wrexham.
- 1.1.2 The proposed development site is bounded to the north by a Waste Transfer Station and open ground comprising the Bonc-yr-Hafod Country Park. The site is bounded to east by Hafod Road, beyond which lies open ground, residential properties and the A483. The site is bound to the south by the B5426 Bangor Road, beyond which lies the Hafod Landfill. To the west of the site lie open land and the Ruabon to Wrexham General railway line, beyond which lies residential properties.
- 1.1.3 The development proposals consist of up to 300 residential dwellings, with 0.29ha of employment use and a local store, as shown on the illustrative masterplan reference 4355-P-05 revision F.
- 1.1.4 This report provides a qualitative dust assessment for the earthworks and construction phase of the proposed development and mitigation measures have been recommended as appropriate. An assessment has also been made of the potential impact on air quality, due to emissions from vehicle movements, associated with the operational phase of the proposed residential development. A qualitative assessment of odour from the Hafod Landfill has also been undertaken.
- 1.1.5 Air quality impacts resulting from the proposed residential development have been assessed at a number of representative existing and proposed sensitive receptor locations.

2 PLANNING POLICY CONTEXT

2.1 Air Quality Standards and Objectives

- 2.1.1 The UK National Air Quality Strategy (NAQS) was published in March 1997 fulfilling the requirement under the Environment Act 1995 for a national air quality strategy setting out policies for the management of ambient air quality. The Strategy sets objectives for eight pollutants, which may potentially occur in the UK at levels that give cause for concern. These pollutants are: nitrogen dioxide, sulphur dioxide, carbon monoxide, lead, fine particulates (PM₁₀), benzene, 1,3-butadiene and ozone.
- 2.1.2 The Strategy was reviewed and a Review Report¹ and Consultation Document² were published by the Department of the Environment, Transport and the Regions in 1999. A revised version (The Air Quality Strategy (AQS) 2000), which supersedes the 1997 Strategy, was published in January 2000. The AQS 2000 strengthens the objectives for a number of pollutants with the exception of that for particulates, which was replaced with the less stringent EU limit value.
- 2.1.3 The objectives for the eight pollutants in the Strategy provide the basis of the implementation of Part IV of the Environment Act 1995. The Air Quality Strategy objectives for each pollutant, except ozone, were given statutory status in the Air Quality (Wales) Regulations, 2000³ and Air Quality (Wales) (Amendment) Regulations 2002⁴ ('the Regulations').
- 2.1.4 In 2007 the Air Quality Strategy was revised. This latest strategy⁵ does not remove any of the objectives set out in the previous strategy or its addendum, apart from replacing the provisional 2010 objective for PM₁₀ in England, Wales and Northern Ireland with the exposure reduction approach for PM_{2.5}. The UK Government and the Devolved Administrations have now therefore set new national air quality objectives for particulate matter smaller than 2.5µm diameter (PM_{2.5}).

¹ Department of the Environment, Transport and the Regions, January 1999. Report on the Review of the National Air Quality Strategy, Proposals to amend the Strategy.

² Department of the Environment, Transport and the Regions 1999, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. A consultation document.

³ The Air Quality (Wales) Regulations 2000. No. 1940 (Wales 138).

⁴ The Air Quality (Wales) (Amendment) Regulations 2002 No 3182 (Wales 298).

⁵ Department of Environment, Food and Rural Affairs, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. July 2007.

2.1.5 EU Directive 2008/50/EC⁶ came into force in June 2008 and was transposed into legislation in Wales as 'The Air Quality Standards (Wales) Regulations 2010'⁷. This EU Directive consolidates existing air quality legislation and provides a new regulatory framework for PM_{2.5}.

2.1.6 The current Air Quality Standards and Objectives, as set out in the Air Quality Standards (Wales) Regulations 2010, are detailed in Table 1.

Table 1: Air Quality (Wales) Regulations 2010. Summary of Current Air Quality Standards and Objectives		
Pollutant	Averaging Period	Limit Value
Sulphur Dioxide	1 hour	350µg/m ³ not to be exceeded more than 24 times a calendar year
	1 day	125µg/m ³ not to be exceeded more than 3 times a calendar year
Nitrogen Dioxide	1 hour	200µg/m ³ not to be exceeded more than 18 times a calendar year
	Calendar year	40µg/m ³
Benzene	Calendar year	5µg/m ³
Lead	Calendar year	0.5µg/m ³
PM ₁₀	1 day	50µg/m ³ not to be exceeded more than 35 times a calendar year
	Calendar year	40µg/m ³
PM _{2.5}	Calendar year	25µg/m ³ to be met by 1 st January 2015
Carbon Monoxide	Maximum 8 hour daily mean	10mg/m ³
Pollutant	Target Value for the total content in the PM₁₀ fraction averaged over a calendar year	Date by which target value should be met
Arsenic	6ng/m ³	31 st December 2012
Cadmium	5ng/m ³	31 st December 2012
Nickel	20ng/m ³	31 st December 2012
Benzo(a)pyrene	1ng/m ³	31 st December 2012

⁶ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe.

⁷ Statutory Instruments 2010 No. 1433 (W.126) The Air Quality Standards (Wales) Regulations 2010.

2.1.7 Examples of where the Air Quality Objectives should/should not apply are included in Table 2. This table is taken from Local Air Quality Management Technical Guidance document LAQM.TG (09)⁸.

Table 2: Examples of where the Air Quality Objectives should/should not apply		
Averaging Period	Objectives should apply at	Objectives should generally not apply at
Annual Mean	All background locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries, etc.	Building facades 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 or any other location where public exposure is expected to be short term.
24 hour (daily) mean 8 hour mean	All locations where the annual mean objectives would apply together with Hotels. Gardens of residential properties ¹	Kerbside sites, or any other location where public exposure is expected to be short term.
1 hour mean	All locations where the annual mean and 24 and 8-hour objectives apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks 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 to which the public might reasonably be expected to spend one hour or longer.	Kerbside sites where public would not be expected to have regular access.
15 min mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	
¹ : Such locations should represent parts of the garden where relevant public exposure is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or in front gardens although local judgement should always be applied.		

⁸ Part IV of the Environment Act 1995: Local Air Quality Management Technical Guidance 2009.

2.2 Local Air Quality Management Guidance

- 2.2.1 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, July 2007, establishes the framework for air quality improvements based on measures agreed at a national and international level. However, despite these measures, it is recognised that areas of poor air quality will remain and these should be dealt with through the Local Air Quality Management (LAQM) process using locally implemented measures.
- 2.2.2 LAQM legislation in the Environment Act 1995 requires local authorities to conduct periodic review and assessments of air quality. These aim to identify all those areas where the air quality objectives are being or are likely to be exceeded. The first round of review and assessment followed a phased approach. All Authorities were required to undertake the first stage. In those areas identified as having the potential to experience elevated levels of pollutants the authority was required to undertake a more detailed second stage review.
- 2.2.3 Where it was predicted that one or more of the air quality objectives would be unlikely to be met by the end of 2005, local authorities were required to proceed to the third stage and if necessary, declare Air Quality Management Areas (AQMAs) and make action plans for improvements in air quality in pursuit of the national air quality objectives.
- 2.2.4 In 2007 an Evaluation Report was commissioned by the UK Government and Devolved Administrations. Following this review revised LAQM Technical Guidance was published in February 2009, LAQM TG(09). This revised guidance draws together previous guidance and the recommendations of the 2007 Evaluation Report. This guidance document maintains the phased approach to review and assessment established in previous technical guidance. The intention is that local authorities should only undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded. Therefore not every authority will need to proceed beyond the first step in future rounds of review and assessment.
- 2.2.5 The first step of the Review and Assessment process is an Updating and Screening Assessment which is to be undertaken by all authorities. This aims to identify aspects that have changed since the previous round was completed. If there is a risk that these changes may be significant, then a simple screening assessment should be undertaken.

- 2.2.6 Where the screening assessment identifies a possible risk that an air quality objective may be exceeded at a location with relevant public exposure, the authority will be required to undertake a Detailed Assessment following the guidance set out in LAQM. TG(09). The aim of the Detailed Assessment should be to ascertain with reasonable certainty whether or not an exceedance of the objective will occur.
- 2.2.7 Where a Detailed Assessment indicates that any of the air quality objectives are likely to be exceeded, an Air Quality Management Area (AQMA) must be designated, or the geographical boundaries of an existing AQMA must be confirmed. An Air Quality Management Area should only be declared if a Detailed Assessment has been undertaken.
- 2.2.8 Once an AQMA has been declared the local authority is required to undertake a Further Assessment with 12 months of the declaration.
- 2.2.9 A rolling programme of Updating and Screening Assessment and Detailed Assessment based on a three-year cycle has been laid down by Defra in its TG(09) policy guidance (Defra 2009). This is supplemented by Progress Reports which are intended to maintain continuity in the LAQM process between the three-yearly cycle of Review and Assessment. Progress Reports are required in the years when the authority is not completing a USA.
- 2.3 Wrexham County Borough Council (WCBC) Local Air Quality Management Review and Assessment**
- 2.3.1 No AQMAs have currently been declared in Wrexham County Borough Council (WCBC). The findings of the WCBC 2011 updating and screening assessment concluded that the air quality standards will be complied with and that there is no need to declare an air quality management area. The proposed development site and the roads surrounding the site are therefore not located within or adjacent to an existing AQMA.
- 2.3.2 WCBC undertakes air quality monitoring within the Johnstown area and currently operates 23 nitrogen dioxide and benzene diffusion tube monitoring sites, and two automatic monitoring sites. The Victoria Road automatic site is the nearest to the proposed development and monitors NO_x, SO₂, PM₁₀ and PM_{2.5}. The Victoria Road monitoring site is located in a roadside location, approximately 4km from the proposed development.

- 2.3.3 The nearest diffusion tube to the proposed development is located in a roadside location at Gardden View on Ruabon Road, approximately 1.4km from the proposed development. The diffusion tube recorded an annual mean bias adjusted NO₂ concentration, in 2011, of 18.5µg/m³. No traffic flow information is available from the transport consultants for the roads in the vicinity of this monitoring location.

3 ASSESSMENT METHODOLOGY

3.1 Consultation

3.1.1 Consultation regarding the scope of the air quality assessment was carried out with Mr Paul Campini, Technical Officer for Environmental Protection at Wrexham County Borough Council, between 04th April and 08th May 2012. The following points were agreed:

- A construction phase assessment will be undertaken to assess the potential impact of construction phase dust at existing receptor locations. This will be undertaken in accordance with the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance' (January 2012). This assessment will include consideration of both human receptors and ecological receptors, including the Stryt las a'r Hafod Site of Special Scientific Interest (SSSI) and Johnstown Newt Sites Special Area of Conservation (SAC) located immediately adjacent to the western site boundary;
- A screening assessment will be undertaken, to consider the impact of development-generated traffic, using the guidance within the Design Manual for Roads and Bridges (DMRB). This will consider NO₂ and PM₁₀ concentrations, at existing sensitive receptor locations, to assess the potential impact of changing traffic flows as a result of the proposed development. The screening assessment will consider the baseline year (2012) and opening/future year (2019) scenarios. Existing sensitive receptor locations to be considered in the DMRB assessment were provided to Mr. Campini in an email on the 03rd May 2012 and agreed by return;
- As representative air quality monitoring data for NO₂ and PM₁₀ is not available along the routes considered in the assessment, it was agreed that background NO_x, NO₂ and PM₁₀ concentrations, for the baseline year (2012), would be obtained from the default background concentration maps, provided by Defra for use in air quality assessments. It was agreed that 2012 background concentrations would be used for all scenarios to provide a robust assessment as there is currently some concern regarding background concentrations not decreasing in line with predicted trends;

- Representative roadside air quality monitoring data is not available for the roads being considered in the assessment. It was therefore agreed that it will not be possible to undertake verification of the DMRB screening model;
- Predicted pollutant concentrations will be compared with the current air quality objectives as set out in the Air Quality Standards Regulations 2010. Changes in pollutant concentrations, as a result of the proposed development, will be calculated and compared against the Environmental Protection UK Significance Criteria detailed in the document 'Development Control: Planning for Air Quality (2010 Update)'; and
- Potential odour emissions from the Hafod Quarry Landfill will be qualitatively assessed using information regarding compliance and complaints provided by the Environment Agency and an informal odour survey to consider the potential for odour nuisance arising from the landfill site.

3.2 Earthworks and Construction Phase Assessment – Dust Emissions

3.2.1 To assess the impacts associated with dust and PM₁₀ releases, during the construction phase of the development, an assessment has been undertaken in accordance with the Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance*', January 2012.

Step 1

3.2.2 Step 1 of the assessment is to screen the requirement for a more detailed assessment. The guidance states that an assessment will normally be required where there are existing sensitive receptors within 350m of the site boundary and/or within 100m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance.

3.2.3 The exact route of the construction vehicles is not known at this stage. There are however existing sensitive receptors located within 350m of the site boundary. It is therefore, necessary to proceed to Step 2 of the assessment.

Step 2

3.2.4 Step 2 of the assessment determines the potential risk of dust arising in sufficient quantities to cause annoyance and/or health effects. The risk is related to:

- The activities being undertaken (demolition, number of vehicles and plant etc);

- The duration of these activities;
- The size of the site;
- The meteorological conditions (wind speed, direction and rainfall);
- The proximity of receptors to the activity;
- The adequacy of the mitigation measures applied to reduce or eliminate dust; and
- The sensitivity of receptors to dust.

3.2.5 The risk of dust effects is determined using three risk categories: low risk, medium risk or high risk. A site is allocated to a risk category based upon the scale and nature of the works and the proximity of receptors.

3.2.6 The risk of dust effects is determined for four types of construction phase activities, with each activity being considered separately. If a construction phase activity is not taking place on the site, then it does not need to be assessed. The four types of activities to be considered are:

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

Step 3

3.2.7 Step 3 of the assessment determines the site-specific mitigation required for each of the activities, based on the risk determined in Step 2. Mitigation measures are detailed in guidance published by IAQM, as detailed in paragraph 3.2.1, and the Greater London Authority⁹, recommended for use outside the capital by IAQM guidance. If the risk is classed as negligible, no mitigation measures beyond those required by legislation will be necessary.

Step 4

3.2.8 Step 4 assesses the significance of the dust effects on existing sensitive receptors for the four construction phase activities. The sensitivity of the area surrounding the site is assessed against the risk of the activities at the site to give rise to dust effects.

3.2.9 The significance of the effect is assessed assuming that measures to minimise dust generation are in place and therefore it is the residual impacts that are reported.

⁹ Greater London Authority (2006) The Control of Dust and Emissions from Construction and Demolition: Best Practice Guidance

Sensitive Receptors

3.2.10 The closest existing sensitive receptors to the proposed development are residential in nature and are detailed in Table 3:

Table 3: Existing Sensitive Receptors: Construction Phase Dust Assessment		
Receptor	Direction from the Site	Approximate Distance from the Site Boundary
Human Receptors		
Hafod House Nursing Home	East	57m
Hafod Cottages, Hafod, Ruabon	East	90m
3, The Hollies, Hafod, Ruabon	East	120m
Ecological Receptors		
Stryt las a'r Hafod SSSI and Johnstown Newt Sites SAC	West	Adjacent to site boundary

3.3 Qualitative Odour Assessment

3.3.1 The proposed development is located immediately to the north of Hafod Quarry Landfill, and is separated by the B5426 Bangor Road. Due to the proximity of the proposed development to the Hafod Landfill, the potential for odour emissions from the proposed landfill at the site has been qualitatively assessed.

3.4 Operational Phase Road Traffic Emissions Assessment

Modelling of Road Traffic Emissions

3.4.1 This air quality assessment has been undertaken in accordance with the revised air quality guidance document LAQM.TG(09). The road traffic emissions associated with changing vehicle movements are quantified using the methodology detailed in Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, HA207/07, May 2007 (DMRB). DMRB contains a spreadsheet identified as 'The Local Impacts Screening Method'. This spreadsheet has been used to predict air pollutant concentrations at the identified representative existing sensitive locations as well as proposed sensitive locations on site. Recommendations for mitigation are made as appropriate.

3.4.2 A DMRB assessment has been undertaken to consider the potential air quality impacts associated with the operational phase of the proposed development. The predicted impacts have been assessed against the air quality objectives and standards set out in the Air Quality Standards Regulations (2010). Changes in pollutant concentrations between 'without development' and 'with development' scenarios are also assessed against a set of significance criteria, detailed in Section 4 of this report.

3.4.3 NO₂ and PM₁₀ concentrations have been predicted for a baseline year (2012) and 'without development' and 'with development' scenarios for the opening year (2019) of the proposed development. Predictions have been made for a total of 3 scenarios:

- Scenario 1: 2012 base year;
- Scenario 2: 2019 opening year without development; and
- Scenario 3: 2019 opening year with development.

Road Traffic Data

3.4.4 The traffic data used for the DMRB air quality assessment has been provided by Ashley Helme Associates who have undertaken the transport assessment for the proposed development. The traffic data used in the air quality assessment is included in Appendix A.

3.4.5 24 hour Annual Average Daily Traffic (AADT) flows have been provided for the years 2012 (base year) and 2019 (opening year). HGV percentages and vehicle speed limits have also been provided. The roads considered in the air quality assessment are:

- A483;
- A5152 Wrexham Road;
- B5426 Bangor Road; and
- Hafod Road

3.4.6 The air quality assessment therefore comprises a cumulative assessment of road traffic both from the proposed development site and from other proposed developments in the vicinity.

Existing Sensitive Receptor Locations

3.4.7 Existing sensitive receptors (ESRs) have been selected based on their proximity to those existing routes which will be affected by the proposed development. Details of the existing sensitive receptor locations are given in Table 4 and are shown on drawing number LE11510/002.

Table 4: Existing Sensitive Receptor Locations					
Receptor	Address	Grid Reference		Roads Considered	Distance from Receptor to Road Centre(m)
		X	Y		
ESR1	1 Hafod Cottages, Hafod, Ruabon	331319	346102	Hafod Road	130
				A483	159
ESR2	Edisbury Grange, Gyfelia, Wrexham	331581	345701	Bangor Road	23
				A483	160
ESR3	18 Linley Avenue, Johnstown	330608	345985	Bangor Road	10.5

3.4.8 The representative existing sensitive receptor locations detailed in Table 4 are all residential in nature and can be considered as moderately sensitive in accordance with the sensitivity criteria detailed in Section 4 of this report.

3.4.9 The impacts of the proposed development with regard to changes in air quality have been evaluated against the air quality significance criteria contained in Section 4 of this report.

Proposed Receptor Locations

3.4.10 Detailed site layouts are not yet available; therefore it has not been possible to consider specific residential receptor locations proposed within the development. Points along transect lines parallel to Bangor Road and Hafod Road have therefore been used to provide an indication of predicted pollutant concentrations across the proposed development.

3.4.11 Pollutant concentrations at these transect points have been predicted for Scenario 3 only. It is only necessary to consider the 'with development' scenario for proposed receptor locations as they will not experience any 'without development' conditions. It is not therefore necessary to consider the changes in pollutant concentrations at the proposed receptor locations.

3.4.12 Details of the proposed receptor transect points are given in Table 5 and are shown on drawing LE11510/002.

Table 6: Proposed Sensitive Receptor Points				
Receptor Point	Distance from Site Boundary/ Centre of Road		Grid Reference	
			Easting	Northing
Transect Line 1 – Running East to West Across the Eastern Part of the Site				
T1 – 1	0m (i.e. at site boundary)		331212	345979
T1 – 2	5m		331207	345981
T1 – 3	10m		331203	345982
T1 – 4	20m		331193	345986
T1 – 5	50m		331166	345998
T1 – 6	100m		331119	346018
T1 - 7	200m		331027	346057
Transect Line 2 – Running South to North Across the Southern Part of the Site				
T2 – 1	0m (i.e. at site boundary)	5m (from centre of potential future site access off Bangor Road)	330823	345920
T2 – 2	5m	5m	330825	345924
T2 – 3	10m	5m	330827	345928
T2 – 4	20m	5m	330832	345937
T2 – 5	50m	5m	330846	345963
T2 – 6	100m	5m	330868	346008
T2 - 7	200m	5m	330915	346098

3.4.13 In accordance with the criteria detailed in Section 4 the proposed residential properties are considered moderately sensitive.

Model Verification

3.4.14 Air Quality monitoring, including the use of diffusion tubes, is undertaken at a number of locations within the Wrexham County Borough Council area. However, there are no roadside continuous analysers or diffusion tubes operating along the sections of roads for which traffic flow information is available. It has not therefore been possible to carry out verification for NO₂ or PM₁₀ concentrations, as representative monitoring data was not available in the assessment area. The uncorrected predicted pollutant concentrations are included in Appendix B.

3.4.15 No suitable monitoring data is therefore available for verification purposes and it has not been possible to undertake verification. This was agreed with Mr Paul Campini, Technical Officer at the Environmental Protection department of Wrexham County Borough Council.

3.5 Information Sources

3.5.1 The following sources of information have been used in the preparation of this report:

- Part IV Environment Act, Chapter 25, Air Quality, 1995;
- DEFRA, The UK National Air Quality Strategy, March 1997;
- The Air Quality Standards Regulations 2010;
- Department for the Environment, Food and Rural Affairs, Local Air Quality Management Technical Guidance LAQM.TG(09), published February 2009;
- Highways Agency, Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 1, Air Quality, HA/207/07, May 2007;
- Environment Protection UK (EPUK) Development Control: Planning for Air Quality (2010 Update), 2010;
- Department for Communities and Local Government, National Planning Policy Framework (NPPF) , published March 2012;
- Wrexham County Borough Council 2011 Air Quality Updating and Screening Assessment; and
- Traffic flow data, provided by Ashley Helme Associates (detailed in Appendix A).

4 ASSESSMENT OF SIGNIFICANCE

4.1 Construction Phase Assessment

4.1.1 The Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance*' (January 2012), details significance criteria for the classification of dust effects from demolition, earthworks, construction and trackout. These criteria are summarised in Tables 6-10 below.

Sensitivity of the Location

4.1.2 The sensitivity of the location is determined using the criteria detailed in Table 6.

Table 6: Examples of Factors Determining Sensitivity of an Area		
Sensitivity of Area	Human Receptors	Ecological Receptors*
Very High	Very densely populated area; More than 100 dwellings within 20m of the site; Local PM ₁₀ concentrations exceed the objective; Contaminated buildings present; Very sensitive receptors (e.g. oncology units); and Works continuing in one area of the site for more than one year.	European Designated Site.
High	Densely populated area; 10-100 dwellings within 20m of the site; Local PM ₁₀ concentrations close to the objective (e.g. annual mean 36-40µg/m ³); and Commercially sensitive horticultural land within 20m of the site.	Nationally Designated Site.
Medium	Suburban or edge of town area; Less than 10 receptors within 20m of site; and Local PM ₁₀ concentrations below the objective (e.g. annual mean 30-36µg/m ³).	Locally Designated Site.
Low	Rural or industrial area; No receptors within 20m of the site; Local PM ₁₀ concentrations well below the objective (less than 75%); and Wooded area between site and receptors.	No designations.

*Only if there are habitats that might be sensitive to dust

Demolition

- 4.1.3 The risk of dust being generated by demolition activities at the site is determined using the criteria in Table 7.

Table 7: Risk Category from Demolition Activities				
Distance to Nearest Receptor (m)*		Dust Emission Class		
Dust Soiling and PM ₁₀	Ecological	Large	Medium	Small
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 100	<20	High Risk Site	Medium Risk Site	Low Risk Site
100 – 200	20-40	Medium Risk Site	Low Risk Site	Low Risk Site
200 – 350	40-100	Medium Risk Site	Low Risk Site	Negligible
*Distances from the dust emission source. Where not known then the distance should be from the site boundary. The risk is based on the distance to the nearest receptor				

Earthworks and Construction Activities

- 4.1.4 The risk of dust being generated by earthworks and construction activities at the site is determined using the criteria in Table 8.

Table 8: Risk Category from Earthworks and Construction Activities				
Distance to Nearest Receptor (m)*		Dust Emission Class		
Dust Soiling and PM ₁₀	Ecological	Large	Medium	Small
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 50	-	High Risk Site	Medium Risk Site	Low Risk Site
50 – 100	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
100 – 200	20-40	Medium Risk Site	Low Risk Site	Negligible
200 – 350	40-100	Low Risk Site	Low Risk Site	Negligible
*These distances are from the dust emission source. Where this is not known then the distance should be from the site boundary. The risk is based on the distance to the nearest receptor				

Trackout

- 4.1.5 The risk of dust being generated by trackout from the site is determined using the criteria in Table 9.

Table 9: Risk Category from Trackout				
Distance to Nearest Receptor (m)*		Dust Emission Class		
Dust Soiling and PM ₁₀	Ecological	Large	Medium	Small
<20	-	High Risk Site	Medium Risk Site	Medium Risk Site
20 – 50	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
50 – 100	20-100	Low Risk Site	Low Risk Site	Negligible
*For trackout the distance is from the roads used by construction traffic				

Significance of Effect

- 4.1.6 Once the risk of dust being generated by earthworks, construction and trackout activities has been identified, the significance of the dust effect can be assessed using the criteria in Table 10.

Table 10: Significance of Effects for Each Activity with Mitigation			
Sensitivity of Surrounding Area	Risk of Site Giving Rise to Dust Effects		
	High	Medium	Low
Very High	Slight Adverse	Slight Adverse	Negligible
High	Slight Adverse	Negligible	Negligible
Medium	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Negligible

4.2 Operational Phase Assessment

Air Quality Significance Criteria

- 4.2.1 In order to assess the significance of the impact of the operational phase of the proposed development on local air quality, significance criteria have been used for NO₂ and PM₁₀. These criteria are detailed in Table 11 and Table 12. The criteria relate to NO₂ and PM₁₀ only, as these are the pollutants most likely to exceed the air quality objectives. The criteria are taken from Environmental Protection UK (EPUK) document 'Development Control: Planning for Air Quality (2010 Update)'.
- 4.2.2 The impact magnitude and impact descriptors in relation to specific objectives for annual mean NO₂ and PM₁₀ concentrations are detailed in Table 11.

Table 11: Definition of Impact Magnitude for Changes in Annual Mean NO ₂ and PM ₁₀ Concentration	
Magnitude of change	Annual Mean
Large	Increase/decrease >4µg/m ³
Medium	Increase/decrease 2-4µg/m ³
Small	Increase/decrease 0.4-2µg/m ³
Imperceptible	Increase/decrease <0.4µg/m ³

- 4.2.3 The EPUK document indicates that when describing an air quality impact at a specific receptor, the actual concentration at the receptor should be taken into account, in combination with the magnitude of change, using the approach detailed in Table 12. This approach is appropriate for the assessment of annual mean concentrations of NO₂ and PM₁₀ in England i.e. where the objective concentration is 40µg/m³.

Table 12: Air Quality Impact Descriptors for Changes to Annual Mean NO ₂ and PM ₁₀ Concentrations at a Receptor			
Absolute concentration in relation to objective / limit value	Change in concentration*		
	Small	Medium	Large
Increase with scheme			
Above objective/limit value with scheme (>40µg/m ³)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just below objective/limit value with scheme (36-40µg/m ³)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below objective/limit value with scheme (30-36µg/m ³)	Negligible	Slight Adverse	Slight Adverse
Well below objective/limit value with scheme (<30µg/m ³)	Negligible	Negligible	Slight Adverse
Decrease with scheme			
Above objective/limit value without scheme (>40µg/m ³)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just below objective/limit value without scheme (36-40µg/m ³)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below objective/limit value without scheme (30-36µg/m ³)	Negligible	Slight Beneficial	Slight Beneficial
Well below objective/limit value without scheme (<30µg/m ³)	Negligible	Negligible	Slight Beneficial

*An imperceptible change (see Table 11) would be described as negligible

Impact Magnitude and Receptor Sensitivity

- 4.2.4 The significance of an environmental impact for vehicular emissions is determined by the interaction of magnitude and sensitivity. The methodology for determining the sensitivity of the receptor is shown in Table 13.

Table 13: Methodology for Determining Sensitivity	
Sensitivity	Methodology
High	The location has little ability to absorb change without fundamentally altering its present character, or is of international or national importance. e.g. a hospital
Moderate	The location has moderate capacity to absorb change without significantly altering its present character, or is of high importance. e.g. a residential dwelling
Low	The location is tolerant of change without detriment to its character, is of low or local importance. e.g. an industrial development

- 4.2.5 The Impact Significance Matrix used in this assessment is shown in Table 14.

Table 14: Impact Significance Matrix			
Magnitude of Impact	Sensitivity		
	High	Moderate	Low
Substantial	Substantial Adverse/Beneficial	Substantial – Moderate Adverse/Beneficial	Substantial – Minor Adverse/Beneficial
Moderate	Substantial – Moderate Adverse/Beneficial	Moderate – Slight Adverse/Beneficial	Slight Adverse/Beneficial
Slight	Moderate – Slight Adverse/Beneficial	Slight Adverse/Beneficial	Slight – Negligible
Negligible	Negligible/Not Significant	Negligible/Not Significant	Negligible/Not Significant

5 BASELINE CONDITIONS

5.1 Qualitative Odour Assessment

5.1.1 The proposed development is located immediately to the north of Hafod Quarry Landfill, approximately 10.5m from the boundary with the landfill at the nearest point.

Odour Complaint History

5.1.2 Consultation with the Local Authority and Environment Agency Wales has confirmed that there is a history of odour complaints regarding the Hafod Landfill. Correspondence with Mr Paul Campini, Technical Officer for Environmental Protection at Wrexham County Borough Council, has confirmed that all complaints regarding the Hafod Landfill are directed to the Environment Agency in the first instance. Table 15 details the odour complaints history relating to the Hafod Quarry Landfill since November 2008:

Table 15: Odour complaints history for Hafod Quarry Landfill since November 2008*					
Month	Year				
	2008	2009	2010	2011	2012
January	-	35	11	4	7
February	-	5	21	0	6
March	-	4	11	2	3
April	-	2	7	0	-
May	-	-	2	0	-
June	-	2	3	1	-
July	-	2	0	0	-
August	-	7	2	1	-
September	-	7	3	2	-
October	-	6	3	3	-
November	6	7	1	1	-
December	35	14	4	1	-

*Contains Environment Agency information © Environment Agency and database right

5.1.3 The complaints history detailed in Table 15 shows that the majority of odour complaints received are focussed on the winter months, with a considerable reduction in complaints from 2011 onwards.

Compliance with Permit

- 5.1.4 The Hafod Quarry Landfill is operated by Cory Environmental (Central) Ltd under an environmental permit (IPPC Ref BS8621, Permission Number 3934TD) issued and regulated by the Environment Agency Wales. Information provided by the Environment Agency Wales¹⁰ has confirmed that there has been no requirement for any enforcement action to be taken against the Hafod Quarry Landfill since Cory Environmental (Central) Ltd took over the site from its previous operators in November 2008.
- 5.1.5 Compliance Assessment Reports provided by the Environment Agency Wales indicate that odour related non-compliances occurred in 2009 in relation to elevated leachate levels, leachate odour and emissions to land and groundwater. The Compliance Assessment Reports indicate that the leachate odour was likely due to opening a leachate pipe to check the pump and from a possible leachate pipe weep and that other non compliances for emissions to land and groundwater were due to gas field optimisation works and a period of heavy rainfall (overflow of groundwater and high leachate levels). No other odour related Compliance Assessment Reports were provided by the Environment Agency Wales.

Informal Odour Survey

- 5.1.6 Informal odour surveys were undertaken at the southern boundary of the proposed development with Bangor Road, nearest to Hafod Quarry Landfill on three occasions between 30th April and 03rd May 2012. As part of this survey, sniff testing was undertaken and odour report forms completed, using the example odour reporting form (sniff testing) provided as part of the H4 odour Horizontal Guidance issued by the Environment Agency. The informal odour survey indicated that odour from the landfill was generally undetectable with a very faint to faint chemical odour detected on one occasion along Hafod Road. Weather conditions were favourable for the detection of odour being dry and calm throughout the informal odour survey, with light winds and occasional gusts of wind from the direction of Hafod Landfill to the survey location. This suggests that the site is able to operate without significant release of odour.

¹⁰ Contains Environment Agency information © Environment Agency and database right

5.2 Operational Phase Road Traffic Emissions Assessment

Background Air Pollutant Concentrations

- 5.2.1 DMRB states that for local impact assessments it is necessary to specify background concentrations upon which local, traffic-derived pollution is superimposed. These may be through local long term, ambient measurements at background sites, remote from immediate sources of pollution. As an alternative to measured background levels, DMRB recommends the use of background concentrations obtained from default concentration maps, which have been prepared for use with the revised LAQM. TG(09) guidance.
- 5.2.2 Wrexham County Borough Council does not operate an urban background continuous analyser in Johnstown. A continuous analyser is operational at the edge of Wrexham; however this analyser is located approximately 4km from the proposed development and is not considered representative of the proposed development site. It is therefore considered more appropriate to obtain the background pollutant concentrations, for the most representative 1km grid square for each receptor, from background concentration maps provided by Defra on their Local Air Quality Management web pages (<http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>).
- 5.2.3 The background pollutant concentrations used in the assessment are outlined in Table 16.

Table 16: Background Ambient Air Pollutant Concentrations Taken from Default Concentration Maps in Accordance with LAQM.TG(09).			
Receptors	2012 Concentrations ($\mu\text{g}/\text{m}^3$)		
	NO _x	NO ₂	PM ₁₀
ESR 1, T1-6 and T1-7	20.16894	14.6135	12.99542
ESR 2 and T1-1 to T1-5	19.08523	13.9354	13.69781
ESR 3 and T2-1 to T2-5	21.35163	15.25752	14.93383
T2-6 and T2-7	16.39448	12.14131	12.18419

5.2.4 In accordance with information provided by Defra¹¹, the background NO₂ values have been entered as zero in the DMRB model. The DMRB calculated NO_x values along with the appropriate background concentrations were then inputted into the NO_x to NO₂ calculator¹², updated September 2012, provided by Defra to give NO₂ values.

Modelled Baseline Concentrations

5.2.5 The uncorrected NO₂ and PM₁₀ concentrations for the assessment in 2012 (baseline year) and 2019 (opening/future year), without and with development, are outlined in Table 17. The baseline assessment has been carried out for existing sensitive receptor locations. It is not necessary to carry out a baseline assessment for the proposed residential dwellings. The full uncorrected pollutant concentrations are included in Appendix B.

Table 17: Predicted NO₂ and PM₁₀ concentrations at Existing Sensitive Receptor Locations for 2012 and 2019 'Without Development' Scenarios				
Receptor	Calculated Annual Mean Concentrations (µg/m³)			
	NO₂ (Uncorrected)*		PM₁₀ (Uncorrected)	
	Scenario 1: 2012	Scenario 2: 2019	Scenario 1: 2012	Scenario 2: 2019
ESR 1	13.46	13.47	13.13	13.13
ESR 2	15.34	15.42	14.13	14.15
ESR 3	16.41	16.49	15.27	15.29

Scenario 1 – Base Year 2012 ESR1 to ESR3

5.2.6 The 2012 baseline annual mean NO₂ concentrations (uncorrected) are predicted to range from 13.46 to 16.41µg/m³ for the three existing sensitive receptor locations assessed. No exceedances of the annual mean air quality objective for NO₂ (40µg/m³) are predicted to occur.

5.2.7 The 2012 baseline annual mean PM₁₀ concentrations (uncorrected) are predicted to range from 13.13 to 15.27µg/m³ for the three existing sensitive receptor locations assessed. No exceedances of the annual mean air quality objective for PM₁₀ (40µg/m³) are predicted to occur.

Scenario 2 – Opening Year 2019 Without Development ESR1 to ESR3

¹¹ 'Guidance on running the DMRB screening model' – Defra website (http://laqm.defra.gov.uk/documents/DMRB_text_150409.pdf) 15th April 2009

¹² Based on the report 'Deriving NO₂ from NO_x for Air Quality Assessment of Roads – Updated to 2006,' Air Quality Consultants

- 5.2.8 The 2019 baseline annual mean NO₂ concentrations (uncorrected) are predicted to range from 13.47 to 16.49µg/m³ for the three existing sensitive receptor locations assessed. No exceedances of the annual mean air quality objective for NO₂ (40µg/m³) are predicted to occur.
- 5.2.9 The 2019 baseline annual mean PM₁₀ concentrations (uncorrected) are predicted to range from 13.13 to 15.29µg/m³ for the three existing sensitive receptor locations assessed. No exceedances of the annual mean air quality objective for PM₁₀ (40µg/m³) are predicted to occur.
- 5.2.10 The modelling results indicate that between 2012 and 2019 the baseline annual mean concentrations of NO₂ and PM₁₀ will increase due to increases in road traffic flows. PM₁₀ concentrations at ESR 1 are predicted to remain the same in 2012 and 2019.

6 IMPACT ASSESSMENT

6.1 Earthworks and Construction Phase Assessment – Dust Emissions

Step 2

- 6.1.1 Step 2 of the construction phase dust assessment has been undertaken to determine the potential risk of dust generation and the significance of effects from demolition, earthworks, construction and trackout activities.
- 6.1.2 To assess the risk, the distance to the closest receptor must be identified and a dust emission class must be chosen for each activity. Emissions are classed as large, medium or small depending on the scale and nature of the works taking place. Examples of the criteria for the dust emission classes are detailed in the IAQM guidance.
- 6.1.3 The risk category is then determined based on the dust emission class and the distance to the closest receptor, as detailed in Tables 7, 8 and 9.
- 6.1.4 The assessment procedure assumes no mitigation measures are applied, except those required by legislation. Site specific mitigation measures do not need to be recommended if the risk category is negligible.

Demolition

Dust Emission Class

- 6.1.5 The demolition phase will involve the demolition of the existing buildings of Hafod Tileries in the north-eastern part of the site, the proposed demolition activities are as follows:
- Demolition of existing buildings on site, with a total building volume to be demolished of greater than 50 000 m³;
 - The buildings are two storeys high and approximately 6-10m in height; and
 - Construction materials include solid brick and blockwork and steel cladding.
- 6.1.6 Due to the volume of existing buildings to be demolished, in accordance with the criteria detailed in the IAQM guidance, the dust emission class is considered to be large.

Distance to the Nearest Receptors

- 6.1.7 The nearest human receptors are located along Hafod Road, as detailed in Table 3. The location of demolition works in relation to the nearest receptors is as follows:

- The existing buildings are located in the north eastern part of the site, adjacent to Hafod Road approximately 57m from the nearest residential buildings at the closest point.
- The majority of building volume to be demolished is located further than 100m from the nearest residential buildings.

6.1.8 The nearest ecological receptors are the Stryt las a'r Hafod SSSI and Johnstown Newt Sites SAC located immediately adjacent to the western site boundary, as detailed in Table 3. The location of demolition works in relation to the ecological receptors is as follows:

- The majority of existing buildings, including the large factory buildings, are located further than 40m from the ecological receptors adjacent to the site.
- Several small sheds and tanks are located within 20m from the boundary of the ecological receptors.

Risk Category

6.1.9 Taking into account the dust emission class and the distance of the closest receptor, the risk category for the demolition of buildings is classed as a medium risk for the demolition of buildings at a distance of 100m or greater from the existing receptors on the eastern site boundary and at a distance of 20m or greater from the western site boundary with ecological receptors in accordance with Table 7. Demolition of the building located closest to the eastern site boundary with nearby residential receptors and the western site boundary with ecological receptors will be classed as a high risk category for demolition. The site is therefore considered to be a medium to high risk site for dust from demolition activities.

Earthworks

Dust Emission Class

6.1.10 Earthworks may be required prior to the construction phase of works. Potential sources of dust during the earthworks phase include:

- Cleaning the site;
- Stripping and stockpiling of topsoil and subsoil;
- Ground excavation;
- Bringing in, tipping and spreading materials on site;
- Stockpiling materials;
- Levelling ground;

- Trenching;
- Road construction;
- Vehicle movements on site roads; and
- Windblown materials from the site.

6.1.11 In accordance with the criteria detailed in the IAQM guidance, the dust emission class is considered large due to the total site area of over 10,000m².

Distance to the Nearest Receptors

6.1.12 The nearest human receptors are located adjacent to the eastern site boundary and nearest ecological receptors are located adjacent to the western site boundary, as detailed in Table 3.

Risk Category

6.1.13 Taking into account the dust emission class and the distance of the closest receptor, earthworks will take place at a distance of 57m or greater from the existing human receptors and between less than 20m and greater than 40m from the ecological receptors. Therefore the earthworks will be classed as a low to medium risk category, in accordance with Table 8.

Construction

Dust Emission Class

6.1.14 The construction phase will involve the construction of individual building access roads, the car parking areas and the buildings themselves. In accordance with the criteria detailed in the IAQM guidance, the dust emission class is considered large due to the construction of up to 300 residential dwellings, 0.29ha of employment and 0.11ha of local store with a total building volume of over 100,000m³.

Distance to the Nearest Receptors

6.1.15 The nearest human receptors are located adjacent to the eastern site boundary and nearest ecological receptors are located adjacent to the western site boundary, as detailed in Table 3.

Risk Category

6.1.16 Taking into account the dust emission class and the distance of the closest receptor, the construction of residential dwellings within 40m from ecological receptors and at a distance greater than 50m from the nearest human receptors will be classed as a medium risk and the construction of dwellings at a distance greater than 200m will be classed as a low risk. As residential dwellings are to be constructed will be located between at least 57m and over 200m from the nearest human receptors, and between less than 40m and over 40m from the nearest ecological receptors, the risk category is considered to be low to medium risk, in accordance with Table 8.

Trackout

Dust Emission Class

6.1.17 Trackout is the transport of dust and dirt by vehicles travelling from a construction site on to the public road network. This may occur through the spillage of dusty materials onto road surfaces or through the transportation of dirt by vehicles that have travelled over muddy ground on the site. This dust and dirt can then be deposited and re-suspended by other vehicles.

6.1.18 At this stage, the number of daily construction phase HGV trips and the exact routing of the construction phase vehicles are not known, as a contractor is yet to be appointed. As the number and routing of construction phase vehicles are not known at this stage, an estimation of the dust emission class has been made based on the size of the development site and likely HDV movements per day.

6.1.19 IAQM guidance indicates that for a large site, significant trackout may occur for up to 500m with no mitigation in place. Given that it is assumed that there will be under 100 HDV movements per day and that vehicles leaving site will likely travel along an unpaved road length of less than 100m, depending on the location of the site compound and access roads, the dust emission class is therefore considered medium.

Distance to the Nearest Receptors

6.1.20 The majority of construction traffic is likely to travel directly from the development site to the A483 and so will not travel on the roads adjacent to the existing human and ecological receptors detailed in Table 3.

6.1.21 The nearest human receptor to the roads likely to be used by construction traffic is Edisbury Grange, which is located approximately 125m from roads likely to be used by construction traffic. Construction traffic will have travelled approximately 650m from the proposed site access before it passes the receptor.

6.1.22 Existing ecological receptors are located to the west of the site, to the north and south of Bangor Road, approximately 205m from the roads likely to be used by construction traffic.

Risk Category

6.1.23 Taking into account the dust emission class and the distance of the closest receptor, the risk category for trackout is classed as a low risk site, in accordance with Table 9.

6.2 Qualitative Odour Assessment

Location of proposed development

6.2.1 The proposed development is located immediately to the north of Hafod Quarry Landfill, approximately 10.5m from the boundary with the landfill at the nearest point. The residential areas of the proposed development are located approximately 150m from the landfill at the nearest point. The proposed employment area is located along the southern site boundary of the development, with buildings to be located approximately 20m from the boundary of the landfill at the nearest point. Existing residential properties at the edge of Johnstown are located approximately 40m to the west and northwest of Hafod Quarry Landfill at the nearest point.

6.3 Operational Phase Road Traffic Emissions Assessment

Existing Sensitive Receptor Locations

6.3.1 The impact assessment has been carried out for existing sensitive receptor locations. The full uncorrected pollutant concentrations are included in Appendix B.

Table 16: Predicted NO₂ and PM₁₀ Concentrations at Existing Sensitive Receptor Locations for 2019 'Without Development' and 'With Development' Scenarios (Uncorrected)			
Receptor	Level of Development	Calculated Annual Mean Concentrations (µg/m³)	
		NO₂	PM₁₀
ESR 1	Without development	13.47	13.13
	With development	13.47	13.13
	<i>With – without development</i>	<i>+/-0.00 µg/m³</i>	<i>+/-0.00 µg/m³</i>

ESR 2	Without development	15.42	14.15
	With development	15.52	14.17
	<i>With – without development</i>	$+0.1 \mu\text{g}/\text{m}^3$	$+0.02 \mu\text{g}/\text{m}^3$
ESR 3	Without development	16.49	15.29
	With development	16.57	15.31
	<i>With – without development</i>	$+0.08 \mu\text{g}/\text{m}^3$	$+0.02 \mu\text{g}/\text{m}^3$

Scenario 3 – Opening Year 2019 With Development ESR1 to ESR3

- 6.3.2 The 2019 ‘with development’ annual mean NO₂ concentrations (uncorrected) are predicted to range from 13.47 to 16.57 $\mu\text{g}/\text{m}^3$ for the three existing sensitive receptor locations assessed. Exceedance of the annual mean air quality objective concentration for NO₂ (40 $\mu\text{g}/\text{m}^3$) is not predicted to occur.
- 6.3.3 The 2019 ‘with development’ annual mean PM₁₀ concentrations (uncorrected) are predicted to range from 13.13 to 15.31 $\mu\text{g}/\text{m}^3$ for the three existing sensitive receptor locations assessed. Exceedance of the annual mean air quality objective concentration for PM₁₀ (40 $\mu\text{g}/\text{m}^3$) is not predicted to occur.
- 6.3.4 All pollutant concentrations changes, between ‘without development’ and ‘with development’ scenarios, are explained by increasing vehicle flows on those roads closest to the receptor locations, with the proposed development in place.

Assessment of Significance

- 6.3.5 Using the air quality significance criteria and the magnitude of impact/sensitivity matrix, detailed in Section 4, the impacts due to changes in pollutant concentrations can be assessed at each of the three existing sensitive receptor locations.
- 6.3.6 For 2019 for NO₂ and PM₁₀, two of the three existing receptors show an imperceptible increase in concentrations (less than 0.4 $\mu\text{g}/\text{m}^3$) as a result of the proposed development. ESR 1 shows no change in PM₁₀ or NO₂ concentrations. All three existing receptors in turn show a negligible impact as a result of the proposed development. All predicted concentrations are also below the air quality objective i.e. they are less than 40 $\mu\text{g}/\text{m}^3$.
- 6.3.7 To summarise, the air quality assessment indicates that the proposed development generated traffic will have a negligible impact on existing sensitive receptor locations in 2019. Also the development will not cause the annual mean air quality objective of 40 $\mu\text{g}/\text{m}^3$, for nitrogen dioxide and particulate matter, to be exceeded.

Proposed Receptor Locations

6.3.8 Table 17 shows the predicted NO₂ and PM₁₀ concentrations (uncorrected) for the 2019 'with development' scenario for the two proposed receptor transects. These transect points represent the areas of the development where the highest pollutant concentrations are likely. It has not been necessary to consider concentrations across the entire site as they will be the same or less than those shown in Table 17. The full uncorrected pollutant concentrations are included in Appendix B.

Table 17: Predicted Pollutant Concentrations at Proposed Receptor Points for 2019 'With Development' Scenario		
Proposed Receptor Point	Calculated Annual Mean Concentrations (µg/m³)	
	NO₂ (Uncorrected)	PM₁₀ (Uncorrected)
T1-1	14.38	13.82
T1-2	14.29	13.81
T1-3	14.15	13.80
T1-4	13.91	13.77
T1-5	13.06	13.73
T1-6	13.00	13.01
T1-7	17.97	13.00
T2-1	17.80	15.58
T2-2	17.52	15.54
T2-3	17.07	15.49
T2-4	16.31	15.40
T2-5	13.08	15.25
T2-6	13.90	12.41
T2-7	14.38	12.38

Scenario 3 – Opening Year 2019 With Development T1-1 to T2-7

6.3.9 The 2019 'with development' annual mean NO₂ concentrations (uncorrected) are predicted to range from 13.00 to 17.97µg/m³ for the proposed sensitive receptor points considered. Exceedance of the annual mean air quality objective concentration for NO₂ (40µg/m³) is not predicted to occur.

6.3.10 The 2019 'with development' annual mean PM₁₀ concentrations (uncorrected) are predicted to range from 13.00 to 15.58µg/m³ for the proposed sensitive receptor points considered. Exceedance of the annual mean air quality objective concentration for PM₁₀ (40µg/m³) is not predicted to occur.

7 MITIGATION MEASURES

7.1 Earthworks and Construction Phase Assessment – Dust Emissions

Step 3

- 7.1.1 During the construction phase the implementation of effective mitigation measures will substantially reduce the potential for nuisance dust and particulate matter to be generated.
- 7.1.2 Step 2 of the construction phase assessment identified that there is a medium to high risk category for earthworks, and construction activities and a medium risk category for trackout and demolition. This assumes that no mitigation measures are applied, except those required by legislation. Site specific mitigation measures do not need to be recommended if the risk category is negligible.
- 7.1.3 As the risk category for these activities are not negligible, site specific mitigation measures will need to be implemented to ensure that dust effects will not be significant.
- 7.1.4 A best practice dust mitigation plan will be written and implemented for the site. This will set out the practical measures that could be incorporated as part of a best working practice scheme. Examples of measures which could be incorporated are detailed in the guidance published by the Institute of Air Quality Management (IAQM)¹³ and the Greater London Authority¹⁴. They include:
- Dust from general traffic at the site during demolition, earthworks and construction works will be controlled by the provision of a wheel wash at the site exit and a road sweeper for use on site and public highways;
 - Easily cleaned hard standing areas will be provided for vehicles arriving at and leaving the site and for parking;
 - Vehicles will be confined to areas of the site where appropriate dust control measures can be in operation;
 - All vehicles will be sheeted when loaded;
 - Minimisation of vehicle movements and limitation of vehicle speeds – the slower the vehicle speeds, the lower the dust generation;

¹³ Institute of Air Quality Management (IAQM) guidance document 'Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance' (January 2012) and associated interim mitigation list

¹⁴ Greater London Authority (2006) The Control of Dust and Emissions from Construction and Demolition: Best Practice Guidance

- Minimisation of the duration of the material handling activity and the amount of handling. Material handling methods will also aim to minimise the generation of airborne dust;
- Protecting surfaces and exposed material from winds until disturbed areas are sealed and stable;
- Exposed stored materials will be damped down and stored as far from sensitive receptors as possible; and
- Activities that generate large amounts of dust will be avoided during windy conditions.

7.1.5 It is recognised that the final design solutions will be developed with the input of the Contractor to maximise construction efficiencies, to use modern construction techniques and sustainable materials, and to incorporate the particular skills and experience offered by the successful contractor.

7.1.6 The implementation of effective mitigation measures during the construction phase will substantially reduce the potential for nuisance dust and particulate matter to be generated and any residual impact should not be significant.

Step 4

7.1.7 Step 4 of the construction phase dust assessment has been undertaken to determine the significance of the dust effects arising from the earthworks, construction and trackout associated with the proposed development.

7.1.8 Once the risk category for each activity has been established, the significance of the impact can be assessed, as detailed in Table 10. The significance of the impact takes into account the sensitivity of the local area, using the criteria detailed in Table 6.

7.1.9 In relation to the criteria detailed in the IAQM guidance, as detailed in Table 6 the factors relevant to the sensitivity of the area are as follows:

- There are no dwellings within 20m of the site;
- Local PM₁₀ concentrations are well below the annual mean objective (approximately 29-34% of the objective);
- The site currently comprises open rural land and industrial premises to the east of the Johnstown urban area;
- A wooded area is located between the site and the nearest dwellings to the east of the site; and

- The Stryt las a'r Hafod SSSI and Johnstown Newt Sites SAC are located immediately adjacent to the western site boundary.

7.1.10 The surrounding area is therefore considered low in sensitivity for Human Receptors and very high in sensitivity for Ecological Receptors.

Demolition

7.1.11 The sensitivity of the local area is considered very high and there is a medium to high risk of dust effects from demolition. The significance of the dust effect for earthworks, with mitigation in place, is classed as negligible to slight adverse, in accordance with the criteria detailed in Table 10.

Earthworks

7.1.12 The sensitivity of the local area is considered very high and there is a low to medium risk of dust effects from earthworks. The significance of the dust effect for earthworks, with mitigation in place, is classed as negligible to slight adverse, in accordance with the criteria detailed in Table 10.

Construction

7.1.13 The sensitivity of the local area is considered very high and there is a low to medium risk of dust effects from construction activities. The significance of the dust effect for construction activities, with mitigation in place, is therefore classed as negligible to slight adverse, in accordance with the criteria detailed in Table 10.

Trackout

7.1.14 The sensitivity of the local area is considered very high and there is a low risk of dust effects from trackout. The significance of the dust effect for trackout, with mitigation in place, is classed as negligible, in accordance with the criteria detailed in Table 10.

7.2 Operational Phase Road Traffic Emissions Assessment

Existing Sensitive Receptor Locations

7.2.1 The air quality assessment has predicted that the proposed development will have a negligible impact on concentrations of NO₂ and PM₁₀ at existing sensitive receptor locations in 2019. The pollutant concentrations predicted for 2019 are below the objectives for both with and without development scenarios. It is not therefore considered necessary to recommend measures to mitigate road traffic emissions.

Proposed Receptor Locations

- 7.2.2 All proposed receptor locations, assessed for 2019, show NO₂ and PM₁₀ concentrations well below the annual mean air quality objectives for these pollutants. It is not therefore necessary to recommend measures to mitigate road traffic emissions.

8 CONCLUSIONS

8.1 Earthworks and Construction Phase Assessment – Dust Emissions

- 8.1.1 The construction phase assessment has been undertaken to determine the risk and significance of dust effects from demolition, earthworks, construction activities and trackout from the proposed development. The assessment has been undertaken in accordance with the guidance on assessing the impacts of construction phase dust published by the Institute of Air Quality Management.
- 8.1.2 The risk of dust effects is considered to be a medium to high risk category for demolition, a low to medium risk category for earthworks and construction activities and a low risk category for trackout. Site specific mitigation measures will therefore need to be implemented at the site.
- 8.1.3 The significance of the dust effects has been assessed by taking into account the sensitivity of the local area and the risk that the activities might give rise to dust effects. The local area is considered to be of very high sensitivity due to the proximity to a European Designated Site. The significance of dust effects for demolition, earthworks and construction activities, with the site specific mitigation measures in place, are considered to be negligible to slight adverse and the significance of dust effects for trackout are considered to be negligible.

8.2 Operational Phase Qualitative Odour Assessment

- 8.2.1 Due to the proximity of the proposed development to the Hafod Landfill, the potential for odour emissions from the proposed landfill at the site has been qualitatively assessed. Information provided by the Environment Agency Wales¹⁵ has confirmed that there has been no requirement for any enforcement action to be taken against the Hafod Quarry Landfill since Cory Environmental (Central) Ltd took over the site from its previous operators in November 2008.
- 8.2.2 Information provided by the Environment Agency also shows that there is a history of complaints associated with the Hafod Landfill, with the majority of odour complaints received in the winter months, although Environment Agency Records show a considerable reduction in complaints from 2011 onwards.

¹⁵ Contains Environment Agency information © Environment Agency and database right

- 8.2.3 Informal odour surveys undertaken on three occasions at the site boundary closest to the Hafod Quarry Landfill indicated that odour from the landfill was generally undetectable with a very faint to faint chemical odour occasionally detected on one occasion along Hafod Road. This suggests that the site is able to operate without significant release of odour.

8.3 Operational Phase Road Traffic Emissions Assessment

Existing Sensitive Receptor Locations

- 8.3.1 Three representative existing sensitive receptor locations have been considered as part of the operational phase air quality road traffic assessment. All are considered moderately sensitive in accordance with the criteria detailed in Section 4 of this report.
- 8.3.2 For 2019 for both NO₂ and PM₁₀, two of the three existing receptors show a negligible impact as a result of the proposed residential development i.e. the changes in concentration due to the development are less than 0.4µg/m³. ESR 1 shows no change in concentration due to the development. All predicted concentrations are also below the air quality objective i.e. they are less than 40µg/m³.
- 8.3.3 To summarise, the air quality assessment indicates that the proposed development generated traffic will have a negligible impact on existing sensitive receptor locations in 2019 and the development will not cause the annual mean air quality objective of 40µg/m³, for nitrogen dioxide and particulate matter, to be exceeded. It is not therefore necessary to recommend any specific mitigation measures.

Proposed Receptor Locations

- 8.3.4 Pollutant concentrations have also been predicted for proposed receptor locations within the development site. The proposed residential properties are considered to be moderately sensitive.
- 8.3.5 No exceedances of the national air quality annual mean objective, of 40µgm⁻³ for either NO₂ or PM₁₀, are predicted to occur, at the proposed receptor locations assessed, for any of the scenarios considered. It is not therefore necessary to recommend measures to mitigate road traffic emissions.

Appendix A
Traffic Data Used in the Air Quality Assessment

Appendix A: Traffic Flow Information Used in the Air Quality Assessment, Provided by Ashley Helme Associates on 30/05/2013

Link	Link Name	2012 Base Year	2019 'Without Development'	2019 'With Development'	HGV%
1	A483 (North of Bangor Road)	43563	45981	47187	3.7
2	A483 (South of Bangor Road)	40850	43117	43396	3.7
3	A483 Slip Road	1311	1384	1663	4.7
4	Bangor Road (East of A483)	3833	4046	4344	2.9
5	Bangor Road (West of Site)	4319	4559	4796	2.4
6	Hafod Road	651	687	687	15.2

All traffic flows 24 hour AADT (Annual Average Daily Traffic) flows

Appendix B
Uncorrected Model Results

Appendix B: Uncorrected Modelling Results –NO₂ and PM₁₀

Receptor Name	2012 Base Year		2019 'Without Development'		2019 'With Development'	
	NO ₂	PM ₁₀	NO ₂	PM ₁₀	NO ₂	PM ₁₀
ESR 1	13.46	13.13	13.47	13.13	13.47	13.13
ESR 2	15.34	14.13	15.42	14.15	15.52	14.17
ESR 3	16.41	15.27	16.49	15.29	16.57	15.31
T1-1					14.38	13.82
T1-2					14.29	13.81
T1-3					14.15	13.80
T1-4					13.91	13.77
T1-5					13.06	13.73
T1-6					13.00	13.01
T1-7					17.97	13.00
T2-1					17.80	15.58
T2-2					17.52	15.54
T2-3					17.07	15.49
T2-4					16.31	15.40
T2-5					13.08	15.25
T2-6					13.90	12.41
T2-7					13.47	12.38

Drawing LE11510-002
Air Quality Existing and Proposed Sensitive Receptor Locations

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