Chapter Nine
AIR QUALITY

INTRODUCTION

9.1 This chapter provides details of the sources and nature of the emissions to atmosphere from the Enviroparks site operations, processes and transport. Through identifying and quantifying the likely emissions, it is possible to undertake a comprehensive assessment of their likely impact on the surrounding area, and thus to assess the effect of the proposed operations.

9.2 The Enviroparks scheme aims to use waste as a resource, segregating materials on entry to the plant and promoting recycling where possible. Thereafter, the materials are processed through an integrated series of facilities designed to extract the energy potential of the wastes. Most of these facilities are sealed or contained units, with no release to atmosphere, however the key processes which could have a potential impact on air quality are:

- Releases from operational buildings, the preferred route for which is as combustion air for the engines, thereby ensuring any odour is removed through combustion, however any surplus which does not provide combustion air to the engines will be discharged to atmosphere, passing through carbon or biofilters to control the emission of odour;
- Emissions from the gas and oil engines which create the electricity;
- Emissions from the emergency flares;
- Fugitive emissions from around the site; and
- Emissions from road transport.

METHODOLOGY

9.3 Consultation with both RCT and the BBNPA highlighted that an appropriate air quality assessment should be undertaken, and noted that this should include an odour management plan.

9.4 The assessment begins with the provision of background information, a description of the processes and resultant pollutants from the site. Information on the current air quality standards, objectives and guidelines which apply to the pollutants is provided, as is detail on the current air quality in the vicinity of the site using results from local monitoring stations where available.

9.5 The chapter then considers the likely impacts from the proposed development and includes details on the management systems in place for their control. Modelling methods have been applied to determine the appropriate stack height for the process exhausts. This has been achieved through application of:

- the Technical Guidance Note on Dispersion (D1);
- an atmospheric dispersion model to determine the dispersion characteristics of the emissions;

- applying the ADMS model.

9.6 ADMS is one of the leading atmospheric dispersion models available in the UK and is an accepted method of assessing the impact on ambient pollutant concentrations from industrial installations. The modelling enables an assessment of the potential impact of the proposed operations, and includes consideration of the potential cumulative impact from weather conditions, terrain effects and other existing and proposed developments in the area. Assumptions made include the combined and continuous operation of the site engines to ensure that the assessment is suitably robust, despite the reality that some of the processes will have significant periods where they are not operational.

9.7 Finally, a description of the proposed mitigation methods and an assessment of any additional requirement for mitigation is provided.

AIR QUALITY LEGISLATION, STANDARDS AND OBJECTIVES

9.8 The European Air Quality Framework Directive (Directive 96/62/EC) and the associated Daughter Directives have the general aim of identifying the basic principles of a common strategy across the Member States, to:

- define and establish objectives for ambient air quality in the Community designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole,
- assess the ambient air quality in Member States on the basis of common methods and criteria,
- obtain adequate information on ambient air quality and ensure that it is made available to the public, inter alia by means of alert thresholds,
- maintain ambient air quality where it is good and improve it in other cases.

9.9 Directive 96/62/EC sets a framework of how the UK must monitor and report ambient levels of air pollutants. The UK has been divided into zones and agglomerations within which the pollutants will be monitored. The Directive has lead to a number of Daughter Directives, which set specific limits for ambient concentrations of pollutants:

- Directive 99/30/EC (the first Air Quality Daughter Directive) sets ambient air limit values for nitrogen dioxide and oxides of nitrogen, sulphur dioxide, lead and particulate matter;
- Directive 2000/69/EC (the second Air Quality Daughter Directive) sets ambient air limit values for benzene and carbon monoxide;
- Directive 2002/3/EC (the third Air Quality Daughter Directive) sets ambient air limit values for ozone;
- Directive 2004/107/EC (the fourth Air Quality Daughter Directive) sets ambient air limit values for arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons.

9.10 A new European Air Quality Directive came into force in June 2008 (2008/50/EC), and will be transposed into national legislation by June 2010. The European Air Quality Directives inform the UK Air Quality Standards Regulations. The Air Quality Standards (Wales) Regulations 2007 (SI 2007/717) came into force on 15 March 2007, replacing the previous Air Quality Limit Values (Wales) Regulations 2002 No. 3183 (W. 299) which gave effect to the provisions of the Air Quality Framework and the First Air Quality Directive. The 2007 Regulations also give effect to the additional Air Quality Daughter Directives, and specify the following limits:

Limit Values for Group A Pollutants

Benzene			
	Averaging Period	**Limit Value**	**Attainment Date**
Limit value for the protection of human health	Calendar year	5 µg m^{-3}	1st January 2010

Carbon Monoxide		
	Averaging Period	**Limit Value**
Limit value for the protection of human health	Maximum daily 8-hour mean	10 mg/m³

Lead		
	Averaging Period	**Limit Value**
Annual limit value for the protection of human health	Calendar year	0.5 µg m^{-3}

Nitrogen Dioxide and Oxides of Nitrogen			
	Averaging Period	**Limit Value**	**Attainment Date**
Hourly limit value for the protection of human health	1 hour	200 µg m^{-3} NO_2, not to be exceeded more than 18 times a calendar year	1st January 2010
Annual limit value for the protection of human health	Calendar year	40 µg m^{-3} NO_2	1st January 2010
Annual limit value for the protection of vegetation	Calendar year	30 µg m^{-3} NO_x	

The alert threshold for nitrogen dioxide is 400 µg m^{-3}.

PM10		
	Averaging Period	**Limit Value**
24-hour limit value for the protection of human health	24 hours	50 µg m^{-3} PM_{10}, not to be exceeded more than 35 times a calendar year
Annual limit value for the protection of human health	Calendar year	40 µg m^{-3} PM_{10}

Sulphur Dioxide		
	Averaging Period	**Limit Value**
Hourly limit value for the protection of human health	1 hour	350 µg m^{-3}, not to be exceeded more than 24 times a calendar year
Daily limit value for the protection of human health	24 hours	125 µg m^{-3}, not to be exceeded more than 3 times a calendar year
Limit value for the protection of ecosystems	Calendar year and winter (1st October to 31st March)	20 µg m^{-3}

The alert threshold for sulphur dioxide is 500 µg m^{-3}.

Target Values for Group B Pollutants

Pollutant	**Target Value**
Arsenic	6 ng m^{-3}
Benzo(a)pyrene	1 ng m^{-3}
Cadmium	5 ng m^{-3}
Nickel	20 ng m^{-3}

The target values above relate to the total content of the relevant pollutant in the PM_{10} fraction averaged over one calendar year. The attainment date for each of these target values is 31 December 2012.

Target Values and Long Term Objectives for Ozone

Target Values		
	Parameter	**Target Value and Assessment**
Target value for the protection of human health	Maximum daily 8 hour mean	120 µg m^{-3} not to be exceeded on more than 25 days per calendar year averaged over three years
Target value for the protection of vegetation	AOT40, calculated from 1 hour values from May to July	18,000 µg m^{-3} hours averaged over five years
Long-Term Objectives		
	Parameter	**Long-Term Objective**
Long-term objective for the protection of human health	Maximum daily 8 hour mean within a calendar year	120 µg m^{-3}
Long-term objective for the protection of vegetation	AOT40, calculated from 1 hour values from May to July	6,000 µg m^{-3} hours

The attainment date for each of these target values is 2010.
The alert threshold for ozone is 240 µg m^{-3}.
AOT40 (expressed in µg m^{-3} hours) means the sum of the difference between hourly concentrations greater than 80 µg m^{-3} and 80 µg m^{-3} over a given period using only the 1 hour values measured between 8:00 and 20:00 Central European Time each day.

9.11 Part IV of the Environment Act 1995 requires the UK Government and the devolved administrations for Scotland and Wales to produce a National Air Quality Strategy containing standards, objectives and measures for improving ambient air quality and to keep these policies under review. In Wales, this is implemented through the Air Quality (Wales) Regulations SI 2000/1940, which have since been amended by the Air Quality (Amendment) (Wales) Regulations SI 2002/3182. The Regulations establish the framework for achieving improvements in ambient air quality within a given time period.

9.12 Air quality in the UK has generally improved since 1997 when the first Air Quality Strategy was adopted. This was replaced by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland published in January 2000 which established the framework for achieving further improvements in ambient air quality in the UK to 2003 and beyond. The 2003 Strategy has now been replaced by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007.

9.13 Table 9.1 details the Air Quality Objective Levels assigned to certain substances, as detailed by the Air Quality (Wales) Regulations SI 2000/1940 (as amended):

Table 9.1 The Air Quality Objectives

Substance	Air Quality Objective Levels	Air Quality Objective Dates
Benzene	16.25 micrograms per cubic metre or less, when expressed as a running annual mean	31st December 2003
Benzene	5 micrograms per cubic metre or less, when expressed as an annual mean	31 December 2010
1,3 - Butadiene	2.25 micrograms per cubic metre or less, when expressed as a running annual mean	31st December 2003
Carbon monoxide	11.6 milligrams per cubic metre or less, when expressed as a maximum daily running 8 hour mean	31st December 2003
Lead	0.5 micrograms per cubic metre or less, when expressed as an annual mean 0.25 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2004 31st December 2008
Nitrogen dioxide	200 micrograms per cubic metre, when expressed as an hourly mean, not to be exceeded more than 18 times a year 40 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2005 31st December 2005
PM_{10}	50 micrograms per cubic metre or less, when expressed as a 24 hour mean, not to be exceeded more than 35 times a year 40 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2004 31st December 2004
Sulphur dioxide	125 micrograms per cubic metre or less, when expressed as a 24 hour mean, not to be exceeded more than 3 times a year 350 micrograms per cubic metre or less, when expressed as an hourly mean, not to be exceeded more than 24 times a year 266 micrograms per cubic metre or less, when expressed as a 15 minute mean, not to be exceeded more than 35 times a year	31st December 2004 31st December 2004 31st December 2005

9.14 This latest (2007) strategy does not remove any of the objectives set out in the 2000 strategy or its addendum, apart from replacing some provisional objectives with an exposure reduction approach. The strategy does however introduce the ozone objective to protect vegetation and ecosystems in line with the EU target value set out in the Third Daughter Directive.

9.15 The achievement of these objectives is determined by the quality of air at locations: situated outside of buildings (or other man made structures) above or below ground; where members of the public are regularly present.

9.16 Information on the nature and potential effects of different pollutants is presented in Air Quality Appendix 1 (ES volume 2).

PLANNING POLICY

9.17 When considering potential developments and the protection and improvement of air quality, the Planning Policy Wales document March 2002[1] states that:

> *The potential for pollution affecting the use of land will be a material consideration in deciding whether to grant planning permission. Material considerations in determining applications for potentially polluting development are likely to include:*
>
> - *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 (particularly if the development would impact on an Air Quality Management Area or a SAC);*
> - *prevention of nuisance;*
> - *Integrated Pollution Prevention and Control Permit).*

9.18 Planning policies and proposals must therefore contribute to the protection and improvement of the environment, so as to improve the quality of life, and protect local and global ecosystems. In particular, planning should seek to ensure that development does not produce irreversible harmful effects on the natural environment. The conservation and enhancement of statutorily designated areas and of the countryside; the conservation of biodiversity, habitats, and landscapes; the conservation of the best and most versatile agricultural land; and enhancement of the urban environment all need to be promoted.

9.19 The development is designed to promote environmentally effective recycling and reduce the requirement for landfill. The development is located on a brownfield site, within an existing industrial estate which has good transport links. Site emissions and the environmental impact of operations will be minimised and controlled. As such, the development will not produce irreversible, harmful effects in the environment and should result in a minimal environmental impact on the local area.

9.20 The core policy values are continued in the Rhondda Cynon Taf Local Development Plan Preferred Strategy (January 2007)[2]. The overall aim of the Rhondda Cynon Taf Local Development Plan (LDP) is derived from the vision for Rhondda Cynon Taf outlined in 'A Better Life': Our Community Plan (2004 –2014). The LDP will seek to ensure that:

'Rhondda Cynon Taf will be a community where everyone who lives, works in or visits the area will enjoy the benefits of a better quality of life, achieving their potential, whilst helping to develop and protect the area for future generations.'

To achieve this, the LDP will translate this vision into a series of social, economic and environmental objectives. These objectives will be at the centre of the LDP and will form the basis for future policy development. The objectives of the Rhondda Cynon Taf LDP include:

Provide an environment that encourages a healthy and safe lifestyle and promotes well being
Minimise waste, especially waste to landfill and making adequate provision for waste facilities in accordance with the findings of the Regional Waste Plan.
Provide for a sustainable economy
Provide for a diverse range of job opportunities
Manage the effects of climate change
Increase the supply of renewable energy and reduce energy consumption

9.21 Strategic Policies from the LDP which consider air pollution and the effects include:

SP3: Sustainable Development; which establishes the requirement to determine development and land use based on the protection and enhancement of the natural environment and environmental capacity, as well as the area's needs.

SP7: Employment Requirements; which also considers environmental protection whilst promoting local employment opportunities.

SP11: Protection of the Natural Environment from inappropriate development.

9.22 Policy SP11 specifically states that developments which may cause unacceptable harm to the quality of natural resources including water, air and soil, will not be permitted.

BASELINE ANALYSIS

Local air quality

9.23 In line with Part IV of the Environment Act 1995 Rhondda Cynon Taf County Borough Council periodically review and assess the air quality in their area for compliance with National Air Quality Strategy objectives.

9.24 The initial First Stage Report of the Air Quality Review and Assessment prepared by Rhondda Cynon Taf in December 1998, considered that there was a possibility that the National Air Quality Strategy (NAQS) Objectives for Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2) and Particulate Matter (PM_{10}) could be breached. Further investigation concluded in 2000, that the objectives were unlikely to be breached, and no Air Quality Monitoring Areas (AQMAs) were declared. Monitoring data obtained in 2003 however suggested that the NAQS for NO_2 could be breached, and subsequent investigations concluded that six areas within the county could exceed the NAQS. This has now been extended to ten exceedence areas. Each of these potential exceedences is due to traffic emissions, and three of the areas experienced high NO_2 due to traffic congestion associated with road construction and modification. Monitoring continues and the County Borough Council are also undertaking PM_{10} monitoring at specific locations to assess the impact of local quarrying activities.

9.25 The current Updating and Screening Assessment, prepared in 2006, has been reviewed, and is supported by the 2007 and 2008 Progress Reports. A Third Stage Detailed Assessment of Nitrogen Dioxide was also undertaken in 2007 and as a consequence of its findings, eight Air Quality Management Areas were enacted on the 1st November 2007 for breaches of the annual mean NAQS for Nitrogen Dioxide and a Further Assessment commenced. This Fourth Stage Further Assessment for Nitrogen Dioxide is due for publication in late 2008. The latest Updating and Screening Assessment, Progress Reports and any Detailed Assessments should be viewed together to provide a comprehensive assessment of the current status of air quality in the Rhondda Cynon Taff area. A summary of the reports is presented in Air Quality Appendix 2 (ES volume 2).

9.26 Rhondda Cynon Taf County Borough Council has been undertaking Air Quality Reviews and Assessments as is required of them under the National Air Quality Strategy. Five of the seven NAQS pollutants are monitored in the area by the Council, and these are:

- Benzene
- 1,3 Butadiene
- Carbon Monoxide
- Nitrogen Dioxide
- Particulate

9.27 In reality however, only one of these pollutants, NO_2, is monitored in the area local to the proposed Enviroparks site. NO_2 is monitored as NO_x, and reported as NO_2. The monitoring station is located in Penderyn.

9.28 A summary of the current background concentrations of pollution in the area local to the proposed Enviroparks site is presented below, and is supported by a detailed review in Appendix 2:

Table 9.2 Comparison of the Annual Predicted Concentrations of Pollutants, Measured Concentrations and the National Air Quality Standards

Pollutant	Predicted (2008)	Measured (2007)	NAQS
Benzene	0.203 ug m^{-3}		16.25 ug m^{-3}
1,3 Butadiene	0.055 ug m^{-3}		2.25 ug m^{-3}
Carbon Monoxide	0.12 mg m^{-3}		10 mg m^{-3}
Nitrogen Dioxide	7.93 ug m^{-3}	10.11 – 27.76 ug m^{-3}	40 ug m^{-3}
Particulate Matter (PM10)	14.46 ug m^{-3}	22.48 ug m^{-3}	40 ug m^{-3}
Sulphur Dioxide	2.79 ug m^{-3}		125 ug m^{-3}

Local industries and proposed developments

9.29 Rhondda Cynon Taf has historically had a thriving coal industry, and indeed the last coal mine in Wales was the Tower Colliery at Hirwaun, which closed at the end of January 2008. However the Hirwaun area has had a long industrial history aside from mining. The site which Enviroparks (Hirwaun) Ltd propose to develop was an ordnance works during the Second World War, and other industries on the estate over the years include a concrete works, a glass factory, a radio factory, engineering works, a bakery

and a meat factory, and chemical and pharmaceutical factories. Current industries in the immediate vicinity of the site include the Dwr Cymru Hirwaun Sewage Treatment Works, Eden Industries Ltd, who produce shop fittings and shelving, and DAR Products who produce pipes and fittings. Other local industries include engineering companies, food processors, plastic moulding and products manufacturers, road haulage companies, builders merchants and metal spinners.

9.30 There are two current Local Authority Pollution Prevention and Control Permits (Environmental Permits) held within a 1 km radius of the proposed site. These both cover coating processes, and one, registered to Eden Industries UK Ltd, is located immediately adjacent to the proposed Enviroparks site. Coating processes can lead, primarily to the release of Volatile Organic Compounds, however as the Eden process is already in existence, any contribution to pollutant concentrations will be included in measured background levels. Other LA-PPC Permits are thought to have been revoked or surrendered.

9.31 There are no known Part A(1) PPC Permits within 2 km of the proposed Enviroparks site. The following Part A(1) PPC Permits exist within a 10 km radius of Hirwaun:

- Bryn Pica Landfill Site and Generating Plant (> 5 km)
- Hill and Moor Landfill Site (> 5 km)
- Dynevor Arms Liquefied Natural Gas Storage Facility (< 5 km)
- Roundhill Sewage Treatment Works (> 5 km)
- 3 x intensive farms (> 5 km)
- Craven Arms Meat Processors (> 5 km)
- Wetmore Site (> 5 km)
- Woodhouse Fields (> 5 km)

9.32 Because these sites are already operational, any contribution from them to levels of pollution can be assessed from available background concentrations. That said, any proposed planning in the local area may combine with the effects of the proposed Enviroparks development and result in a cumulative impact.

9.33 Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 states that, as with all aspects of the environment, cumulative impacts are to be considered where there are likely to be significant effects. Cumulative impacts can be defined as follows:
'the impacts on the environment which result from incremental impacts of the action when added to other past, present and reasonably foreseeable future actions…'

9.34 Proposed developments in the Local Authority area that are likely to have an effect on air quality, have been detailed in the 2008 Air Quality Progress Report, and are summarised in Appendix 2 which considers local levels of pollution. The Local Authority has instigated protocols and procedures to ensure all planning applications received are reviewed and if necessary additional information, in the form of air quality assessments, are provided to allow thorough consideration of the development and its potential impacts.

9.35 Of the developments currently proposed, an application for the development of 214 dwellings at Tir Founder Fields, Cwmbach, Aberdare, and an application for a small residential development consisting of a few flats within the Aberdare Town Centre Air Quality Management Area are within 10 km of the proposed Enviroparks development. However the nature of the potential air quality impact, being traffic related

is likely to be a local concern, and is unlikely to impact on the air quality close to the proposed development.

PROPOSED OPERATIONS

9.36 The proposed processes to be undertaken at the Enviroparks site are detailed in Table 9.3 below, with the potential releases to air listed against each process:

Table 9.3 Proposed Processes and their Associated Releases

Process	*Primary Potential Releases to Atmosphere*
Construction	Dust from earth movement works, aggregate handling, foundation piling and site traffic on paved and unpaved roadways
Road Traffic; during construction and operation	Combustion emissions from vehicle engines: Benzene 1,3 Butadiene Carbon Dioxide Carbon Monoxide Oxides of Nitrogen Particulate Matter Sulphur Dioxide Volatile Organic Compounds
Waste Acceptance, Sorting and Pre-treatment Ventilation from process buildings	Materials are off-loaded and handled within the feedstock preparation area. Sealed buildings with controlled ventilation and double doors will minimise releases from areas with high odour creation potential. Ventilation discharges via the engines as combustion air, or through carbon or biofilters. The potential does still exist for the release of odour, however this should not be significant.
Sealed transportation of feedstock and fuels around site	Sealed and covered systems, and thus no release to atmosphere.
Anaerobic Digestion	Sealed processing tanks with feedstock and gases pumped in and out. A very occasional requirement to enter the tanks for maintenance will be proceeded by a rigorous pre-clean, and hence the potential for odour release will be minimised.
Biomax Separator	No emission point, and operation is contained within a process building with controlled ventilation and double doors. Ventilation will discharge as combustion air to engines, if this is acceptable to the regulating State Veterinary Service, and / or via carbon or biofilters. The potential does still exist for the release of odour, however this should not be significant.
Plasma Conversion	No emission point, plant is a series of sealed reactor vessels located externally. The only potential odour point is the feed inlet which is a contained design. The potential does still exist for the release of odour, however this should not be significant.
Pyrolysis	No emission point, and operation is contained within a

Plant	process building with controlled ventilation. Ventilation will discharge as combustion air to engines and / or via carbon or biofilters. The potential does still exist for the release of odour, however this should not be significant.
Power House (gas and oil engines for conversion to electricity)	Combustion emissions from fuel engines: Carbon Dioxide Carbon Monoxide Dioxins and Furans Heavy Metals Hydrogen Chloride Hydrogen Fluoride Oxides of Nitrogen Particulate Matter Sulphur Dioxide Volatile Organic Compounds Emissions constitute point source releases to atmosphere from the site and will be discharged through exhaust stacks.
Emergency Flares	The flares will constitute point source releases to atmosphere and are designed to ignite should an emergency release of gas be required from the process or storage vessels. Emergency flares are designed to combust excess gas in order to ensure the safety of systems from overfilling or excess pressure. Flares are designed with specific residence times and temperature control ensuring adequate combustion, however emissions to atmosphere will still comprise: Carbon Dioxide Carbon Monoxide Oxides of Nitrogen Unburned Hydrocarbons
Fugitive Emissions	Controlled handling and processing of the in coming materials should minimise the potential for fugitive releases of odour or litter, and as all operational areas of the site are to consist of impervious hardstanding, it is unlikely that large quantities of dust will be created by the site.

POTENTIAL EFFECTS

9.37 The proposed Enviroparks development has the potential to impact on air quality in the following ways:

- Dust emissions (construction phase)
- Traffic emissions (construction and operational phases)
- Engine exhausts (operational phase)
- Potential odour emissions (operational phase)
- Flare exhausts (short term start up or emergency conditions only)

DESCRIPTION OF PROCESSES AND CONTROLS

Dust emissions

9.38 Dust emission from the proposed development site will occur predominantly during construction. The main sources of dust include that generated from land stripping and excavation, piling and foundation works, aggregate and materials handling and preparation, and traffic movements across the site which will, periodically at least involve movement across open ground.

9.39 Once operational, the site will be covered in hardstanding and landscaped areas therefore the dust creation potential will be negligible. All materials handling operations will be undertaken within enclosed buildings incorporating negative pressure ventilation systems, and thus dust creation through operational practices will also be negligible.

Odour emissions

9.40 Feedstock materials will be delivered in refuse collection vehicles (RCV) and articulated lorries. All vehicles must be covered when arriving at the site, such that the refuse collection vehicles have the back doors closed and articulated lorries are fully sheeted. Materials are accepted under contract and as such most deliveries will be scheduled to occur at staggered periods throughout the day, resulting in a well controlled delivery and acceptance operation.

9.41 The majority of the feedstock material arriving at the site will be municipal solid waste. RCVs will deliver newly collected waste twice per day, five days per week. This results in the material being stored within the collection vehicle for up to approximately four hours prior to controlled tipping into the fuel preparation area. Thus, although the collected material will likely have begun to decompose over the course of the proceeding week or fortnight (since any earlier collection), the transportation of the refuse vehicles along the roadway and into the site, should give no greater rise to odours than during the waste collection round. In fact, because the vehicle will remain closed until within the enclosed tipping area, the odour from the refuse vehicles will generally be less than that generated during the street collections.

9.42 Other feedstocks have a higher potential for odour generation, specifically the food and animal by-products material associated with the biomax plant. The main source of this material will be from food preparation plants within the region, and thus the deliveries will consist largely of fresh food and meat waste which have travelled for only a short distance. However, it is accepted that some of the material arriving at the site may have travelled further distances or may not be of the same quality (i.e. non-food grade). The material will generally have been loaded directly into an open topped articulated vehicle prior to being fully covered for transportation. Alternatively, deliveries may arrive in smaller covered Eurobins which are transported within an enclosed vehicle. All deliveries into the biomax building will be unloaded into a temperature controlled storage area and processed within 48 hours.

9.43 Material accepted at the site would be dealt with as soon as possible. The fuel preparation area is designed to accept four simultaneous deliveries, and the biomax area can accept two. The delivery process includes material acceptance checks and weighing etc, and a waiting area is provided for the delivery vehicles. Deliveries will usually be accepted on a first come first served basis. However, should initial material acceptance checks suggest that an incoming load would benefit from preferential treatment, e.g. because it is particularly odorous, Enviroparks will give it priority. Enviroparks retain the right to refuse to accept any delivery which arrives at the site in an uncovered or poor state.

9.44 With the exception of the material acceptance checks, all waste handling operations will be within enclosed buildings served by a negative pressure ventilation system. Two rapid action doors on each unloading / loading bay for the fuel preparation area and the biomax plant ensure that a vehicle is enclosed prior to accessing the operational area. Ventilation extracted from all fuel handling areas will be used preferentially as combustion air within the site engines. Any additional ventilation air will pass via carbon or biofilters prior to release to atmosphere. Either route will ensure effective control of emissions of odour. All filtration systems will be fully maintained in accordance with manufacturers guidance, however daily checks at key locations around the site will also be undertaken to ensure that any signs of deterioration of the abatement effectiveness are noted and acted upon promptly.

9.45 Once accepted into the process, materials will remain in enclosed buildings or processes. The site has a fuel preparation storage area capable of holding sufficient feedstock for four days' operation. Under no circumstance will feedstock material be stored externally. Materials pass through the processing system on conveyors within enclosed buildings or through pipework. In the unlikely event that the movement of other materials may be required (e.g. movement of solids from one process building to another), this will be undertaken in a sealed container or sealed sack.

9.46 Combustion emissions from flares and the engine exhausts would be released at height and are controlled for optimum combustion thereby controlling the odour of the emissions. The main engine release stacks are 40 m in height above ground level and will incorporate continuous monitoring systems for emissions concentrations. The flares are much lower at 16.5 m, however these are designed to function only during start up, shut down or emergency conditions and thus their use will be minimised. Neither type of combustion gas release point should have a noticeable odour creation potential.

Process exhausts

9.47 The proposal includes several emission points to atmosphere. These consist of three engine exhaust flues, routed up a single 40 m chimney stack to serve the tallow engines, the fuel preparation area pyrolyser, and the anaerobic digestion gas (methane) engines.

9.48 Additionally, there are four flares at the site which will operate on an infrequent basis to ensure safe conditions. The flares will operate during engine start up: where it is necessary to ensure stable conditions within the engines prior to the introduction of the site-produced fuels; during shut down to maintain controlled conditions; or during emergency conditions: where an engine suddenly fails; or due to an uncontainable quantity of gas which is excess to requirements and requires venting for safety reasons. Of the four flares, three serve the engine and pyrolysis processes and the fourth provides a safety release for the gas holder tank. Flares will be 16.5 m in height.

PREDICTION OF POTENTIAL IMPACTS

9.49 The HMIP Technical Guidance Note (Dispersion) D1 methodology[3] has been used to identify the most appropriate stack height for the releases proposed. A D1 calculation has been run for the main chimney of this development and the details are included as Appendix 5. The results suggest that a stack height of 31 m would be required for this development.

9.50 It should be noted, that whilst the D1 assessment provides a good starting point for the calculation of stack height required, it cannot take factors such as local terrain or meteorological conditions into effect. Thus a comprehensive dispersion modelling exercise has been undertaken in order to assess the likely pattern of dispersion of pollutants from the stacks, and to ensure that the stack height promotes effective dispersion such that the resultant ground level concentrations of pollutants from the process are within the appropriate guidelines for the protection of health and the ecosystem.

9.51 The complete dispersion modelling report is presented in Appendix 6. The model was prepared by inputting data on the anticipated releases from each of the three discharge stacks. Comprehensive information on the site buildings was also included, as was data of local terrain and meteorological conditions.

9.52 The four site flares were not modelled as they will only ever be operational for short periods and are primarily designed as an emergency release (thus no data on the likely emissions from these points is currently available). It is relevant to note that including such temporary releases in a long-term modelling exercise, which assumes that releases are operational on a continuous basis, would result in a false conclusion.

9.53 Long term emissions from the engines were assumed to discharge on a continuous basis, despite some processes only expecting to operate for 50% of the time and no process actually achieving 100% operability. This is considered an appropriate surrogate for modelling flares which will rarely be used, and still retains a substantial element of worst case scenario assessment.

9.54 The output from the model was designed around a 3km by 3km grid, with the proposed site located at the approximate centre. Additionally, a number of sensitive receptors were included. The chosen receptors are detailed below and are designed to represent those locations where members of the public are likely to be regularly present and are therefore likely to be exposed to pollutants over the relevant averaging period of any associated assessment level. Sensitive ecological receptors such as SSSIs were included where these fell within the modelled grid.

9.55 Modelled sensitive receptors include:

- Castell Farm
- Penderyn Reservoir
- House at Penderyn Reservoir
- Ty Newydd Hotel
- Eden Industries
- Factory at the corner of Fifth Avenue
- Cors Bryn-y-Gaer SSSI
- Woodland Park 1 SSSI
- Woodland Park 2 SSSI

9.56 Although the D1 calculation suggested a stack height of 31m, modelling exercises were undertaken using various stack heights in order to determine the optimum release. Although the environmental assessment levels were not necessarily exceeded when applying lower stack heights (e.g. 30m), the most suitable stack heights identified were determined to be 35m and 40m, heights at which the ground level pollutant concentrations were some way off the relevant assessment levels. Where possible, background concentrations of pollutants have been included in the model, and often formed approximately 50% of the predicted environmental concentration.

9.57 The results in the table below demonstrate that all pollutant concentrations, including those which incorporate a background concentration, are within the Air Quality Objective, Environmental Quality Standard, National Objective or Environmental Assessment Level assigned to them. Pollutants remain within their respective assessment limit when considering any of the relevant averaging periods or the worst case hourly result where a shorter referencing period is relevant. A summary of the range of results reported is presented in Table 9.4:

Table 9.4 Summary of the Results of the Dispersion Modelling Exercise

Pollutant and Averaging Period	*Limit*	*Concentration Range*
Annual NOx ug m-3	30	19.5 - 23.69
Annual NO2 ug m-3	40	16.7 -19.61
Max Hourly NO2 ug m-3 (Minus up to 18 exceedences)	200	75.95 - 93.16
Max 15 Minute SO2 ug m-3 (Minus up to 35 exceedences)	266	31.18 - 42
Max Hourly SO2 ug m-3 (Minus up to 24 exceedences)	350	26.67 - 34.96
Annual SO2 ug m-3	20	4.3 - 4.96
Max 24 Hourly SO2 ug m-3 (Minus up to 3 exceedences)	125	11.9 - 15.13
8 Hour Running Average CO mg m-3	11.6	0.14 - 0.15
Annual PM10 ug m-3	40	23.11 - 23.38
Max 24 Hourly PM10 ug m-3 (Minus up to 35 exceedences)	50	24.3 - 25.33
Annual VOC ug m-3		0.6 - 0.86
Annual HCl ug m-3	20	0.21 -0.31
Annual HF ug m-3		0.0211 - 0.0306
Annual Hg	0.25	0.0011 - 0.0015
Annual Cd and Th ug m-3	0.005	0.0011 - 0.0015
Annual As, Cr, Co, Cu, Mn, Ni, Pb, Sb and V ug m-3	0.006	0.01 - 0.02
Annual Dioxin ug m-3		2.11E-09 - 3.06E-09

9.58 Table 9.4 presents the range of results recorded as the highest values across each gridded output, and gives the range for the 35m and 40m stack runs, utilising 5 years of meteorological data (2003 – 2007). The lower concentrations detailed in the table were the result of modelling a 40m stack, whilst the 35m stack resulted in the higher predicted environmental concentrations.

9.59 When testing the results against the Environment Agency criteria for insignificance, which indicates that concentrations equating to less than 1% of the long term assessment level, or 10% of the short term level can be screened as insignificant emissions, some pollutant concentrations can be considered as insignificant when considering the process contribution only.

9.60 However, when comparing the predicted environmental concentration which incorporates the background concentration, none of the pollutants modelled are considered to be insignificant. That said, the level at which insignificance can be determined is very small, and assuming the ground level concentrations remain below the assessment levels, there is considered to be little or no risk to human health or the environment.

9.61 Enviroparks confirm the proposed stack height at 40m, as this will result in a lower process contribution and therefore a lower predicted environmental concentration. In employing a higher stack, the resultant improvements to dispersion ensure that there is still a significant proportion of the assessment level available, and thus other potential increases in pollutant levels in the local area can still be accommodated whilst remaining below the limits.

9.62 Concentrations at all identified sensitive receptors were well below the assessment levels, and thus the potential impact on sensitive sites can be considered to be low.

9.63 For most substances released from the plant, the most significant effects on human health would arise from inhalation of pollutants. The air quality objectives discussed within the modelling report have been set by the various relevant authorities at levels which are considered to present no or minimum risks to human health. It is widely accepted that, if the concentrations in the atmosphere are less than the air quality objectives, then the pollutant is unlikely to have an adverse effect on human health. Therefore, since the total predicted concentration of each of the modelled substances at ground level was less than the respective air quality objective it can be concluded that the atmospheric emissions from the engines at the proposed Enviroparks site are unlikely to have any adverse effect on human health.

Traffic emissions

9.64 Enviroparks operation will increase the volume of traffic visiting the Hirwaun industrial estate. Vehicles emit many types of pollutants including NO_x, VOCs, CO, CO_2, SO_2 and particulates. In most situations, industrial and domestic pollutant sources, together with their impact on air quality, tend to be steady-state or improving over time. However, this is not always the case for traffic pollution, due to the increase in vehicle use exceeding the improvements due to better engine performance.

9.65 The transport assessment has applied various analysis and modelling techniques to determine the impact of the increase in traffic and the Design Manual for Roads and Bridges (DMRB)[4] Screening Method has been applied to two of the local link roads to determine the likely levels of pollutants which will be experienced at local receptors.

9.66 The DMRB assessment considered the current traffic flow rates at two locations along the A465, and one of these rates was also assumed to apply to the junction with the A4060, for which Annual Average Daily Traffic flow data was also available. The assessment considered the base traffic flow in 2008, subsequently increased to represent flows during 2010 and 2025. Predicted vehicle movements from the construction of the site were applied to the 2008 data, and operational traffic was included with the 2010 and 2025 data in order to determine the predicted contribution of the development traffic flows to the 'no change' situation of the current road loadings and their potential growth rates.

9.67 The contribution of the development was thus demonstrated for each year assessed, and which generally showed no change in any of the pollutant concentrations, with increases being consistently less than 1 ug m^{-3}. As such, the impact of the proposed development traffic on local air quality can be considered insignificant.

Construction

9.68 A Site Management Plan is proposed for the site preparation and construction stage which will ensure that full consideration is given to potential nuisance such as the creation of noise, dust or odour. A copy of the Draft Site Management Plan is included as Appendix 3 (ES volume 2). Appropriate measures could include:

- Undertake a daily assessment of potential odour and other nuisance at the site boundary during construction activities;
- Inform local businesses, residential and recreational facilities of any likely odour that cannot be avoided or other nuisance which may affect them. Information will be provided in advance where possible to include details of the likely timescales and mitigation measures in place;
- Consideration of weather conditions prior to undertaking potentially dusty works, and the provision of suitable mitigation techniques such as damping down;
- Sheeting raw materials or stock piles as necessary to control dust emissions;
- The creation of hardcore and/or paved roadways around the site at the earliest opportunity;
- The creation of a transport plan which considers the safest and most direct routes across the site, safe site speed limits and the routing of delivery vehicles.
- Record and investigate any complaints of odour or dust nuisance;
- Notify the Developer, either directly or through the Principal Contractor, of any complaints received and the results of any investigations.

Operation

9.69 Mitigation for operational air quality impact is inherent in the design of the facility and comprises a combination of abatement systems such as:

- Negative pressure ventilation in potentially odorous areas, discharging via the engine air intake or through carbon and / or biofilters;
- All operations which may have an impact on odour generation will be undertaken internally, and any movement of materials which may be potentially odorous, which cannot be piped or conveyed internally, will be moved within a closed container or sealed sack;
- No external feedstock storage;
- Frequent and regular observations of odour at key locations to identify any processing or maintenance issues promptly;
- An adequate stack height to promote effective dispersion;
- Good on-going management and housekeeping practices.

9.70 As a result of the inherent abatement and management systems proposed, it is not anticipated that any of the current air quality objectives or similar assessment levels will be jeopardised, and the potential for odour nuisance around the site and beyond the site boundary is limited.

9.71 It is anticipated that a management plan will be prepared and implemented for the operation which will take the form of a certified environmental management system. Good management and working practices will be employed at the site, and the systems implemented during the construction phase could be continued into the operational phase

if considered appropriate, or until such time as these are superseded by any other operational procedures.

9.72 A Pre-Operational Odour Management Plan is presented in Air Quality Appendix 4 and identifies how it is proposed to minimise the risk of odour issues.

EVALUATION OF RESIDUAL EFFECTS

9.73 Consideration has been given to the likely regulated emissions from the site engines, as well as the potential for the generation of nuisance emissions such as odour and dust, and emissions resulting from traffic generation. A robust scenario has been assumed for the assessment, and it has been considered unacceptable for the proposed development to breach of any current air quality objective. The effects have been defined using the following significance matrix:

Table 9.5 Significance matrix for the assessment of air quality impacts

Positive or Negative	*Significance*	*Description of Impact*
Negative	High	Predicted environmental concentration* is 75% of the assessment level or more and / or; A significant predicted increase in the potential for local nuisance.
Negative	Medium	Predicted environmental concentration* is 25-75% of the assessment level and / or; A moderate predicted increase in the potential for local nuisance.
Negative	Low	Predicted environmental concentration* is 25% of the assessment level or less and / or; A small predicted increase in the potential for local nuisance.
Either	Negligible	Predicted changes in the air quality are so slight that the effect is negligible with insignificant process contribution and / or; No change is predicted in the effect of any local nuisance issue.
Positive	Low	A small predicted decrease in the levels of pollution in the local air and / or; A small predicted improvement in a local nuisance issue.
Positive	Medium	A moderate decrease in the levels of pollution in the local air and / or; A moderate predicted improvement in a local nuisance issue.
Positive	High	A significant decrease in the levels of pollution in the local air and / or; A significant predicted improvement in a local nuisance issue.

* Where the predicted environmental concentration is not available, the assessment will apply the same consideration to the process contribution.

9.74 Comprehensive management and consideration for neighbours should ensure that the impact from dust emissions during construction remains a **low negative** effect.

9.75 Once operational, the site has limited potential for the creation of dust emissions as materials handling is undertaken internally. Therefore the potential effect from dust emissions once the site is operational is considered **negligible**.

9.76 The potential for emissions of odour from the site during construction is **negligible**.

9.77 Receiving various waste streams for recycling and the creation of energy might be considered to be an inherently odorous operation. The proposed control methods at the Enviroparks site which include containment, air filtration, sealed transfer of materials, covered systems, and good management and working practices, would provide a high level of control and abatement of potentially odorous emissions.

9.78 As identified in the Pre-Operational Odour Management Plan, potential failures of these normal control measures could occur, however at such times, further measures would be implemented to minimise the risk of nuisance. Despite the potential of odour release through the handling of wastes, the control measures proposed for the Enviroparks development would reduce the potential of odour from the site to one of **medium negative** risk and short term effect.

9.79 The dispersion modelling exercise applied information provided by the design engineers, the emissions data for which are considered to represent worst case results, not least because the model has been run to assume continuous operation, when in reality one engine set will only operate for 50% of the time and the other two will operate for between 89% and 92% of the time. The maximum ground level concentrations across a 3 square km grid have been reported, for five years of meteorological conditions, as have the highest ground level concentrations predicted at local sensitive receptors around the site.

9.80 The incorporation of background pollutant concentration data takes into account other local sources of pollution where these already exist. At the time of reporting, no other proposed development which may contribute to the levels of the pollutants modelled was identified.

9.81 The modelling exercise predicted no breaches of air quality objectives or assessment levels. When modelling a 40m stack, the process contribution / predicted environmental concentrations of all pollutants remained below 75%, ranging from less than 1% (insignificant) to 69%. It can therefore be concluded that emission to air from the process engines of the proposed development can be considered to have a **medium negative** effect on the local air quality.

9.82 Emissions from the traffic movements created by the proposed development have been assessed using the DMRB modelling tool and suggest that the impact of the proposed development on current and predicted future concentrations of pollutants is **negligible**.

REFERENCES

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2. Rhondda Cynon Taf Local Development Plan 2006 – 2021. Preferred Strategy January 2007.

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4. Design Manual for Roads and Bridges. Volume 11 Environmental Assessment; Section 3 Environmental Assessment Techniques. Part 1 HA 207/07 Air Quality. May 2007.