enviroparks
reuse, recycle recover

Enviroparks Hirwaun

environmental statement

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savills

Environmental Statement
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Chapter One
INTRODUCTION

BACKGROUND

1.1 Local authorities in Wales are required to achieve waste recycling targets set by the Welsh Assembly Government (WAG), reflecting landfill diversion targets defined in the European Landfill Directive. The targets will become more demanding over time, with fines incurred for waste landfilled over specified target thresholds. These targets apply in addition to the landfill tax, which applies on a rising scale for each tonne of waste disposed to landfill. As a consequence, local authorities are seeking alternatives to landfill.

1.2 The demise of landfill as the option of choice and convenience for waste disposal has focussed attention on alternative disposal methods that recover more of the value from waste. Enviroparks has been established to promote integrated waste processing, co-locating recycling and commercial operations on one site or 'park'. The concept is to treat diverse streams of waste materials as a resource and to recycle material and recover energy in the most efficient and controlled manner. This approach is designed to deliver a 97.5% diversion from landfill for such material, and would be the most advanced recycling operation in the UK.

1.3 In liaison with the Welsh Assembly Government, a site for the first Enviroparks facility has been identified at Fifth Avenue on the Hirwaun Industrial Estate, near Hirwaun in South Wales (figure 1.1). This environmental statement accompanies a planning application submitted by Enviroparks (Hirwaun) Limited (EHL) to Rhondda Cynon Taf County Borough Council and Brecon Beacons National Park Authority for this development.

ENVIRONMENTAL ASSESSMENT

1.4 Environmental impact assessment (EIA) is a process that aims to improve the environmental design of a development proposal and provide decision-makers with sufficient information about the environmental impacts of the project.

1.5 An environmental statement (ES) is a report that sets out the results of the EIA process. The ES is submitted with an application for planning permission and provides environmental information about the scheme, including a description of the development, its predicted environmental impacts and the measures proposed to ameliorate any adverse effects.

1.6 The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 include a list of those forms of development that require EIA in all cases (Schedule I) and in certain cases where thresholds are exceeded (Schedule II). EHL's proposal can be classified as a Schedule I (section 6a) development, as it involves the manufacture of a basic organic chemical on an industrial scale using chemical conversion processes in which several units are designed to be functionally linked to one another. Section 10 of Schedule I is also relevant as the proposal would have the capacity to provide

treatment to more than 100 tonnes of non-hazardous waste per day. Furthermore, the application site lies partly within the Brecon Beacons National Park and there is a Special Area of Conservation in the locality.

1.7 An environmental impact assessment has thus been undertaken for EHL's project. This document is the environmental statement that accompanies the planning application for the proposed development at Hirwaun.

THE PLANNING APPLICATION

1.8 The description of development for EHL's proposal is as follows:

Development of a sustainable waste resource recovery and energy production park comprising 27,562 m^2 of buildings and structures, including a 10,240 m^2 building for use class B1 / B2 use; process buildings; a gatehouse and weighbridge; a visitor centre and administration building; a 20 MW_e net capacity combined heat and power plant; with a 40 m ventilation stack; external anaerobic digestion, liquid and gas holding tanks; 30,352 m^2 of internal roads and hardstandings; vehicular parking; external security lighting; 17,497 m^2 of landscaping; vehicular ingress and egress from Fifth and Ninth Avenues, and associated utilities infrastructure.

1.9 The planning submission comprises the following documents:

- planning application forms and land ownership notification certificates;
- plans and drawings of the proposed development;
- a *Planning Policy Statement*, which reviews the proposal in the light of relevant planning, waste and energy policy;
- a *Design and Access Statement*, which explains the proposed design of the development and the arrangements for access.
- this *Environmental Statement*.

THE APPLICANT: ENVIROPARKS (HIRWAUN) LIMITED

1.10 EHL is an energy company that has developed a concept of co-locating waste recycling, energy recovery and associated commercial operations on the same site or 'park'. The company's approach is to recycle diverse waste streams using integrated advanced technologies to maximise recycling and energy generation with the minimum residual waste and environmental impact.

1.11 Based in Abergavenny, EHL is a wholly-owned subsidiary of Enviroparks Limited, which was established with the aim of developing a chain of Enviroparks in the UK.

Enviroparks Limited is owned by private investors, industrial property developer Marlborough Developments Limited and Enviroactive Limited. Enviroactive Limited was responsible for the development of a lead acid battery recycling plant in Ebbw Vale. This facility is the most modern of its kind in Europe and one of only two in the UK. It has a total processing capacity of 100,000 tonnes per year with 150 employees, and will become the biggest single producer of lead for roofing in the world.

THE PROJECT TEAM

1.12 EHL is advised by a team of experienced consultants. Companies working on the project design and the EIA of the scheme, together with the tasks and specialist issues for which each is responsible, are as follows.

Enertech – a specialist in renewable energy projects that is providing project management services, advice on process integration and design evaluation.

Savills – town and country planning consultant and the EIA coordinator for the project. Savills is also providing visual assessment and landscape architectural services.

Envisage – an environmental consultancy service undertaking the technical assessment of environmental effects.

Pell Frischmann – environmental, structural and civil engineers responsible for the investigation of ground conditions and hydrology and for the preparation of a lighting strategy for the proposal.

PRC Architects – the project architect, responsible for developing the site layout and building designs

1.13 EHL is also working in partnership with several specialist technology providers to deliver its aims. The combination of technologies brought together by EHL is designed to ensure high levels of efficiency with regard to fuel preparation and electricity production. These technologies are intended to represent Best Available Techniques for the functions they serve.

THIS ENVIRONMENTAL STATEMENT

1.14 The ES comprises a main report (this document), appendices presented in a separate lever-arch file, and separate non-technical summary (NTS). Following this introductory chapter, this main report is organised as follows:

2. Site description
3. Proposed development and land uses
4. Site selection, alternatives and scheme evolution
5. Planning policy context

6. Scoping and consultation
7. Community effects
8. Transport and access
9. Air quality
10. Noise and vibration
11. Ground conditions, drainage and flood risk
12. Landscape and visual effects
13. Ecology
14. Archaeology and cultural heritage
15. Conclusion

1.15 Chapter 2 provides a description of the existing site and current land uses and considers how this is likely to change in future irrespective of the proposed scheme being developed. Chapter 3 explains each element of EHL's proposal and, with the planning application plans and drawings, defines the physical and operational parameters that have been assessed during the EIA.

1.16 Chapter 4 summaries the site selection and evaluation process and explains how the layout has evolved through a series of iterations - effectively alternative options.

1.17 Chapter 5 provides a summary of relevant planning and other policy as directly relevant to the EIA of the current proposals. As already explained, a more detailed policy analysis is provided in a *Planning Policy Statement* that accompanies EHL's planning application. The 'scope' of the EIA is then identified in chapter 6. This explains how the ES provides the environmental information identified by the local planning authorities and statutory consultees during the preliminary stages of the EIA process.

1.18 The main element of the EIA process is then reported in chapters 7 to 14.
The final chapter of the ES provides a summary of the mitigation incorporated into the proposed development. This will assist in ensuring that these measures are translated into legal instruments and, where relevant, a construction and environmental management plan for the project. Chapter 15 also set out the residual impacts of the proposal after the proposed mitigating measures have been taken into account. Where appropriate, technical reports have been included as appendices to the ES.

1.19 A non-technical summary provides, in plain language, a summary of the ES and contains the essential illustrative material required to support the description of the proposal and its environmental effects.

THE APPROACH TO ASSESSMENT

1.20 The framework used to express the predicted significance of the environmental effects identified is explained in each ES chapter. In summary, unless best practice guidance for technical assessment dictates otherwise, each predicted impact and residual effect will be ascribed one of the following levels of significance:

- negligible;
- low;
- medium; or
- high.

1.21 Those elements of the development that have been introduced to mitigate potential adverse effects are identified within each chapter. The mitigation included in the scheme can be categorised into two types - 'inherent' and 'additional' mitigation. Inherent mitigation is amelioration that is a fundamental part of the scheme and can generally be represented in the application plans. Additional mitigation is generally less capable of being shown in the planning application drawings, because it might involve controls on the construction or operation of the development, for example. The need for additional mitigation might be enforced through planning conditions or obligations associated with a grant of planning permission for the proposals.

Chapter Two
SITE DESCRIPTION

LOCATION

2.1 The planning application site lies within the Hirwaun Industrial Estate, which lies to the north of the A465 'Heads of the Valley' east-west trunk road, close to its junction with the A4059 / A4061 north-south route between Brecon and the Rhondda Valley. Road access to the site is gained from the A465(T) Heads of the Valley road via the A4061 Rhigos Road, which leads onto Fifth Avenue. The site has existing road accesses from Fifth Avenue to the south and Ninth Avenue to the east. These are currently sealed to deter unauthorised access.

LOCAL SETTLEMENTS

2.2 The nearest large settlements in the area are Merthyr Tydfil 11 km to the east, and Aberdare, 7 km to the south-east. Local settlements include Hirwaun, 2 km to the south-east of the site, the village of Penderyn 2 km to the north-north-east, and Rhigos, which lies 1.7 km to the south-west of the application site. There are isolated smaller dwellings closer to the site, and two hotels.

THE IMMEDIATE SURROUNDINGS

2.3 The site is located in an area of varied terrain. Whereas the Hirwaun Industrial Estate occupies a generally level area of land, the land rises gently to the south and east, and more steeply to the east and north. Established land uses in the locality are also diverse, with a variety of manufacturing, storage and waste reclamation activities taking place on the industrial estate itself, and with a large area to the south-east of the industrial estate occupied by the workings of the former Tower Colliery, a coal mine that closed in 2008. Across Ninth Avenue from the application site stands a large industrial complex operated by Eden Industries. On the southern side of Fifth Avenue to the south-east of the site there is a waste wood processing and storage yard. The area to the north and west of the planning application site is more rural in character, comprising woodlands and well-defined fields used for pasture.

2.4 This urban-rural distinction is reflected in local authority boundaries, and it happens that the boundary between Rhondda Cynon Taf County Borough Council (RCT-CBC or 'RCT') and the Brecon Beacons National Park Authority (BBNPA) bisects the planning application site. For this reason, EHL's planning application has been submitted to both planning authorities.

2.5 Water storage, transfer and treatment facilities are a notable feature of the locality. Immediately to the north of the planning application site is the Penderyn reservoir, a lake formed by high artificial embankments. The reservoir is used for fishing by the Mountain Ash Fly Fishing Association (MAFFA). In addition to the reservoir there are operational pumping station and treatment facilities at the northern end of Ninth Avenue and on both sides of Fifth Avenue to the south-west of the application site.

THE SITE

2.6 The boundaries of the planning application site are clearly defined on the ground, comprising Fifth Avenue to the south, Ninth Avenue to the east, a woodland screen below the reservoir embankment to the north, and wooded hedgerows on the western side. A stream on the western side of the site flows into the River Camnant nearby.

2.7 The planning application site is pictured in figure 2.1. It is roughly square in shape and approximately 8.5 hectares in area. In general the land comprises flat grassland with scrub vegetation. The site is classified as previously developed land, and ground investigations have identified made-up ground overlying the natural geology. The site has a well-defined network of drainage ditches in a regular herringbone pattern. It is understood that the site was prepared for development by the former Welsh Development Agency approximately a decade ago. During the Second World War the site was used in association with a factory that made brass shell and bullet cases for munitions.

Chapter Three
THE PROPOSED DEVELOPMENT AND LAND USES

INTRODUCTION

3.1 This chapter provides a detailed description of EHL's proposals. It explains both the physical nature of what EHL proposes to build and the operations that will take place once construction is completed.

THE SCHEME IN OVERVIEW

3.2 The proposed site layout, including the principal built elements described in this chapter, is shown in figure 3.1. The central objective of the proposed development is to operate a series of advanced resource management processes in one place so that, together, they can recover as much material and energy as currently possible under closely-controlled environmental conditions. Thus, whereas many waste processing technologies such as incineration combust a large proportion of recyclable material and leave a substantial volume of ash or other material that is typically disposed of to landfill, the Enviroparks concept employs a series of alternative technologies that extract the full recyclable value from the waste stream, and which are capable of leaving only 2.5% of the original material for final disposal to landfill.

3.3 The proposed development would do this by:

- sorting the waste materials that arrive at the site efficiently to extract recyclable materials, and preparing the feedstock for further processing. This takes place in what is called a 'fuel preparation area';

- using five technologies in an interlinked manner to process the residual wastes and recover energy resources.

3.4 These five processes, each of which is explained later in this chapter, are as follows:

- a 'Biomax' separator that extracts oil akin to a biodiesel from organic materials such as waste food, and other food industry products.

- anaerobic digestion, in which biomass waste is placed in sealed vessels and warmed and stirred in the absence of oxygen. This process removes most pathogens and odour from the waste and provides a useful energy source in the form of methane gas and a clean water effluent.

- pyrolysis, in which solid organic wastes are converted to a useful fuel gas under high temperatures and in the absence of oxygen.

- a plasma gasifier process in which any materials are converted to simple gases or an inert, glass-like solid material that can be used as an aggregate in construction.

- the liquid and gas-based fuels produced through these processes would then be used to fuel a range of reciprocating engines located in a proposed 'engine house'. Some of this recovered energy will then be used by a 'high energy user' – a manufacturing employer with high energy needs, occupying an industrial unit proposed in the northern part of the Enviroparks site.

3.5 The proposed Enviroparks development at Hirwaun is intended to be the first in a series of such projects across the UK. EHL wants to use this site as a showcase for its resource management approach, to which end the various processes described will be accommodated in buildings of bespoke architectural design in a landscaped setting. Buildings on the site have been designed to achieve 'excellent' standard under BREEAM – the Building Research Establishment Environmental Assessment Method.

3.6 Furthermore, the proposed development includes a visitor centre designed to accommodate visiting parties from organisations such as schools and colleges. The site design will allow these visitors and other interested parties to be given an educational tour of the facility, enabling them to see the various recovery and recycling processes at close quarters.

3.7 The proposals will now be described in detail.

THE SCHEME IN DETAIL

Physical extent of development

3.8 Built development including roads and other hard-surfaced areas would cover approximately five hectares of the site and comprise 27,562 square metres (m^2) of buildings, 30,352 m^2 of external roads and hardstandings and 17,497 m^2 of 'soft' landscape, including mounds, planted areas and water features.

3.9 As explained in the overview section above, the site will be divided into several process areas, accommodating the following activities.

Fuel preparation area

3.10 Unacceptable waste supplies or 'feedstocks' will be refused entry if they fail an initial inspection and screening process. All feedstocks arriving on site would be checked for quality assurance purposes. Acceptable feedstocks would then be weighed on a weighbridge and directed to the appropriate process area. Fat or vegetable oil-bearing food

wastes, including waste classified as animal by-products, would be sent to the Biomax reception area. Other mixed feedstocks would be directed to the fuel preparation area where they would be transferred under controlled conditions into the first of two holding bunkers. The first bunker would be able to store the equivalent of three days' maximum throughput. Feedstocks would then be then shredded into the second holding bunker, capable of storing the equivalent of one day's maximum throughput.

3.11 The feedstock would then be mixed with water and fed into a slowly rotating drum approximately 30 metres in length. The drum contents would be heated by adding steam. Under these conditions the material would be reduced to a wet pulp. After about an hour the material would leaves the drum and pass directly into the recyclate recovery train. This would use water separation to recover metals, plastics, textiles, aggregate and wood. In addition, a cellulose fibre would be recovered which will be used as a fuel. This process uses established technologies and is designed to minimise the need for human intervention.

3.12 The water separated from the process would first be transferred to a day tank for testing prior to being sent to the anaerobic digestion process below. The cellulose fibre would be partially dried before being used as a fuel in the pyrolysers described below. The recovered recylates would be sold 'off site' Any non recyclables would be co-mingled with materials such as the non-degradable fibre from the Biomax process. These would be stored separately prior to treatment by the plasma converter.

3.13 The fuel preparation process will be accommodated in a building 7,082m^2 in floor area, in an L-plan with a maximum dimension of 132.95 m (eastern elevation) and 14.2m in height to the ridge. The building will be kept air-tight and under negative air pressure to contain odours, and the air extracted from the building will filtered and used as the air source in the proposed power house.

A 'Biomax' separator

3.14 The Biomax process employs centrifuge technology under relatively low temperatures to separate the feedstocks into oil, solids and water effluent. The oil is a form of biodiesel and would be used on-site to fuel a diesel engine with heat recovery. (see below). The water would be treated by anaerobic digestion before discharge to the site effluent plant, attaining the required standards before discharging it to the local sewerage network. The remaining solids would be passed forward for thermal treatment by plasma conversion. These processes are explained below. The Biomax process would be housed within a building specified to food industry standards. All operations including storage would occur inside the building under controlled conditions.

3.15 The Biomax separator will be accommodated in a building 2,742m^2 in floor area, 65.2m x 36.9m in plan with 14.2m x 23.8m offices, and 10.95 m in height to the ridge.

Enhanced anaerobic digestion

3.16 Anaerobic digestion is a natural process that involves the breakdown of organic material under sealed conditions in the absence of oxygen. The methane produced would be used as a fuel source for heat and power generation.

3.17 The anaerobic digestion plant would process the aqueous arisings from the fuel preparation area and the Biomax process. The by-product of this process is water. The digestion process would involve several processing steps. The dominant process vessels would include three tanks (15 metres in height and 20 metres in diameter). There would also be three holding tanks, each 13.5 metres in height and 8.6 x 8.6 m in plan, and a gas buffer tank to ensure the engines receive a steady supply of gas (13.5 m in height and 17m in diameter). The anaerobic digestion plant would be set 2.5 metres below local ground level and surrounded by a bund.

3.18 The capture and use of methane is regarded by the applicant as an important benefit of the proposals. Methane would otherwise arise naturally from the decay of organic wastes. Where this occurs in landfill sites, it is known as 'landfill gas'. If allowed to escape to the atmosphere, methane acts as a harmful greenhouse gas with over 20 times the potency of carbon dioxide. Its capture is thus inherently beneficial, and this benefit is multiplied where the methane is used as a renewable form of energy in preference to fossil fuel sources.

Pyrolysis

3.19 Pyrolysis has been used for centuries to make charcoal from wood. The process proposed by EHL is similar but would take place under carefully controlled conditions. The cellulose fibre produced in the fuel preparation area would be passed through a chamber and heated at high temperatures. No oxygen would be allowed to enter this sealed chamber and, as a result, the organic fraction cannot burn. As such, there would be no flame. The bulk of the material would be reduced to a gas, leaving a solid char. This gas would be collected, cleaned and sent to an engine within the building for use as a fuel. The remaining char would be high in carbon, being similar to charcoal. This would be collected and sent to a plasma converter (below) where it would also be used as a fuel.

3.20 The pyrolysis machines together with their associated engines will be housed in a building 2,241 m^2 in floor area, 36.9 m x 60.7 m in plan, and 8.5 m in height to the ridge. The building will have an exhaust stack 40 metres above local ground level and 2.5 metres in external diameter for the emission of engine exhaust gases from both the engines within this building and the engines located within the engine house. This would be the main emissions point to air on the site.

Plasma gasification

3.21 This part of the scheme would subject the remaining unrecyclable materials to high temperature thermal treatment, a process is known as plasma gasification. By intense heat and controlled addition of oxygen all organic material is reduced to a simple gas mix. The

purpose of the plasma torches is to provide an additional high energy gas reaction that ensures the completion of these reactions, resulting in an organically free gas. Any inorganic material such as residual glass or metal is reduced to a completely inert glassy aggregate that can be used in construction.

3.22 The plasma gasifier would be situated alongside the fuel preparation area. This element of the proposals will also incorporate external plant and structures, views of which would be contained by vertical screens.

Engine house and electricity generation

3.23 The processes described above would recover energy resources from the waste stream in three forms:

- oil produced by the Biomax process;
- methane gas produced by the enhanced anaerobic digestion process,;
- the simple gas produced by the pyrolysis and plasma gasification processes.

3.24 These fuels would be is piped to an array of engines with a net generation capacity of about 20 megawatts (MW). These engines would be accommodated in two adjacent buildings, both noise-attenuated and externally resembling a standard industrial unit, each referred to as an 'engine house'.

3.25 The engine house would be 1,573.2 m^2 in floor area, 55.2 m x 28.5 m in plan and 8.82 m in height to the ridge.

3.26 It is proposed that the engine houses will be connected to the local electricity distribution network by means of an underground 11 kV cable connected to the local electricity distribution network at the existing Rhigos sub-station, which lies just over 1 km to the south-west of the Enviroparks site.

Visitor centre and administration building

3.27 The Enviroparks proposal is intended to be a showcase development and a reference site to which waste authorities and contractors from the UK and beyond will be interested in visiting. Accordingly, the proposals incorporate a combined administration and visitor centre at the south-east corner of the site, visible from Fifth Avenue. This will accommodate the site's main reception, security and administration functions, along with an education and briefing area intended for use by commercial visitors and school and college parties of up to 40 in number. The adjacent car park thus includes space for a coach.

3.28 The visitor centre and administration centre is itself intended to be of interest to visitors, because it will be designed to BREEAM 'excellent' standards and will feature various sustainable construction features including a green roof. The building would have two

storeys and is 791 m^2 in floor area, would be built to an L-plan with a maximum external dimension of 20.8 m, and would be 9.4m in height to the ridge.

On-site high energy user

3.29 The Enviroparks concept seeks to recover as much material and energy resources as possible from the waste stream. In view of the fact that the proposed development would generate useful quantities of heat and power, and that heat is best used as close to its source as possible to avoid losses, a use class B1 / B2 industrial unit is proposed on the part of the application site. With energy costs currently high and forecast to follow a rising trend in the long term, it is envisaged that the availability of heat will be particularly attractive to inward investors.

3.30 An occupier for this unit has yet to be confirmed although, at the time of writing, there are indications that the building will be occupied by a company that makes plastic bottles and containers, using both heat and power generated on the site and, potentially, the plastic materials recovered in the fuel preparation building already described. The high-energy user building would measure 152.2 m x 61.7 m in plan and 14.2 m in height to the ridge, with a total floor area of 10,240 m^2.

Site access, circulation and parking

3.31 As figure 3.1 shows, vehicular access to the site would be from Fifth and Ninth Avenues. Internally, the site has been arranged to facilitate the safe and efficient movement of commercial vehicles around the site, and to ensure safe separation of operational and visitor traffic. The principal car park will be adjacent to the visitor centre and administration building in the south-east corner of the site. As noted, this will incorporate appropriate manoeuvring and parking spaces for cars and a visiting coach.

3.32 The development will incorporate covered bicycle parking and shower / changing facilities for cyclists. There is an existing bus stop nearby the site at Rhigos Road.

3.33 The visitor centre and administration building would incorporate provision for disabled access.

Site layout and landscape

3.34 The buildings and structures described above would be laid out in a manner reflecting a range of planning and design considerations. These are considered in detail in the *Design and Access Statement* that accompanies EHL's planning application. Beyond operational efficiency, these considerations include a desire to present a coherent and attractive elevational appearance in external views of the site – particularly from Fifth and Ninth Avenues and from the Penderyn reservoir embankment on the northern site boundary. As far as possible, the design intention is to present a development that would not look out of place in a use class B1 business park.

3.35 To this end, the buildings have been designed to what is an unusually high specification for this type of use, and structures of a more industrial appearance, such as the anaerobic digester tanks and the plasma gasifier, would be located towards the centre of the site so that they would be substantially screened by other buildings in external views. Building materials and colours have been selected to integrate the development into the local landscape in elevated views from the reservoir embankment and the slopes of Moel Penderyn to the north, and from Hirwaun Common (the slopes of Llethr Las, Twyn Canwyllyr and Pistyll y Graig) to the south.

3.36 Extensive landscape and planting is proposed around the periphery of the site and within the car park. Plant species would be selected to reflect the aims of integrating new planting with that which already exists on the site boundaries, providing a suitable visual foil for the buildings and some ecological benefit.

SUMMARY OF INPUTS AND OUTPUTS

3.37 EHL is thus proposing an integrated and advanced resource recovery process. At its heart are several material recovery trains and several engines. The economics of the plant hinges on keeping each of these elements supplied at an economic rate. The combined process is designed to effectively separate an extremely broad range of feedstocks so as to address as many local and national requirements as possible. In practice, whether a feedstock is a waste or non-waste is immaterial to the operation of the plant. The pricing structures and gate fees attributed to wastes are often greater than those for non-wastes. The process will be appropriately regulated and controlled so as to comply with the legal obligations of waste processing waste.

3.38 Accordingly, to define a specific daily throughput of feedstock is inappropriate as it is clearly dependent upon the composition and make up of that day's arisings. Given the need to state a throughput rate relevant to arisings and dispersals from the site the annual throughput of the site is unlikely to exceed 250,000 tonnes.

3.39 Electricity exported to the local electricity distribution network from the site is predicted to be in the region of 160,000 megawatt-hours (MW/h) of electricity per year based on maximum throughput as described above. Approximately, this is sufficient electricity to power approximately 40,000 homes (reference: energywatch.org.uk)

3.40 Recyclable materials or 'recyclates' recovered on the site will include ferrous and non-ferrous metals, plastics, and aggregates including glass

3.41 The Enviroparks process is designed to optimise both the quality and quantity of these recovered recyclates. If, for example, local household waste arisings of approximately 140,000 tonnes per year (t/yr) were processed, then 12,600 t/yr of plastics would be recovered along with 8,700 t/yr of ferrous metals, 1,340 t/yr of non-ferrous metals and 25,000 t/yr of aggregate. In addition, around 40,000 t/yr of cellulose fibre fuel will be recovered for use on site. Because household waste is also quite wet, around 42,000 t/yr of water would be extracted from this material and treated prior to discharge to the local sewers.

3.42 These figures exceed the government's recycling targets for 2025 which are for 70% of waste to be recycled.

3.43 All fuels produced on the site would be used in 'state of the art' reciprocating engines. These are fitted with waste heat recovery systems, the heat being used on the site or by the adjoining high energy user. Engine exhausts would all be monitored and controlled to achieve the required emission limits. All exhausts will be ducted to a triple-flue single stack as previously described.

3.44 Provision has been made for the disposal of approximately 2.5% by weight of unrecoverable material to non-hazardous landfill.

3.45 It is estimated that the overall development, including the high-energy user, will generate c. 200 full-time jobs or their equivalent.

PHASING OF DEVELOPMENT

3.46 The site will be developed in two phases. The first phase would see the construction to operations of the principle site activities. Phase 2 would see the development of the plasma gasifier facility, and the high energy occupier.

3.47 An Environmental Permit (EP) application will be submitted as a single submission, with allowance made for phased development. For the avoidance of doubt, this ES takes into account both phases of the development.

OPERATION OF THE PARK

3.48 The effective operation of the site will require a highly competent workforce. The skills needed can be found locally. Overall control by EHL will reside with a competent management team experienced in the relevant procedures including operations and maintenance, environmental permitting, health and safety, quality assurance, site security, weighbridge, grid connection, electricity production and transmission. Importantly, the EP licence conditions for the whole site will be under control of an EHL-appointed site director.

Environmental monitoring and community liaison

3.49 EHL thus proposes to build an exemplar project in the emerging resource management industry. The technologies proposed are well established and understood, but EHL believes that public understanding and acceptance will be essential for the success of this new industry. To this end, the applicant wishes to maintain a high quality professional relationship with the local community representatives, local authority officers and government regulators.

3.50 Accordingly, it is proposed that an independent liaison group is established as soon as practicable after planning permission has been granted, to allow local residents access to impartial advice regarding EHL and its operations. EHL proposes that this liaison group would be chaired by a local nominated representative, along with a nominated secretary. The other three members would ideally be comprised of a health professional (e.g. local GP), an engineer with experience in waste management and emissions and an environmental specialist. These could be independent volunteers selected by the community councils and the posts would be unpaid, although EHL would pay reasonable out of pocket expenses. EHL would provide whatever information which was reasonably requested in respect of its permissions and operations.

Chapter Four
SITE SELECTION, ALTERNATIVES AND SCHEME DEFINITION

INTRODUCTION

4.1 This chapter summarises the process followed by EHL to identify a suitable site for a proposed Enviropark and to define the content of the proposed development. The chapter begins with an explanation of the general operational requirements and the planning and environmental principles and criteria relevant to the locational decision, and then explains the various process and technical options considered by EHL.

GENERAL REQUIREMENTS

4.2 The starting point for the site selection exercise was for EHL to define its essential operational requirements. These can be summarised as follows.

Land availability

4.3 A site reasonable regular in shape and at least seven hectares in area was identified as the minimum area of land required to serve EHL's operational requirements. Given the intention to achieve a close integration of resource recovery and energy recovery technologies, and to support the requirements of a high energy third-party business occupier, split site options were considered to be unsuitable for an Enviroparks development.

4.4 The Enviroparks development has a 25 year design life. As such, the site should be available to EHL for at least this length of time.

Waste streams

4.5 From the outset, EHL wanted to be certain that appropriate 'feedstocks' were likely to become available. Regulations have conventionally classified many materials as waste, which implied that they had no economic value. EHL considers this to be inappropriate, and the purpose of the Enviroparks development is, as explained, to recover and use these resources. For these reasons the company prefers to refer to 'feedstocks' rather than 'waste'. The waste label has resulted in many of these resources incurring a gate fee for their treatment. EHL will process these materials in preference to non-waste materials that do not incur a gate fee. In a general sense, European Commission landfill diversion targets and the UK's landfill tax escalator are rendering landfill progressively less acceptable as a disposal route for waste. As explained in chapter five of this environmental statement and the *Planning Policy Statement* that accompanies EHL's planning application, Welsh

Assembly and local authority planning and waste policy lend strong support for the diversion of waste streams for landfill and for the waste hierarchy.

4.6 Waste collection, treatment and disposal arrangements are subject to a range of contracts. For example, local authorities issue contracts for municipal solid waste management. Their contractors might process all of the waste collected or might sub-contract aspects of the process – such as specialist or segregated waste streams. Industrial wastes, clinical waste from hospitals and other special wastes such as tyres are typically handled by specialist licensed contractors, and some of these materials cannot be recycled. In identifying potential sites for an Enviroparks proposal, EHL thus needed to satisfy itself that there was an acceptable likelihood of appropriate feedstocks being available in suitable volumes.

Transport connections

4.7 An Enviroparks development requires a site that facilitates the collection and delivery of feedstocks from dispersed sources and the export of recovered materials and any other residual materials along with products produced by the high energy user. In view of the proximity principle for waste processing and the localised nature of feedstock sources, the use of rail transport is not practicable. Accordingly, EHL requires a site with good road connections to the strategic highway network.

Grid connection

4.8 The Enviroparks development will provide fuel for an on-site combined heat and power plant with an electricity generating capacity of c. 20 MW. The plant must be designed so that all of the electricity generated can be exported to the local electricity distribution network. The availability of a conveniently located connection point to the distribution network, with the capacity to accept the electricity that EHL will generate, is thus an important locational criterion.

Water supply and drainage

4.9. The development will require a reliable supply of water in the quantities required to support relevant parts of the process such as the separation of waste in the fuel preparation area. It will also require a connection to a local sewerage network.

Planning and environmental status

4.10 EHL's preference is for a site formally allocated in the local development plan for industrial use, energy production or waste recycling use, and that is not subject to constraining environmental designations or prone to flood risk.

Community benefit

4.11 EHL is a company founded and based in South Wales, and wants to ensure that the economic, reputational and educational benefits envisaged for its Enviroparks development can be shared with the host community.

POLICY GUIDANCE AND PRINCIPLES

4.12 The relevant planning, waste and energy policy criteria influencing the site selection process are identified in the following chapter of this ES and considered in greater detail in the Planning Policy Statement that accompanies EHL's planning application. This analysis includes *Technical Advice Note (Wales) 21: Waste*. Para. C36 of TAN21 identifies the range of sites that might be considered for new waste management facilities. These include brownfield sites, minerals sites, industrial areas and redundant sites and buildings. Para. C37 requires locations for waste management facilities to be considered in the context of development plan policy and the Best Practicable Environmental Option (BPEO). Annex H of TAN21 explains the principles of BPEO and sustainable waste management options. EHL had regard to these principles in its site search and project formulation.

4.13 In accordance with TAN21 para. C35, EHL had regard to a comprehensive analysis of potential waste sites undertaken by the South East Wales Regional Waste Group (SEWRWG) on behalf of the Welsh Assembly Government (WAG). This group is led by a steering group of councillors from the eleven local planning authorities in the region with a technical group of officers from local government, the Welsh Assembly Government, Environment Agency Wales and other government bodies, and representatives from the waste industry and environmental groups. The first regional waste plan was approved in 2004, and is now at an advanced state of review. One of the main objectives of this review is to develop a regional waste plan spatial strategy to influence the location of future waste management and resource recovery facilities in south-east Wales.

4.14 In order to address the requirements of the EU Waste Framework Directive and TAN 21 while retaining adequate flexibility for local development plans and developers, the RWP Spatial Strategy contains two elements:

- Estimates of the total land area required for new in-building facilities, an analysis of the potentially available land area for new in-building facilities on *existing* B2 or major industry sites and B2 sites that have already been allocated in development plans, and a list of these sites.

- 'Areas of Search' maps for use in identifying *new* sites for in-building and open-air facilities.

4.15 According to the consultation draft regional waste plan, published by the SEWRWG in October 2007:

11.1.1 Advances in technology and the introduction of new legislation, policies and practices mean that many modern waste management / resource recovery facilities on the outside look no different to any other industrial building and on the inside contain industrial demanufacturing processes or energy generation activities that are no different to many other modern industrial processes in terms of their operation or impact.

11.1.2 For this reason, many existing land use class B2 'general industrial' employment sites, existing major industrial areas[60], and new B2 sites allocated in development plans will be suitable locations for the new generation of in-building waste management facilities this will be required in accordance with the RWP Technology Strategy.

4.16 The draft consultation document ranks 'areas of search' for new waste facilities according to a five-tier hierarchy, reflecting the sites' estimated levels of 'constraint' and 'potential'. Sites and areas of search are identified on a map generated by a geographic information system.

SITE SELECTION

4.17 EHL appraised its operational requirements against a review of the sites identified in the South East Wales Regional Waste Plan consultation draft to draw up a shortlist of potential sites for its first Enviroparks development. The Regional Waste Plan analysis was valuable for this purpose because provided a definitive 'long-list' of sites, identified on the basis of broadly-based assessment criteria that reflect relevant planning and waste policy in Wales.

4.18 EHL's site selection process then followed the following stages.

Stage 1: overview of available sites

4.19 In the first stage of its review, EHL established that a site located conveniently with respect to Rhondda Cynon Taf County Borough (RCT) would be desirable, given that this authority's municipal waste contract was being tendered. Having regard to transport requirements, EHL determined that its preferred site should ideally be easily accessible from the A465(T) Heads of the Valleys road, which offers good connections to north-south routes including the A4061 and A4059. A site in this part of South Wales would also allow waste to be brought in from neighbouring local boroughs and the national park if necessary and desirable.

Stage 2: shortlist of sites within Rhondda Cynon Taf CBC

4.20 EHL then reviewed the sites and areas of search identified by the SEWRWG in its draft Regional Waste Plan review in the RCT area. Of the 26 locations identified within RCT from the draft plan, most were too small to accommodate EHL's requirements. EHL concluded that it should focus on sites in the Hirwaun area.

Stage 3: the provisional choice of a site

4.21 A review of sites in the Hirwaun area was then undertaken, in consultation with landowners. At this time, EHL became increasingly aware that the Tower colliery at Hirwaun was due for closure. Whereas it was decided that sites on the colliery site itself were unsuitable for an Enviroparks development in view of timing issues and the need for a comprehensive decontamination and restoration strategy to be implemented prior to development, the potential of an Enviroparks development to provide new employment in a community suffering economic stress reinforced the attractiveness of the locality to EHL.

4.22 Discussions with WAG representatives steered EHL towards the site on Fifth Avenue in the Hirwaun industrial estate that forms the subject of the current planning application.

Stage 4: site verification

4.23 EHL then assessed the site from the following perspectives, in consultation with the local authorities and organisations such as the Environment Agency Wales, having regard to the following considerations:

i). operational suitability;
ii). effective use of physical resources;
iii). land use planning;
iv). environmental considerations;
v). design and mitigation;
vi). cost, deliverability and risk.

THE FINAL CHOICE OF SITE

4.24 EHL's assessment confirmed the suitability of the Fifth Avenue site as the optimum location for an Enviroparks development for the following reasons.

- **Land availability** – with an area of almost 8.5 hectares, the site is large enough to accommodate all of EHL's requirements, including the high energy user, with room for landscape works and planting around the periphery of the site.

- **Accessibility** – the site has direct access on to Fifth and Ninth Avenues, is close (1.7 km) to the junction between the A465(T) Heads of the Valleys road and the A4059 / A4061 north-south route, and is connected to this junction by roads designed for industrial traffic from the Hirwaun industrial estate.

- **Proximity** – the site is conveniently located with respect to the waste markets it is intended to serve.

- **Development plan policy** – as the following chapter explains, the site is allocated for industrial use in the adopted development plans of both RCT and BBNPA. In this context

it will be recalled that the draft regional waste plan regards sites of this nature as appropriate locations for in-building waste management facilities.

- **Environmental constraints** – there are no designations seeking to protect the site for its natural, historical, cultural or landscape value.

- **Site characteristics** – the site was levelled and prepared for development by the Welsh Development Agency during the 1990s. Being open, level and reasonably well drained, it is physically well suited to EHL's requirements.

- **Site setting** – EHL intends that, through a combination of architecture and landscape architecture, its proposals will present the impression of a business park in external views. The tree and hedge lines on the northern western boundaries will assist EHL in its efforts to achieve a nigh quality environment and to integrate the development into the surrounding landscape. The high reservoir embankment to the north of the site and the prominent industrial buildings occupied by Eden Logistics to the east will contain view of EHL's development.

- **Neighbouring land uses** – the site is on an established industrial estate. The containment of most processes in controlled environments within buildings is intended to protect the amenity of isolated residential properties and hotels in the general vicinity.

- **Utilities connections** – the Fifth Avenue site affords all of EHL's required utilities connections, including a convenient link to the local electricity distribution network for the export of power generated on the site.

- **Local economic benefit** – a development in the Hirwaun area would provide alternative employment for, amongst others, local people made redundant following the closure of the Tower colliery.

4.25 As chapter six of this ES explains, the applicant undertook further consultations with the local planning authorities and other parties during the course of the EIA and prior to the submission of this planning application. Nothing arose from these consultations to cast doubt on the information upon which EHL's site selection decision was based. Having regard to the range of environmental, economic, social, practical / operational and policy compliance considerations summarised in this chapter and elsewhere, EHL concluded that the Fifth Avenue site represented a BPEO solution for its waste recycling and energy recovery aspirations.

PROCESS OPTIONS

4.26 EHL's focus is on efficient resource recovery and reuse. In pursuit of these objectives, the company undertook a review of many technologies used both in the UK, the EU and beyond. In isolation, none of these technologies was found to be wholly applicable to the company's objectives. The solution appeared to be the careful selection of appropriate technologies and their careful integration into an Enviroparks-type development.

4.27 The technologies required by EHL fell into three distinct categories.

i). material separation;
ii). bio-energy recovery;
iii). other energy recovery.

Each of these is considered below.

Materials recovery

4.28 The conventional means of separating materials is to use air as the separating medium for the waste feedstocks. Unless there is a well-defined and consistent input, use of these technologies normally results in only a partial separation. This means that multiple stages are needed to achieve the recovery efficiency and decontamination of the recovered materials to which EHL aspires.

4.29 This conclusion was arrived at having visited and inspected several conventional mechanical and biological treatment processes in operation. EHL concluded that the few processes using water as the separating medium were capable of achieving the separation cleanliness and efficiencies required. Examples of this included a process in Israel, various autoclave and thermal processes, in the UK and the '*Dano-Drum*' type processes employed in the USA. Whilst some may regard the latter as not being a 'wet' process, in process engineering terms a combination of moisture and temperature is used to not only clean surfaces but to reduce fibrous materials such as paper to a pulp. It is the easier separation of the pulp from the cleaned materials that gives the process advantage.

4.30 EHL thus decided to pursue a wet process. None of the established processes has actually been replicated in an unmodified way by EHL because, whilst they meet the quality criteria, they fail to meet other requirements such as energy efficiency, minimal plant footprint or costs.

Bio-energy recovery

4.31 Many biological waste streams are already wet when sent for recovery, including food waste. This condition, together with an energy efficiency hierarchy developed by EHL, highlights that anaerobic digestion is the preferred energy process for these materials. As a result EHL first concentrated on the use of this established technology. However, a review of existing plants demonstrated that much of the European industry has failed to modernise its technologies in line with best industrial practice. For example, many conventional anaerobic digestion facilities still employ high retention times as opposed to separate hydrolysis to achieve even a mediocre gas conversion. This fails to meet EHL's needs. EHL's design thus utilises modern industrial anaerobic digestion technology, as used by breweries or distilleries, affording a low residence time with a high gas conversion.

4.32 A further consideration is that modern kerbside collection and separation schemes have directed much of the more highly biodegradable material into the compost market as

opposed to the energy market. As a result much of the bio-energy source material remaining is a complex cellulose fibre that is known not to hydrolyse easily, rendering it inappropriate for anaerobic digestion. EHL's research concluded that pyrolysis is the most appropriate technology for processing this material. Given the quality and cleanliness of the cellulose fibre produced by EHL a longer term ambition is to use this material as a transportable fuel. As a result, a small scale modular design of pyrolyser will be used by EHL.

Other energy recovery

4.33 Anaerobic digestion is inappropriate for non-biological materials. EHL energy hierarchy for such materials starts with pyrolysis and progresses to gasification, in order to optimise the production of energy. Pyrolysis needs to be operated with appropriate fuels and conditions to produce a minimal quantity of 'carbon char' - a by-product that would require further treatment. EHL inspected pyrolysis units in use and development in the UK and the mainland Europe in developing its proposals for this element of the process.

4.34 EHL's specifications for a gasifier included a requirement to deliver total organic destruction to the feedstock. Various gasifier design options exist, including air or oxygen-blown gasifiers, with or without plasma assistance. Of these, air blowing is cheaper, but lower temperatures normally result in lower organic destruction. As a result, EHL has selected a conventional air blown gasifier with a secondary plasma-assisted gas clean up-system. This ensures both the efficiency and effectiveness required by EHL at an acceptable cost. In arriving at this conclusion all types of gasifier were visited at various locations across the UK, mainland Europe, the USA and Canada.

CONCLUSION

4.35 Both in its technological specification and in the identification of a suitable site for the Enviroparks development, EHL pursued a structured process of research and review, informed by consultations with relevant authorities and expertise. This approach is in accordance with relevant policy guidance including TAN21: Waste, and is consistent with BPEO principles.

Chapter Five
PLANNING POLICY CONTEXT

INTRODUCTION

5.1 The purpose of this chapter is to consider the principal policy issues relevant to this application, having particular regard to development plan policy for the site. Consideration is also given to policy and strategy at a national and international level.

5.2 More detailed consideration of the scheme against available policy and guidance is given in a *Planning Policy Statement* accompanying this application.

CONTEXT

The global imperative

5.3 The consistent concern of many of the policies reviewed in this chapter is the need to contain global climate change by reducing the emission of greenhouses gases, particularly carbon dioxide (CO_2), that contribute to global warming. The extensive use of fossil fuels that accompanied the industrialisation of the world's economy has released large volumes of CO_2 back into the atmosphere. The accumulation of greenhouse gases in the upper atmosphere reduces the planet's ability to reflect solar radiation back into space, resulting in a gradual increase in mean global air temperature. Amongst other things, this is thought to be causing a retreat of polar icecaps and a trend towards more extreme weather, with hotter, drier summers and warmer, wetter and windier winters anticipated for Wales. Rising sea levels caused by the melting of the polar ice sheets could have profound adverse consequences for coastal communities and residents of other low-lying areas.

5.4 The obvious response to this challenge is to reduce fossil fuel use, partly by using energy more efficiently, and partly by finding alternatives. A recurrent concern of the policies summarised in this chapter is the need to develop renewable sources of energy - forms of energy that occur naturally and repeatedly in the environment, including energy resources that are currently locked up in the waste stream.

This chapter

5.5 This chapter examines the planning and energy policy context within which EHL's development proposals have been prepared. Section 38(6) of the Planning and Compulsory Purchase Act (2004) requires that planning applications should be determined in accordance with the development plan unless material considerations indicate otherwise. The application site falls under two separate Local Planning Authorities and the Development Plan thus comprises the following:

For the south-eastern part of the site:

- The Mid Glamorgan (Rhondda Cynon Taff County Borough) Replacement Structure Plan 1991-2006 (adopted January 1999);
- Rhondda Cynon Taf (Cynon Valley) Local Plan (adopted January 2004).

For the north-western part of the site:

- Brecon Beacons NPA Local Plan (adopted May 1999);
- Brecon Beacons NPA UDP (approved for development control purposes but not formally adopted).

5.6 For the avoidance of doubt, BBNPA advises that its UDP provides 'a more up to date and relevant planning framework'[1] than the Mid-Glamorgan Structure Plan, and therefore the authority 'has determined to afford greater weight to the UDP in the determination of planning applications' than to the Structure Plan, despite not having formally adopted it. The Brecon Beacons National Park Authority (BBNPA) advises also that a later 'Authority-Approved UDP' (April 2007) is more relevant than the extant Local Plan, despite the fact that the UDP has not formally been adopted. Consequently this plan is considered in this chapter alongside the formally-adopted development plan policies.

5.7 Other material considerations affecting the application include national and regional waste and energy strategies, Planning Policy Wales, the Wales Spatial Plan, and Technical Advice Notes (TANs), and these are also considered in this chapter.

5.8 It is beyond the scope of this chapter to summarise all aspects of national planning policy guidance that might be of relevance to the current proposals. However, the Planning Policy Statement that accompanies this application provides a fuller review, and relevant provisions are also considered in the thematic chapters of this Environmental Statement.

INTERNATIONAL OBLIGATIONS

Global agreements

5.9 The 1992 United Nations Framework Convention on Climate Change was negotiated by an Intergovernmental Negotiating Committee (INC) and was opened for signature at the 'Earth Summit' that met in Rio de Janeiro in June 1992, coming into force in March 1994. It recognised that human-induced changes to the atmosphere are affecting the climate and it set out to ensure that atmospheric concentrations of greenhouse gases are stabilised at a safe level.

5.10 The Kyoto Protocol set internationally-agreed and binding targets for reducing emissions of greenhouse gases up to 2012. The Kyoto targets must be seen as only a start, as it has been estimated that a 60-70% cut in greenhouse gas emissions will probably be

[1] Foreword to the UDP

required to stabilise CO_2 levels in the atmosphere. Through the Kyoto Protocol, the UK has a legally binding target to reduce emissions of greenhouse gases by 12.5% below 1990 levels in the period 2008-2012. In furtherance of this, the UK government has also set a domestic goal to reduce emissions to 20% below 1990 levels by 2010.

European Union

5.11 The EU Framework Directive on Waste provides the overarching legislative framework for the collection, transport, recovery and disposal of waste, and includes a common definition of waste. The Directive requires all member states to take the necessary measures to ensure that waste is recovered or disposed of without endangering human health or causing harm to the environment, and includes permitting, registration and inspection requirements. The Directive requires member states to take appropriate measures to encourage first, the prevention or reduction of waste production and its harmfulness and, second, the recovery of waste by means of recycling, re-use or reclamation or any other process with a view to extracting secondary raw materials, or the use of waste as a source of energy. Member states are also required to prepare a waste management plan in order to attain these objectives and establish an integrated and adequate network of disposal installations.

5.12 The Landfill Directive aims to prevent or reduce as far as possible negative effects on the environment from the landfilling of waste, by introducing stringent technical requirements for waste and landfills. It also sets targets for the reduction of biodegradable municipal waste going to landfill. In response, the government is seeking a reduction to 50% of 1995 levels by 2013.

5.13 The EU's Emissions Trading Scheme (ETS) came into force on 1 January 2005 and aims to reduce emissions of CO_2 and combat the threat of climate change. Member states must ensure that each industrial or electricity generation plant covered by the scheme holds a greenhouse gas emissions trading permit - in effect, a licence to operate and to emit CO_2. The ETS provides financial incentives for large energy users to reduce CO_2 emissions, and procuring energy from renewable sources is an important means of doing this. However, for the desired CO_2 emissions reduction to take place there needs to be a substantial increase in renewable energy generation capacity.

5.14 In 2001, the European Commission approved a Renewable Energy Directive which aims to achieve an increase in renewable energy's share of total energy consumption from 6% to 12% by 2010 across the EU, and to create a basis for a future European Community renewable energy framework. The Directive sets the UK an indicative target of increasing the percentage of electricity production derived from renewables to 10% by 2010.

The UK Government Sustainable Development Strategy (2005)

5.15 This sets out a framework for all government policy, seeking to emphasise sustainability in all areas, which is summarised as 'living on the earth's income rather than eroding its capital'. The document stresses that there is a pressing need for the economy to become less reliant upon CO_2, less damaging to the environment, and more efficient. To this end it highlights the need for sustainable consumption and production. The reduction, re-use and re-cycling of waste in accordance with the waste hierarchy is fundamental in this. The strategy also particularly highlights the need for a 'profound change' in energy production and use, particularly in terms of the major greenhouse gases CO_2 and methane, in order to minimise climate change. The development of the renewable energy sector is vital in this regard.

UK Climate Change Programme (2006)

5.16 This programme describes Climate Change as '*the greatest long-term challenge facing the world today*' and sets out actions in furtherance of commitments under Kyoto. The energy supply sector is identified as being the biggest single contributor. Renewable energy is a particular priority and a variety of benefits to biomass use are highlighted, particularly in terms of the local economy and the ability to simultaneously address problems arising from landfill.

DTI Energy White Paper (2003)

5.17 The White Paper maintains the 2010 national target for the share of electricity generated from renewables at 10%, whilst raising the aspiration for 2020 to 20%. In addition to the environmental and low-carbon benefits of renewable energies, other important benefits are noted such as reliability of energy supply, promotion of competitive markets, and affordability of energy for households.

UK Biomass Strategy 2007

5.18 This strategy outlines the particular benefits of biomass energy as a low-carbon and sustainable replacement for fossil fuels, and confirms that this sector 'will need to increase significantly and sustainably', reflecting similar aims at the European level. Implementation of the strategy is intended to exploit an estimated potential resource of around 96.2 TWh, whilst also significantly offsetting methane, which constitutes around 3% of total UK greenhouse gas emissions.

DEVELOPMENT PLAN POLICY

Mid Glamorgan (Rhondda Cynon Taf) Replacement Structure Plan (1991-2006)

Employment allocation

5.19 Policy E1 provides a clear policy basis whereby employment development of the application site is, in principle, considered acceptable subject to detailed matters, and this is supported by a specific employment allocation for the planning application site made under policy E4.

Environmental policies

5.20 Structure plan policies EV5-6, relating to nature conservation, are applicable and their overriding objective is to prevent harm, particularly to nationally and internationally-designated sites. The Ecology chapter of this Environmental Statement has particular regard to the presence of a Special Area of Conservation (SAC) and Sites of Special Scientific Interest (SSSIs) in the locality. The overall finding is that there would be no significant adverse effects on nature conservation interests.

5.21 Structure plan policy EV12 resists proposals that would be at risk from flooding, or which would be likely to increase flood risk elsewhere. The requisite Flood Risk Assessment has been undertaken, and necessary mitigation measures form part of this application, as chapter 11 of this ES explains. Policy EV13 seeks to protect trees in the landscape, and promotes the planting of native species in development proposals. This guidance is taken into account in the landscape design and mitigation strategy for the project, explained in chapter 12 of this ES.

Transport

5.22 Structure plan policies T8, T9, T15 and T16 encourage a modal shift away from car use with support for public transport, walking and cycling. Policies T10, T11 and T12 oppose development that would have adverse implications on the highway network. These policy requirements are considered in chapter 8 of this ES. As chapter 4 of this ES explains, transport and access considerations influenced the choice of site for the Enviroparks development. The Hirwaun Industrial Estate is close to a junction with the A465(T) Heads of the Valleys road, is connected to local communities by bus, and is conveniently reached from these communities by bicycle.

Energy and utilities

5.23 The structure plan supports the development of utility services and an increase in renewable energy use, subject to environmental considerations. Energy crops, landfill gas, sewage gas, and waste-sourced energy are considered by the authority to be locally relevant. Structure plan policies U1, U2, U4 and U5 state that environmental effects and conflicts should be minimal and that damage or disturbance to important sites should be

avoided. The applicant has taken these considerations into account in the formulation of the current proposals, as later chapters of this ES explain. The current proposals include renewable energy generation whilst ensuring that processes are contained within buildings and subject to appropriate environmental control and monitoring.

Brecon Beacons National Park Authority Local Plan (1996-2006)

5.24 In summary, the local plan's strategy for employment and economic development is to provide for limited employment and industrial growth in the National Park on allocated sites, whilst preventing detrimental environmental effects on the surroundings – with landscape amongst the foremost considerations. The current proposals would occupy land allocated for industrial development by policies EM1 and EM2 of the local plan. Later chapters of this ES examine how EHL has responded to the local plan's concerns to avoid significant adverse effects on the National Park.

5.25 The National Park Authority regards this plan as outdated and superseded by the Unitary Development Plan.

Brecon Beacons National Park Unitary Development Plan (April 2007)

5.26 The overall objectives of the Plan are[2]:

1). conserving and enhancing the natural beauty, wildlife and heritage of the park;
2). promoting public understanding and enjoyment of its special qualities;
3). fostering socio-economic wellbeing in its communities; and
4). ensuring that development is sustainable.

5.27 These objectives were taken into account by EHL during the site selection process for the Enviroparks project, and were taken into account in the scoping of the current environmental impact assessment, as chapter six of this ES explains.

Employment, renewables and waste

5.28 UDP policy SS4 allocates the planning application site for B2 (general industrial) uses, effectively creating a presumption is in favour of proposals for industrial or business uses subject to other material considerations. In this context it is relevant to note that the Enviroparks proposal corresponds with the 'eco-park' concept for integrated resource and energy recovery, as identified in the Welsh Assembly Government's Technical Advice Note 21: Waste. TAN21 regards industrial estates as appropriate locations for eco-park development.

5.29 UDP part 1, policy 8 encourages sustainable energy generation. UDP policy S11 is supports biomass proposals, subject to neighbourhood amenity and transport considerations.

[2] These are paraphrased for brevity, however the Planning Policy Statement quotes them in full.

The proposed Enviroparks development would employ liquid and solid biomass materials as sources of renewable energy. Chapters 8-14 of this ES examine the effects of the proposals on amenity and transport.

5.30 UDP policy S13 allows for waste schemes within the National Park where there is a need identified within the Regional Waste Plan and where detriment to Park objectives in terms of landscape, nature conservation and tourism would be avoided. In the current context, the need for integrated waste recycling facilities is identified in the South East Wales Regional Waste Plan (RWP), as explained in the previous chapter of this ES. The RWP includes the Hirwaun Industrial Estate in an 'area of search' for sites for such facilities.

5.31 An Enviroparks development would also be consistent with UDP Part 1 Policy 9, which promotes the efficient handling of energy and waste and increased recycling.

Design

5.32 UDP policies G3-G6 promote a high quality of design in the National Park and minimal development impacts, necessitating respect for surrounding landscapes and local amenity whilst avoiding adverse effects. EHL's planning application is accompanied by a Design and Access Statement which explains how these principles influenced the design of the current proposals. The effects of the Enviroparks proposals on views towards, in and out of the National Park are analysed in chapter twelve of this ES.

Rhondda Cynon Taf (Cynon Valley) Local Plan (Adopted Jan 2004)

Overall strategy

5.33 The Strategy of the Cynon Valley Local Plan is 'to secure the economic regeneration of the Cynon Valley by providing opportunities for new investment through the allocation of land and the control of new development, without prejudice to the conservation and enhancement of the built and natural environment'.

Employment, energy and waste

5.34 Local plan policies B1 and BP3 allocate the application site for 'large-scale industrial and business users'. These policies suggest that the site is, in principle, a suitable location for an Enviroparks development. Policy B4 seeks environmental improvements in industrial and commercial areas where possible. This is consistent with EHL's aspiration for a high quality development capable of showcasing the Enviroparks approach to resource recovery.

5.35 Policy ENV21 of the local plan supports renewable energy schemes where adverse landscape effects are avoided. Local plan policy WD1 relates to waste recycling facilities and supports such development in principle, provided subject to the satisfactory outcome of EIA studies. This ES has been prepared for EHL to inform such considerations.

Planning Policy Wales

5.36 Planning Policy Wales (PPW) contains various objectives relating to energy, pollution and waste, which seek collectively to maximise use of renewable resources, minimise waste, and encourage sustainable patterns of land use which do not cause or exacerbate environmental harm or risk. EHL's proposals and its design approach for the Hirwaun site, which has involved an iterative process of site and scheme assessment and design mitigation, seek to respond to these priorities.

5.37 Economic growth and regeneration is a priority of PPW, and the relationship between the economy and social well-being and quality of life is made explicit. Chapter seven of this ES thus examines the economic and community effects of EHL's proposals.

Wales Spatial Plan

5.38 The Wales Spatial Plan sets out a strategy that would meet the needs of society through economic change whilst protecting the natural environment and the distinctive identity of Wales. The plan specifically identifies the Heads of the Valleys area as an economically disadvantaged area in need of regeneration. Again, chapter seven of this ES examines the economic and community effects of EHL's proposals. In a regeneration context, it is noteworthy that EHL is a local company seeking to establish an exemplar development template that can be replicated elsewhere in the UK.

Technical Advice Notes (TANs)

5.39 The applicant and its design and EIA team took account of the following TAN documents during the preparation of the planning application. These include

- ***TAN 5: Nature conservation and planning*** – the guidance of which is taken into account in chapter 13 of this ES.

- ***TAN8: Renewable Energy*** – which refers to the renewable energy generation target of 10% of UK demand by 2010, and which offers explicit support for the energy recovery technologies included in the current proposals, including anaerobic digestion and combined heat and power.

- ***TAN12: Design*** – the advice of which is reflected in the Design and Access Statement that accompanies EHL's planning application.

- ***TAN15: Development and flood risk*** - the guidance of which is taken into account in chapter 11 of this ES.

- ***TAN18: Transport*** - the guidance of which is taken into account in chapter 8 of this ES.

- ***TAN21: Waste*** – which establishes general principles for waste planning that EHL took into account in the site search for and formulation of the current proposals. Amongst other things, TAN21 promotes the waste hierarchy, the proximity principle and self-sufficiency in waste development.

5.40 TAN21 supports materials recovery and recycling facilities, energy recovery and combined heat and power systems. Of the various types of waste plant described in TAN21, the EHL scheme corresponds most directly to the 'eco-park' concept which is 'commended to local planning authorities' and 'should be regarded positively by local planning authorities'. For this type of development, existing industrial estates are identified as potentially appropriate locations.

5.41 TAN21 echoes the general concern that the landscape and scenic value of national parks should be strongly protected. However, it notes that national park authorities are also waste planning authorities and should participate fully in regional waste planning, and that no specific restrictions are placed upon proposals for waste handling facilities within their boundaries.

CONCLUSION

5.42 This chapter has outlined a wide range of planning, waste and energy policy of general or specific relevance to EHL's proposal for an Enviroparks development on the Hirwaun Industrial Estate. A more detailed review is, as noted, provided in the *Planning Policy Statement* that accompanies EHL's planning application. Based upon these reviews, it is evident that the Enviroparks development would respond positively to a wide range of policy concerns concerning waste recycling, energy production, environmental protection and economic and social regeneration. At the same time, the review highlighted a range of environmental considerations to be addressed in the EIA. These have been reflected in the scoping exercise for the environmental assessment of EHL's proposals, as the following chapter explains.

Chapter Six
SCOPING AND CONSULTATION

EIA SCOPING

Introduction

6.1 This chapter describes the scoping and consultation process that has been undertaken for the Enviroparks scheme. Scoping is an important part of the EIA process which is used to identify the environmental issues that need to be assessed and to ascribe an appropriate level of importance to each issue so that the EIA work is properly focussed.

6.2 The EIA Regulations do not stipulate that scoping is mandatory, although Regulation 10 enables an applicant to request a scoping opinion from a planning authority. This requires the local authority to seek advice from key consultees and then set out their opinion on what information should be included in the ES. Government guidance on EIA emphasises that undertaking a thorough scoping exercise is good practice. The guidance highlights also that scoping should involve consultation before the submission of a planning application.

EIA scoping with the planning authorities

6.3 In advance of the planning application, a scoping report was submitted to both RCTCBC and BBNPA in May 2008 with a request for a formal scoping opinion to each of the planning authorities. The report was able to draw on information regarding ground conditions reported in 1995 for the Welsh Development Agency in connection with preparation of the land for development, and existing environmental information available from sources such as the Countryside Council for Wales, Environment Agency Wales and other government agencies.

6.4 The scoping report gave an outline of the environmental issues that would be examined in the EIA. Each of the environmental issue sections included information on the baseline conditions, the potential effects that could arise and the potential mitigation that could be provided. To ensure that a comprehensive assessment was achieved, comments were invited on the intended scope of the EIA, inviting reviewers to consider whether:

- there were any potential significant impacts that had not been identified;
- the intended method of assessment was appropriate; and
- if there were any additional mitigation measures that should be considered.

Meetings with local planning authorities

6.5 Prior to submitting the EIA scoping report, meetings were held with officers of BBNPA and RCTCBC to review the key issues that needed to be considered in the planning submission.

6.6 To assist this, RCT officers with responsibilities for planning, development control, landscape, highways, drainage and pollution control were consulted. It is relevant to note that discussions on the methodology for detailed EIA studies, such as for transport, were being conducted by members of the applicant's EIA team concurrently as part of their normal approach to assessment.

Formal EIA scoping opinion from RCTCBC

6.7 In June 2008, RCTCBC provided a formal response to the scoping exercise. It confirmed that the content of the scoping report presented a reasonable basis for progressing the EIA and added a number of comments from officers in addition to those documented in a note of the meeting in May. In summary, these comments were in respect of:

- ***transport*** – RCT Highways department provided the scope of information for the Transport Assessment
- ***landscape*** – RCT advised that the Countryside Council for Wales's *Landmap* should be used alongside the guidance from CCW cited in the scoping report.
- Assessment of the potential ***visual effects*** should include illustrations such as photomontages.
- RCT also consulted local council members on any ***specific local views*** that might be considered in the assessment.
- ***TAN21: Waste*** – to which the ES should have regard.
- The effects on ***air quality*** should be considered with reference to the information contained in the Stage 3 Detailed Assessment for NO_2 (April 2007).

6.8 No response on the scoping report was received from BBNPA. However, a meeting with planning officers to discuss the project was held on 30 April 2008.

6.9 Chapter 12 sets out a comprehensive account of the methodology used for the landscape assessment, in respect of the above, CCW's *Landmap* has been utilised, and photomontages have been prepared in developing the scheme design and assessing the potential visual effects of the scheme. Nine visual receptor locations were incorporated in the visual effects assessment on the basis of the information provided to RCT by local councillors.

6.10 The Environment Agency Wales also reviewed the EIA scoping report and offered comments concerning:

- the local planning authorities' role as competent authority in respect of assessing whether there would likely be any significant effect on the Blaen Cynon SAC. Subsequent correspondence confirmed EAW's satisfaction with the scope of ecology survey work proposed;
- the need to identify licensed and un-licensed abstractions in the area;
- the need to confirm with Welsh Water that the discharge of treated effluent to the local sewerage network should not cause Hirwaun treatment works to fail any discharge consent limits;
- the need to include consideration of how the development would affect surface water and flood risk.

Consultation by the project team on technical assessment

6.11 Additional consultation has been undertaken regarding specific elements of the technical assessment as follows.

6.12 The transport assessment was conducted after consultations with the Highways Development Control and Adoption Manager and the Transportation Strategy Co-ordinator of RCT-CBC. Additionally, one of the council's chosen auditors, Capita Glamorgan Consultancy, was involved in the discussions. Various issues were raised regarding the production of a suitable transport assessment, and these are detailed within the transport and access chapter of this ES. Guidance received included:

- the need to undertake peak period surveys at five roundabouts in Hirwaun, and automatic traffic count (ATC) data to be obtained from Fifth Avenue in order to inform a Stage 1 Road Safety Assessment;
- junction assessments (ARCADY) are required at the five roundabouts to be surveyed;
- the proposed site access junction on Fifth Avenue as proposed initially by EHL, which formed a staggered access, should be modified. This was undertaken;
- the principles of a Travel Plan are to be included in the Traffic Assessment. Again, this has been done.

6.13 The noise and vibration study was informed through consultation with Rhondda Cynon Taff County Borough Council prior to the undertaking of the monitoring exercise. The scope of the monitoring surveys was discussed and agreed. Representation was also made to the Brecon Beacons National Park Authority regarding the proposed noise assessment scheme, although no response was received.

6.14 The provision of water and drainage and the options to discharge trade effluent into the local sewer were discussed with Dwr Cymru Welsh Water, initially through a pre-planning request and then through the supply of information as to the nature of the trade effluent from the site. Dwr Cymru Welsh Water identified the potential for water supply and domestic sewerage treatment, and identified the nearest drainage runs. The water company advised that clean surface water run-off would have to be discharged separately, through the use of a soak-away or similar. Initial comments on the discharge of trade effluent suggest that the Dwr Cymru Welsh Water Sewage Treatment Works has sufficient capacity for the proposed volume flow, but would require effluent from the facility to be treated to a high standard, and to omit any effluent from the biomax facility. Copies of the Dwr Cymru Welsh Water responses to Enviroparks' enquiries are included in Appendix 11.8 of this ES.

6.15 Before finalising the scope of the ecology works, requests were made to the Countryside Council for Wales (CCW) for comments on the original ecology baseline report. CCW agreed that a marsh fritillary butterfly survey would be required due to the proximity of the Blaen Cynon SAC and the potential for the devil's bit scabious to exist within the tussocky turf. CCW recommended that, should the marsh fritillary butterfly be found, mitigation measures would be expected and this might include providing sufficient land for their continued habitat.

6.16 CCW was also interested in the deep peat beds of the SAC / SSSI. It was agreed that, as a contaminated land survey was proposed, the hydrogeology of the area could be assessed at this point, although a subsequent meeting with RCT-CBC had suggested that the topography of the area means that the planning application site is unlikely to be associated with the peat beds.

6.17 CCW would expect further studies for the European protected species including otters, bats, great crested newts and reptiles. Additionally, as potential water vole habitat existed, CCW would expect further investigation. These considerations are reflected in the ecology chapter of this ES.

6.18 Finally, CCW predicted that lapwings might favour the application site and thus proposed a breeding birds survey. CCW felt that two visits would suffice for the survey, and suggested that the Glamorgan Bird Club and the Local Record Centre (Biological Record Centre) could provide some useful information. These organisations were duly contacted.

6.19 The local planning authorities agreed that that EHL's EIA team should follow CCW's advice, and could seek to incorporate additional bat habitats on the site using landscaping and green construction techniques.

6.20 Representations were made to both CADW and the Glamorgan Gwent Archaeological Trusts for information on available records and any specific requirements of a local study. CADW noted that that no designated historic assets fell within the area of interest. GGAT responded by noting that, due to a lack of records in the immediate vicinity of the site, it was unlikely to recommend that an archaeological condition be attached to any consent granted.

CONSULTATION AND COMMUNITY ENGAGEMENT

Public engagement

6.21 EHL held a public exhibition at Hirwaun Village Hall on 23 and 24 September 2008 and Rhigos Community Centre on 30 September 2008. Invitations to attend the exhibition were sent to a wide range of stakeholders, including elected members and community representatives, council officers and representatives of government agencies and economic development bodies. The exhibition was advertised by press notices and posters.

6.22 The exhibition was staffed by senior representatives of EHL and its consultant team at all times. The exhibition itself comprised illustrated display panels, a large screen television showing resource recovery process diagrams and 'fly-by' digital film of the proposals, and leaflets. Feedback from the exhibition that influenced the proposals as now submitted included the following:

- **Lorry routing** – EHL is committed to ensuring that heavy goods traffic does not use Halt Road. Heavy goods traffic will only be allowed to approach and leave the site via Fifth Avenue and Rhigos Road to the east of the application site.

- **Air quality** – to make absolutely sure that adequate emissions dispersion can be achieved, EHL has increased the height of the central ventilation stack to 40 metres above local ground level, and has deleted ventilation pipes on the Biomax building.

6.23 At the same time, the exhibition underscored the local desire for new employment opportunities and regeneration, with some visitors to the exhibition requesting job application forms.

Consultation on the planning application

6.24 In accordance with the EIA Regulations and normal planning procedures, the planning application and ES will be advertised, provided to consultees and made available to members of the public. During the consultation period, written representations on EHL's planning application should be sent to the local planning authorities.

6.25 The remaining chapters of this ES consider in detail the environmental effects of the Enviroparks proposals, highlighting proposed mitigation measures and the residual environmental effects of the scheme.

Chapter Seven
COMMUNITY EFFECTS

INTRODUCTION

7.1 Socio-economic effects may be defined as the consequence to human populations of public or private actions that alter the way people live, play, relate to one another, organise their needs and generally cope as members of society[1].

7.2 This chapter of the ES examines the potential social and economic effects that might arise within the Hirwaun area as a result of constructing and implementing the proposed resource recovery and energy production park. These include – amongst others – population, employment, quality of life, health, education, and recreation. Foremost amongst these are the economic effects of the permanent jobs created in the scheme, and the social effects which would result. Overall these are considered to be beneficial and substantial.

Legislative framework and policy context

7.3 As explained in detail in the separate *Planning Policy Statement* that accompanies EHL's planning application, the Enviroparks proposal is considered to be consistent with, and a positive exemplar of, a wide range of current and emerging waste, energy and development plan policy. Of particular relevance to social and community concerns are the following documents:

- The UK Government Sustainable Development Strategy (2005);
- Wales Spatial Plan (2008);
- A Winning Wales - The National Economic Development Strategy of the Welsh Assembly Government (2002);
- SE Wales Development Strategy (2005);
- Turning Heads: a strategy for the Heads of the Valleys to 2020 (2006);
- A Better Life: Our Community Plan 2004-2014.

7.4 A common theme of these plans and policies is the need to deliver sustainable development to enable socio-economic and environmental regeneration. This overall thrust is most succinctly set out in first of the documents listed above, emphasising the need to 'live on the earth's income rather than eroding its capital'. The document stresses that there is a pressing need for the economy to become less reliant upon CO_2-producing energy sources, less damaging to the environment, and more efficient in resource use.

[1] The Interorganisational Committee on Guidelines and Principles for Social Impact Assessment, Guidelines and Principles for Social Impact Assessment (May 1994)

ASSESSMENT METHODOLOGY

Outline

7.5 The methodology employed in this chapter is based on the Department of the Environment (DoE) Good Practice Guide (1995), which was intended for use in Wales, England and Scotland and was based on an eight-year programme of research. This is a proven methodology that comprises two stages: first, a detailed analysis of the local economy, population and community profile is set out, having regard to national, regional and local factors. Second, an assessment is made of the likely effects of the proposed development on the area, the significance of these effects, and whether these are beneficial or detrimental. Baseline information on the socio-economic conditions of the area has been collated from a variety of sources referenced in the text. Crown Copyright material is reproduced with the permission of the controller of HMSO. Sources of information include:

- National Census (2001) and other ONS-produced sources
- NOMIS labour market statistics
- Welsh Indices of Multiple Deprivation
- Welsh Assembly Government Learning and Labour Market Intelligence (2008)

7.6 These have provided a comprehensive quantitative 'baseline' of socio-economic conditions. However, it should be stressed that many social and community effects are by definition complex, interrelated, and difficult to characterise or measure in any precise way. As a result, some judgements are necessarily subjective. Because of this, efforts have been made to incorporate and respond to issues arising from the public consultation events that took place in relation to the scheme during September 2008.

Study area

7.7 The study area for the purposes of this chapter is, for the most part, taken as the whole of the County Borough of Rhondda Cynon Taf (RCT), which for most statistical purposes is the relevant authority for the entire application site. There are two main reasons for assessing the effects of the scheme over this broader area: first, the EHL scheme is significant both in terms of the amount of employment it would create and in terms of its waste management operations. Second, a wide variety of socio-economic data are collected and reported based upon on the geography of unitary authority boundaries. Whilst the planning application site lies partly within the Brecon Beacons National Park, major centres of population and economic activity in the National Park are remote from the Hirwaun Industrial Estate, as such, a focus on RCT was considered to be appropriate for the purpose of this analysis.

7.8 Where appropriate and where published data allow, reference in this chapter is also made to smaller areas in order to provide greater clarity. This is done by making use of data at electoral ward and 'super output area'. Furthermore, comparative data are frequently provided for Wales and Great Britain as a whole, in order to clarify the broader significance of various figures.

7.9 As the introduction to the RCT Local Plan notes, the Cynon Valley area has been substantially shaped by the iron and coal industries, physically and economically. Over recent decades, these heavy industries have gradually been replaced by newer, more modern, and diverse economic activity. However, rapid growth in the coastal belt of south Wales over recent decades has not been fully shared in remoter areas such as Hirwaun, which continue to suffer from relative economic deprivation.

Data analysis and assessment

7.10 Quantitative assessments have been made in this chapter where possible, including an estimate of the number of jobs to be created by the application proposals. However, due to the complexity of socio-economic issues and the numerous interactions that can occur with neighbouring and more distant communities, it is not possible to predict the precise nature or scale of each impact. *Qualitative* assessment has thus been used where necessary and significance criteria have been produced to ensure that there is a consistent identification of effects applied during the assessment. Significance criteria used to provide a consistent identification of effects in the assessment are shown in Table 7.1 below.

Table 7.1: Significance criteria

Significance	*Criteria*
Major	Social and economic effects that have an influence at the sub regional or possibly regional scale
Moderate	Social and economic effects that will have an influence on the wider local population
Minor	Social and economic effects that principally have an effect at the local scale or concern sub-sections of the local community
Negligible	No discernible social or economic effects

7.11 The methodology for assessing economic impacts has been structured around the following key stages:

- an analysis of the current state of the local economy including key sectors, unemployment and general trends in employment provision;
- an assessment of the provision for employment based land uses included within the proposal;
- consideration of the effects that the employment uses provided within the site might have on the local economy.

7.12 The methodology for assessing social impacts involved the following stages:

- collation of data relating to the existing population profile;
- consideration and assessment of the likely effects of the proposal based on available evidence.

7.13 This chapter is structured around the two key themes of *economy* and *society*. The first theme includes not only employment or unemployment, but also industrial sectors, earnings and other factors. The second theme is to be understood in the sense of overall 'quality of life', and includes health, education and indicators of deprivation. The chapter also provides a brief outline of existing businesses in the Hirwaun industrial estate and community facilities in the surrounding area.

The economy

7.14 In 2007[2] there were 6,800 unemployed people in Rhondda Cynon Taf (RCT); a rate of 6.3%. This exceeds the Welsh average by 0.7%, and the British average by 1.1%. Similarly, rates of economic inactivity in RCT are higher than national averages: a total of 37,000 individuals of working age in RCT were economically inactive, with 24,200 not wanting a job. These findings are shown in Table 7.2 below. It should be noted that these statistics pre-date the closure of the Tower colliery near Hirwaun in spring 2008.

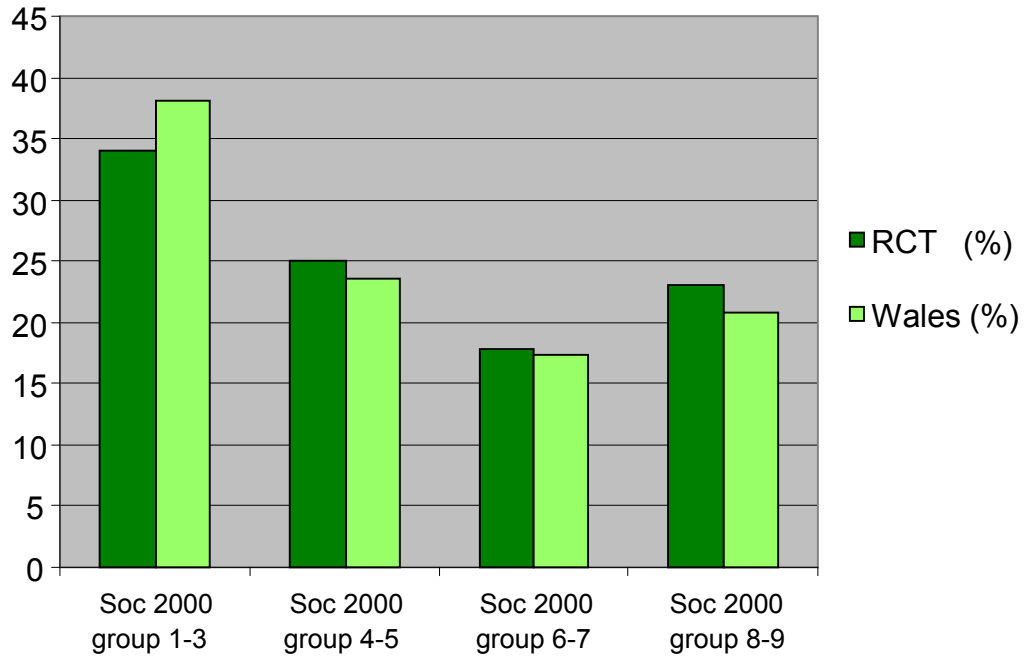
Table 7.2: economic inactivity in Rhondda Cynon Taf. 2007

	RCT (numbers)	*RCT (%)*	*Wales (%)*	*GB (%)*
Economically inactive	37,000	26	24.5	21.4
Wanting a job	12,800	9	5.9	5.4
Not wanting a job	24,200	17	18.6	16.1

7.15 The Office for National Statistics categorises occupations into nine levels, from skilled professions and management to unskilled elementary occupations. As illustrated in figure 7.1 below, RCT has proportionally more people in lower-skilled occupations (groups 8-9), and fewer within professional and managerial occupations (groups 1-3), compared with the average for Wales.

[2] 'Reweighted' figure for the year as a whole (see https://www.nomisweb.co.uk/articles/374.aspx)

Figure 7.1: Employment by occupation (2007)[3]



7.16 Average weekly earnings in RCT in 2007 were £398.20, which is around £17 less than the Wales average, and £61 behind the average for Great Britain.

7.17 The ONS reports that, in 2005, there were 88,000 jobs in Rhondda Cynon Taff. Based upon this, a 'jobs density' can be calculated which represents the ratio of jobs to working-age population. In RCT, this ratio is 0.62; a figure that is substantially lower than both Wales (0.78) and Great Britain (0.84). It appears likely that this is partly explained by out-commuting from RCT towards Cardiff, Swansea and elsewhere on the M4 corridor.

7.18 The majority of jobs in RCT (76.1%) are within the service sector. This figure is somewhat lower than the Wales and Great Britain figures of 79.6% and 82.9% respectively. This is counterbalanced by the manufacturing sector, which in RCT is proportionally larger at 17.6%, compared with 13.4% and 10.9% Wales and Great Britain respectively. The construction sector in RCT is also larger than average, at 5.5% compared with 4.8% across Great Britain.

7.19 The above observations reflect the findings of the 2001 Census Area Classification[4], which categorised RCT as an 'industrial hinterland', along with much of south-east Wales, central Scotland, and parts of northern England.

7.20 The proportion of individuals within RCT claiming benefits is 23.6% (a total of 33,700 individuals); considerably higher than the figures of 18.7% and 14.1% across Wales and GB respectively. As table 7.3 below indicates, the claimant rate within RCT is higher for each of

[3] NOMIS Labour Market Profile, August 2008
[4] http://www.statistics.gov.uk/about/Methodology_by_theme/area_classification/

the major benefit types, and the rate exceeds the national average by a particularly large margin in the case of incapacity benefit:

Table 7.3: Comparative benefit claimant rates

	RCT (%)	Wales (%)	GB (%)
Total claimants	23.6	18.7	14.1
Incapacity benefits	14.9	10.7	7.1
Lone parents	2.6	2.1	2
Job seekers	2.4	2.3	2.2
Carers	1.5	1.4	1
Disabled	1.4	1.3	1
Others on income related benefits	0.4	0.4	0.5
Bereaved	0.3	0.3	0.3

Society ('quality of life')

7.21 Rhondda Cynon Taf is a large unitary authority area with a population of 233,900 in 2006[5]. Its age profile is similar to that of Wales as a whole, with a fairly even distribution across the age ranges, though with a characteristic 'dip' in people in their 20s and a 'spike' of people in their 50s. In 2007, the population of working age in RCT was 143,400. This comprises 61.3% of the total population, which is slightly above the Wales figure of 60.3%.

7.22 Compared with national averages, a smaller percentage of individuals in RCT have qualifications, and this is the case at every level, as Table 7.4 below illustrates. Conversely, RCT has a higher proportion of individuals *without* qualifications, totalling 23,800 individuals in 2007.

Table 7.4: Comparative qualification levels

	RCT	Wales	Great Britain
NVQ4 +	21	25.4	28.6
NVQ3 +	37.9	43.8	46.4
NVQ2 +	57.3	63.8	64.5
NVQ1 +	75.3	77.5	78.1
No qualifications	16.7	15.4	13.1

7.23 The 2008 Welsh Indices of Multiple Deprivation (WIMD) report finds that much of RCT experiences relative deprivation. Geographically, figures are provided on the basis of '*Super-Output Areas'* (SOAs), of which there are 152 in Rhondda Cynon Taf. Overall, 70% of

5 ONS mid-year estimate

these are below the median ranking for Wales. There is a significant over-representation at the most-deprived end of the spectrum, with 18% of RCT's SOAs falling within the lowest 10% in Wales.

7.24 In addition to providing an aggregate 'index' of deprivation, WIMD subdivides into a number of more specific 'domains'. Within RCT, the domains of employment and education perform particularly badly, with 22% of RCT's SOAs falling within the most-deprived 10% in Wales. RCT also underperforms in the education and income domains. In contrast, the domains of community, housing and 'geographic access to services' emerge more positively with relatively few SOAs at the lowest end of the spectrum. Table 7.5 below summarises these findings.

Table 7.5: Percentage of RCT Super-Output Areas within lowest 10% in Wales

Domain	*% within most deprived 10% in Wales*
Employment	22
Health	22
Education	16
Income	13
Environment	10
Community	5
Housing	3
Access	1

7.25 Areas of particularly high deprivation occur within Hirwaun and Pen-y-waun, which are in very close proximity to EHL's planning application site. Six SOAs neighbouring the site have been considered in particular detail:

- *Rhigos 1*: the EHL site, surrounding countryside and villages;
- *Hirwaun 1*: eastern parts of the town including Maescynon;
- *Hirwaun 2*: the north west of the town including Mount Pleasant;
- *Hirwaun 3*: southern and central parts of the town;
- *Pen-y-waun 1*: western parts of the village;
- *Pen-y-waun 2*: eastern parts of the village.

7.26 Within table 7.6 below, it is apparent that SOA *Hirwaun 3* and both Pen-y-waun SOAs are particularly deprived, being within the lowest 25% in Wales across most of the 'domains' of deprivation. Only *Hirwaun 2* has no instances within the lower quartile

Table 7.6: Deprivation by rank and 'domain' in areas surrounding the EHL site

	Hirwaun 1	Hirwaun 2	Hirwaun 3	Pen-y-waun 1	Pen-y-waun 2	Rhigos
WIMD	961	1028	159	116	12	676
Income	1056	952	231	246	23	*947*
Employment	846	643	73	63	24	545
Health	854	1489	75	209	30	*849*
Education	1031	998	588	90	4	629
Access to Services	740	828	1755	732	763	*296*
Housing	1362	1152	1314	739	1540	1436
Physical Environment	179	497	365	1348	1405	*412*
Community Safety	920	1291	381	558	115	1214

- 1= most deprived, 1896= least deprived in Wales
- Shaded= within most deprived quartile in Wales

7.27 Rates of household overcrowding are marginally higher within RCT than across Wales as a whole: 4.8% of households in RCT had a negative occupancy rating at the 2001 Census, compared with a figure of 4.4% across Wales. In terms of tenure, as indicated in table 7.7 below, RCT has greater levels of owner-occupation compared with Wales, with fewer rented, and a greater proportion living rent free.[6]

Table 7.7: Tenure by household (2001)

	RCT (%)	Wales (%)
Owned	75.2	71.3
Social rented	14.7	17.9
Private rented	7.4	8.6
Living rent free	2.7	2.2

7.28 RCT falls somewhat behind Wales in terms of health. Life expectancy in 2004-6 was 75.6 years for males and 80.1 for females; for both sexes this is approximately one year below the Welsh average and 1.5 years below the average for England and Wales. At the 2001 Census, figures for 'general health' found that compared with Wales overall 4.1% fewer people in RCT considered their own health to be 'good'. Conversely, 3.2% more people in RCT considered their health to be 'not good', compared with Wales overall. Similarly, rates of limiting long-term illness in RCT (27.2%) exceeded the Wales average by 3.9%.

Community facilities

7.29 Primary schools in the area are provided at Hirwaun, Rhigos and Penderyn. The nearest secondary school is *Ysgol Gyfun Rhydywaun*, a Welsh-medium comprehensive school approximately 3 km south-east of the site between Hirwaun and Penywaun. There are

[6] Source: ONS 2001 Census (UV63)

three further secondary schools in Aberdare. The nearest GP is Hirwaun Health Centre, and the nearest dental surgery is also in Hirwaun (D. Adams). Other community facilities in the area include:

- Hirwaun Community Centre
- Rhigos Community Sports Hall
- Rhydywaun Youth Centre (Lawrence Avenue, Penywaun)
- Penywaun Community Centre, (Gwladys St, Penywaun)

7.30 The main transport links to the area are the A465(T) Heads of the Valleys route, and the A4059 and A4061 which run northward and southward toward Brecon and Treherbert respectively. Public transport is limited to buses and coaches, which are mainly local services to surrounding towns and villages in the upper Neath and Rhondda, Cynon Taf valleys. Bus services suitable for commuters to Hirwaun Industrial Estate operate from Hirwaun and Penywaun. Nearest passenger rail services are at Aberdare, approximately 8 km to the east.

Employment at Hirwaun Industrial Estate

7.31 A site visit in December 2007 indicated that 40 companies were currently operating at Hirwaun Industrial Estate (HIE). These comprise primarily light industrial users, with a large number of engineering and metal-related companies:

- Aman Metal Spinners
- Anderson & Firmin
- Authentic Curry Company
- Barton Dale Engineering
- Cefn Strain Gauges
- Chiltern Services
- D& S Tooling Supplies
- Dare Valley Poultry
- Designs in Wood Ltd.
- Dyllas Engineering Co Ltd.
- Eden Manufacturing Ltd.
- Engard Fan
- Environmental Solutions Wales
- EPA plc
- Hirwaun Engineering
- Hirwaun Saw Mills
- Houghton Vaughan
- K & D Structural Stock Ltd.
- KJ Heating Service
- LJ Ashman & Sons
- Martin Williams Fashions Ltd.
- Maxweld Engineering Ltd.
- Metal Polishing Engineers Ltd.
- Millennium Windows
- ND Products
- Morgan & Brace Ltd.
- Pentapack
- Phoenix Metal Products Ltd.
- Precision Writing Points
- Primarius Wales Ltd.
- R Brown Ltd.
- Sealability Ltd.
- Swantex Party Creations
- Tebrax Ltd.
- The Picture Warehouse
- UK Euro Group plc
- Walters Group Ltd.
- WEB Engineering Ltd.
- Welsh Trust (Rhigos) Ltd.
- Willbow Manufacturing Ltd.

POTENTIAL EFFECTS

During construction

7.32 Construction activity for the Enviroparks development could commence in the second quarter of 2009 and be completed in the second quarter of 2011. The economic and social impacts of the construction phase are set out below.

Economic impacts (employment)

7.33 Prior to the tendering process for construction contracts, it is not possible to accurately identify the origin of personnel, and hence predict to what degree the construction employment would represent an increase (short-term or residual) in the local population. However, it is a certainty that the construction would require both full and part-time jobs in a range of sectors and skills. There would be an opportunity to source employees from the local area where possible, and similarly to use local suppliers during the construction period.

7.34 HM Treasury measures construction jobs on the basis of 'job years' and this can be calculated by dividing the estimated construction capital cost for implementing the project (c. £20m) by the average annual output per construction employee[7]. Based on this calculation, the construction programme would necessitate the use of approximately 530 temporary construction workers.

7.35 The following additional factors would also contribute to an overall beneficial impact:

- the relative local importance of the construction and manufacturing sectors in Rhondda Cynon Taf, as identified in the preceding section;
- inclusion of a range of occupational levels within the construction, including unskilled or labouring jobs to more senior positions, as well as across a range of disciplines;
- unskilled labour is often required in construction, making it a potential opportunity for unemployed people. The preceding section identified that there are relatively high numbers of unemployed and low-skilled people in the area;
- the local construction industry is particularly at risk during the current period of economic stagnation and volatility.

7.36 In summary therefore it is considered that the EHL scheme would have a **moderate beneficial effect** on the local employment market.

Economic impact (secondary impacts)

7.37 In addition to direct employment, the presence of the construction workforce would have an indirect impact on the local economy associated with their expenditure in local

[7] The DTI figure for gross average annual output per construction employee in 2003 was £37,727.

businesses. Major construction projects often indirectly generate significant additional temporary employment in businesses that benefit from the local spending of construction workers, as well as sub-contracts, services and supplies needed by the contractors.

7.38 It is not possible to quantify accurately the scale of impact which this would have, however on balance it is reasonable to conclude that the secondary impacts upon the economy during the construction phase have a **minor beneficial effect.**

Social impacts

7.39 It is considered that the proposed development would not have significant effects upon residents during the construction phase, given the distance of the site from dwellings. Similarly, local businesses are likely to experience only minimal effects. Outdoor recreational users of the Penderyn Reservoir adjacent to the site (particularly anglers) and users of rights of way are likely to experience some noise impact during the construction period.

7.40 However any disruption during construction would be controlled and managed through implementation of a Construction and Environmental Management Plan. Overall therefore the social impact of the scheme during the construction phase has therefore been assessed as being **negligible.**

During operation

Economic impacts (employment)

7.41 The proposed development will generate around 200 employment opportunities when it is operating at full capacity and with the high-energy user in operation. As with construction workforce, it is not possible to accurately identify the origin of personnel for the plant once in operation and consequently the permanent increase in local employment cannot be predicted.

7.42 As with the construction workforce there would be a significant opportunity to employ staff from the local area where possible, and similarly to use local suppliers during the construction period. Therefore it can reasonably be expected that a significant proportion of the 200 jobs created would be filled by local people, including individuals who are currently unemployed. In August 2008 there were 85 claimants of Jobseekers' Allowance in the Hirwaun ward and 20 in Rhigos ward[8], so the implementation of the EHL scheme could, theoretically, fully offset local unemployment. This benefit should be seen in the context of the closure of the Tower Colliery in 2008.

7.43 The operation of the plant would require both full and part-time jobs in a range of sectors and skills. The degree to which local people will be engaged in these new

[8] Source: Nomisweb labour market profiles

opportunities will be influenced partly by the level of training which is offered to the local community. Training and job preparation initiatives are therefore proposed by EHL.

7.44 In summary the overall impact of the EHL scheme in employment terms once in operation is considered to be **major beneficial.**

Economic impacts (secondary)

7.45 The key secondary economic impact of the EHL scheme will be to increase levels of expenditure in the local economy as a result of the following:

- unemployed local people who gain work will have an increased level of disposable income;
- other employees in the area may, over time, increase their income through the opportunities provided by EHL, which would in turn increase their level of spending in the area;
- that part of the EHL workforce which commutes inward from surrounding areas would contribute to the economy during the working week, through their use of local services and facilities.

7.46 The proposed Enviroparks development would also contribute to improving the image of the local area as 'green' and forward-looking, potentially enhancing its attractiveness as an investment location especially within this sector. The overall impact of the EHL scheme in secondary economic terms is therefore considered to be **moderately beneficial.**

Social impacts (Education)

7.47 EHL proposes to dedicate a facility for educational use by visiting schools, colleges and the wider public. It is intended that this facility will help to enhance awareness and understanding of environmental and sustainability issues in general and renewable sources of energy and the need for waste reduction specifically. The effects of the proposal on education are assessed as being **moderately beneficial** in this regard.

Social impacts (Accessibility and inclusion)

7.48 The application site was allocated partly due to its location within an established employment area, which is accessible by various sustainable means including by regular bus services, and by bicycle. These factors (explored in more detail in Chapter 8 of this Environmental Statement) are expected to contribute toward social inclusion by supporting and creating additional demand for these more affordable means of transport.

7.49 An example of potential developments that could be supported is the proposed route of the National Cycle Network, promoted by Sustrans, which is adjacent to the site. The creation of jobs and additional expenditure within a relatively deprived area (as noted in the above sections) would have a further beneficial impact upon inclusion due to the opportunities for the community as a whole this would provide.

7.50 As noted in the Planning Policy Statement, the Wales Spatial Plan identifies the Heads of the Valleys as being particularly deprived, and the South-East Wales Development Strategy identifies a need for access to employment in areas where out-commuting to Cardiff and the M4 corridor is high. The 'jobs density' ratio referred to in the preceding section suggests that this is a factor in Rhondda Cynon Taf. In addition to the economic benefit of new employment opportunities coming to the area outlined above, a reduction in the need to commute long distances would contribute toward inclusion and quality of life. Overall therefore the EHL scheme is considered to have a **major beneficial** effect upon accessibility and inclusion.

Social impacts (Health)

7.51 Other chapters of this Environmental Statement identify the beneficial effect this scheme would have in terms of reduced carbon dioxide and methane emissions, and diversion from landfill. Since climate change and environmental degradation have a negative impact on people's health and well-being it can be concluded that the EHL scheme would have a **beneficial** effect in this regard. However, given the global scale of these issues the contribution made by EHL scheme alone is considered to be **minor.**

Social impact (population/demographics)

7.52 The impact of the proposed development on the size of the local population is likely to be minimal, since the application does not include proposals for residential development. It is possible that new employment opportunities generated by the proposal will be filled by people from outside the local area who might then move nearby, thus slightly raising local population figures. However, given that the proposed development in total is to employ around 200 new staff at full capacity, the overall impact upon population will be **negligible.**

Summary of effects

7.53 The economic and social effects of the proposed development scheme in economic and social terms are summarised in the tables below.

Table 7.8: Summary of economic effects

	Employment effects	Secondary effects
Construction	Moderate beneficial	Minor beneficial
Operation	Major beneficial	Moderate beneficial

Table 7.9: Summary of social effects

	Education	Accessibility and inclusion	Health	Population/ demographics
Construction	Negligible	Negligible	Negligible	Negligible
Operation	Moderate beneficial	Major beneficial	Minor beneficial	Negligible

PROPOSED MITIGATION

During construction

7.54 To ensure that any negative social or economic effects remain negligible, a Construction and Environmental Management Plan (CEMP) and Health and Safety Plan are proposed by EHL to control and manage any disruption.

During operation

7.55 The effects of the proposed scheme during operation are predicted to be beneficial. The following measures could be considered to add further value to the area as a result of the Enviroparks development:

- development of specific vocational training initiatives in conjunction with local employers and local educational establishments, to help local people to develop new skills and to strengthen good public relations with the scheme.
- early liaison with local people for their training and potential employment once the scheme is completed.
- local labour agreements to encourage employment of local people and businesses.
- the use of local purchasing initiatives, where possible, to capture the maximum benefits of the scheme to RCT construction firms and product manufacturers.
- the use of local purchasing initiatives, where possible, to optimise the benefits of the scheme to the economy and other product suppliers and manufacturers.

RESIDUAL EFFECTS

7.56 No residual effects have been identified beyond those discussed above.

SUMMARY

7.57 In summary it is considered that the Enviroparks project is likely to result in a range of beneficial effects on the socio-economic conditions within the catchment of the project, which could be enhanced with complementary measures such as local employment and skills initiatives outlined in the 'mitigation' section above.

7.58 This chapter has considered a broad range of official data and found that under most socio-economic indicators, Rhondda Cynon Taf is behind regional and national averages. During the decade or thereabouts to 2007, during which the national economy performed well overall, the County Borough grew and benefited to some extent, however the legacy of the decline in mining and manufacturing was not fully overcome.

7.59 In the current period of economic recession, the comparatively weak economy of Rhondda Cynon Taf is liable to suffer more acutely than other parts of South Wales. Projects capable of generating new employment, such as the Enviroparks development, would thus be of significant benefit.

Chapter Eight
TRANSPORT AND ACCESS

INTRODUCTION

8.1 The development of a site which has been vacant for many years on an industrial estate which has a good deal of spare capacity will naturally bring a shift in the transportation flows of the immediate area, especially when the operation requires a constant feedstock to be brought to site, as well as staff to operate it. This chapter of the Environmental Statement will therefore consider the potential impact of the changing traffic movements which will be required to facilitate the proposed Enviroparks operation.

Transport policy and strategy

8.2 The Welsh Assembly Government aims to extend choice in transport and secure accessibility in a way which supports sustainable development by encouraging the establishment of an integrated transport system which is safe, efficient, clean and fair. In accordance with Planning Policy Wales(1), this will be achieved through integration:

- within and between different types of transport;
- between transport measures and land use planning;
- between transport measures and policies to protect and improve the environment; and
- between transport measures and policies for education, health, social inclusion and wealth creation.

8.3 Land use planning can help to achieve the Assembly Government's objectives for transport through:

- reducing the need to travel, especially by private car, by locating development where there is good access by public transport, walking and cycling;
- locating development near other related uses to encourage multi-purpose trips and reduce the length of journeys;
- improving accessibility by walking, cycling and public transport;
- ensuring that transport is accessible to all, taking into account the needs of disabled and other less mobile people;
- promoting walking and cycling;
- supporting the provision of high quality public transport;
- supporting traffic management measures;
- promoting sustainable transport options for freight and commerce;
- supporting sustainable travel options in rural areas;
- supporting necessary infrastructure improvements; and
- ensuring that, as far as possible, transport infrastructure does not contribute to land take, urban sprawl or neighbourhood severance.

8.4 Planning Policy Wales also notes that Local Authorities should utilise available powers to reduce the need to use trunk roads and other through routes for short, local journeys, and identify policies and proposals relating to the development of other transport infrastructure and related services. The strategic significance of freight access to industry and commerce should also be taken into consideration. Wherever possible, planning authorities are expected to promote the carriage of freight by rail, water or pipeline rather than by road, and should consider which routes are most suitable for use by road freight, encouraging the location or relocation of distribution and operating centres to sites which have good access to these routes.

8.5 Despite not being located in the immediate vicinity of good public transport links, the proposed Enviroparks development on the Hirwaun Industrial Estate supports several of these objectives. Due to the nature of the waste materials being brought to site as feedstock, the most appropriate form of transport is along the road network, enabling a variety of collection containers (e.g. bins and skips) and vehicles (e.g. refuse collection vehicles and lorries) to transport material to the site. As such, it is imperative that the facility is located close to a good road network, and the chosen site on the Hirwaun industrial estate is situated approximately 1.7 km from the main A465, providing an east-west road network through south Wales, and direct access to the A470 for a north-south route. The on-going extension to the A465 promotes this road as a main route through south Wales, and as a dual carriageway it will be ideally suited to the transportation of freight, whilst enabling the continued use by other vehicles.

8.6 Although waste is to be sourced from the local region, deliveries will not necessarily constitute 'short, local journeys' and the main trunk roads will be employed for these journeys wherever possible, keeping large and heavy goods vehicles off the smaller road network. However Enviroparks also aim to employ local people and promote sustainable travel options through the use of a transport plan, and thereby hope to reduce dependency on the main road networks for a proportion of staff. Staff travelling from the immediate vicinity may avoid the need to travel for any great distance on the trunk roads, however the main route into the Hirwaun industrial estate, and indeed that which will be used by all HGVs, will be from the roundabout of the A465 / A4059 / A4061.

8.7 The following points should be considered by any development application. What are:

- the impacts of the proposed development on travel demand;
- the level and nature of public transport provision;
- accessibility by a range of different transport modes;
- the willingness of a developer to promote travel by public transport, walking or cycling, or to provide infrastructure or measures to manage traffic, etc
- the environmental impact of both transport infrastructure and the traffic generated; and
- the effects on the safety and convenience of other users of the transport network?

8.8 These issues have been addressed through the production of a Transport Assessment, which appraises the travel demand and impact, and has provided the basis for the production of a Transport Plan. These documents, which inform this chapter, are presented in volume 2 of the ES (appendices).

8.9 The South East Wales Transport Alliance (Sewta) draft Regional Transport Plan[(2)] (RTP) was released for consultation in July 2008, and will replace the Local Transport Plans once the final document is issued. This requirement for a regional approach to transport planning reflects the need for cross-boundary issues to be managed in a regional way.

8.10 The RTP has also been developed within the context of the Wales Transport Strategy (WTS) outcomes and themes, and the five over-arching priorities that provide additional strategic direction for work towards the long term outcomes, which are:

- Reducing greenhouse gas emissions and other environmental impacts;
- Integrating local transport;
- Improving access between key settlements and sites;
- Enhancing international connectivity; and
- Increasing safety and security.

8.11 The RTP vision is to provide a modern, integrated and sustainable transport system for South East Wales that increases opportunity, promotes prosperity and protects the environment; where public transport, walking, cycling and sustainable freight provide real travel alternatives.

8.12 Sewta's priorities build on the vision of the plan. They tackle main problems within the Sewta group, of which Rhondda Cynon Taf County Borough Council (RCT) is a member, and they set the general direction of the RTP, as follows:

- To improve access to services, facilities and employment, particularly by public transport, walking and cycling;
- To provide a transport system that increases the use of sustainable modes of travel;
- To reduce the demand for travel;
- To develop an efficient and reliable transport system with reduced levels of congestion and improved transport links within the Sewta region and to the rest of Wales, the UK and Europe;
- To provide a transport system that encourages healthy and active lifestyles, is safer and supports local communities;
- To reduce significantly the emission of greenhouse gases and air pollution from transport;
- To ensure that land use development in South East Wales is supported by sustainable transport measures;
- To make better use of the existing transport system; and
- To play a full role in regenerating South East Wales.

8.13 The preferred strategy requires a balanced programme of investment and support for all modes of travel. Three 'Strategic Opportunity Areas' (SOAs) have also been identified offering potential regional benefits from their sustainable development. These include the development linked to the dualling of the Heads of the Valleys Road (A465) and in being identified as a SOA greater coherence can be brought to the development.

8.14 Key Sewta policies identified in the RTP which could impact on or be impacted by the proposed Enviroparks development are as follows:

8.15 **Policy PL1:** Sewta will improve public transport links between the WSP key settlements and Cardiff and Newport, and to other WSP key settlements and equivalent towns and cities outside the Sewta area.

8.16 **Policy PL2:** Sewta will improve public transport connections between the key settlements and their hinterlands.

8.17 **Policy PL4:** Sewta will seek, through the Local Development Plans, supplementary transport planning guidance and development control processes, to establish a pattern of land use that reduces the need to travel, and maximises the potential for sustainable transport infrastructure and services. Sewta will seek the refusal of schemes which will adversely affect transport networks, or which will conflict with the objectives, policies and proposals of the RTP.

8.18 **Policy WC1:** Sewta will promote infrastructure to encourage walking and cycling.

8.19 **Policy SC2:** Sewta will promote a reduction in the number of unnecessary journeys via prompting trip linking, encouraging home- working and teleconferencing, and promoting car sharing activities and clubs.

8.20 **Policy SC4:** Travel Plans: Sewta will target business and other organisations to deliver travel plans, and to encourage use of public transport and a reduction in car travel (particularly single occupancy car travel.

8.21 **Policy SC5:** Sewta will prepare and promote regional travel planning best practice advice and guidance.

8.22 **Policy SC6:** Personalised Travel Plans: Sewta will improve marketing of personal travel choices, through PTI Cymru and personalised travel planning.

8.23 **Policy SC7:** Sewta will seek to ensure, through Local Development Plans, Supplementary Planning Guidance, and development control processes, that all significant development proposals are accompanied by travel plans that meet best practice standards. It will seek to ensure that all associated planning permissions are subject to conditions or agreements that will ensure that effective processes are in place for approval, implementation and monitoring.

8.24 Sewta intends to invest heavily in alternative modes of travel but car traffic (and lorry freight) will continue to dominate the transport scene. Sewta accepts that some new highway investment may be necessary but the thrust of Sewta's highways policy is to protect what we already have and make best use of it.

8.25 **Policy RA2**: Sewta will plan to further extend the rail system through selected line and station reopening.

8.26 **Policy BU5:** Sewta will work with operators to develop a bus network and an infrastructure operated to common standards.

8.27 **Policy RU1:** Sewta will seek, through a regional road user charging scheme, to reduce the demand for travel by car and to avoid increases in traffic that might otherwise occur.

8.28 The RCT Local Development Plan Preferred Strategy[3] (LDP) published in January 2007 notes that among the objectives of the LDP, RCT aim to reduce the need to travel and promote more sustainable modes of transport. Strategic Policy SP 3 identifies that the development and use of land will be determined on the needs of the area, coupled with the protection and enhancement of the environment, *'environmental capacity, prudent use of resources, transportation and infrastructure considerations,'* a mixture of uses, high design standards and the minimisation of energy consumption.

8.29 SP 9 considers transportation specifically and states that:

'The Council will seek to implement transportation schemes and initiatives which will achieve sustainable regeneration, enhance the public realm, improve the economy, reduce congestion, and improve road safety by:-
a) Reducing the need to travel by private car;
b) Maintaining and improving accessibility for all sections of the community;
c) Supporting transportation schemes which benefit the economy of the County Borough whilst seeking to minimise impact on the environment;
d) Supporting and enhancing public transport; walking and cycling provision; and achieving integration of all modes of transportation;
e) Minimising adverse effects of traffic and parking on local amenities and the environment as a whole.'

8.30 SP 9 is supported by targets to promote sustainable forms of transport and to reduce the need to travel, indicators of which are cited as the number of new developments with travel plans and the percentage of people living and working within RCT. The Hirwaun area is seen as a strategic location due to its good links to the M4, and good access via the A4059 and the A465. It is also noted that the bus network runs through the Hirwaun area, and although there is currently no railway station in Hirwaun, the infrastructure is in place.

8.31 The Brecon Beacons National Park Authority (BBNPA) also supports sustainable development and transport opportunities, although the largest impact and hence concern of the Authority is the impact of tourism travel.

8.32 Planning Policy Wales Technical Advice Note 18[4] identifies that the land use planning system can impact on travel patterns by guiding the location, scale, density and mix of new development and controlling changes of land use. In this way, transport and land use interact and can have an effect on the emission of greenhouse gases, the health of the local population, social inclusion and the costs of congestion. Changes in travel patterns brought about by land use change can ultimately significantly reduce the need to travel and ensure that effective use is made of public transport options, walking and cycling. As a result, planning authorities should ensure that their development plan strategy is compatible with the aim of reducing the need to travel and provides greater choice of means of transport other than the private car.

8.33 Maximum car parking standards should be used at regional and local level as a form of demand management. Evidence based on the likely effects of different parking levels for each land use should be considered, including consideration of the relative locations of land uses and their consequent accessibility. Required parking for those with disabilities should be fully specified in any adopted parking strategy in terms of space dimensions and proportions of the total number of spaces.

8.34 In determining maximum car parking standards for new development, regard should be given to:

- public transport accessibility and opportunities or proposals for enhancement;

- targets and opportunities for walking and cycling;
- objectives for economic development including tourism;
- the availability in the general area of safe public on- and off- street parking provision; and
- potential for neighbouring or mixed use developments sharing parking spaces, for example at different times of the day or week.

METHODOLOGY

8.35 The assessment of transport and access issues for the proposed development has been prepared with consideration to the Institution of Highways and Transportation Guidelines for Traffic Impact Assessment; and the Institute of Environmental Assessment Guidelines for the Environmental Assessment of Road Traffic.

8.36 Additional guidance has been drawn from the CSS Parking Guidelines, which are due to be adopted.

8.37 A comprehensive Transport Assessment (TA) has been produced and considers the current and committed transport infrastructure, its availability and use (Appendix 2). The requirements of the development are then detailed prior to an assessment of the impact that these needs will have on the current facilities. Finally, an assessment of the likely environmental effects of the proposal is presented.

8.38 An integral part of the TA is the provision of a Transport Plan, which identifies a strategy to promote sustainable transportation options for the development. Details of committed and proposed programmes, and infrastructure at the development are provided. The Transport Plan is presented in Appendix 6 of the TA.

8.39 Prior to undertaking the TA, detailed scoping was undertaken with RCT. Meetings were held with both RCT and the BBNPA, with additional scoping and discussion subsequently undertaken with RCT. Capita Glamorgan Consultancy (CGC) has also been involved with discussions, as RCT's representative for TA auditing. The completed TA scoping document, and an initial response from CGC on behalf of RCT is provided in Transport Appendix 1 (ES volume 2).

8.40 RCT raised the following points in relation to the requirements of the TA:

- Peak period surveys are to be undertaken at five roundabouts in Hirwaun, and automatic traffic count (ATC) data to be obtained from Fifth Avenue in order to inform a Stage 1 road safety assessment;
- Trip generation to be calculated for the a.m. and p.m. weekday peak hours;
- The TA should include full details of trip generation and distribution and provide information on how this is assessed;
- Consideration of the modal split of traffic should be included with information on any impact this may have;
- A statement should be included in the TA noting that the Visitors Centre will be accessed outside of the peak hours and therefore is not included in the peak hour traffic flows;
- A percentage increase assessment should be undertaken to confirm the scope of the study and identify the impact at junctions at the arm most affected;

- Allowance will be made for HGV's as diverted traffic where they already exist on the network;
- Staff and servicing vehicles will be calculated as new traffic;
- Plans to be provided showing a.m. and p.m. peak hour traffic flows for the Opening Year and Design Year, with and without the development traffic;
- Junction assessments (ARCADY) are required at the five roundabouts to be surveyed;
- The proposed site access junction on Fifth Avenue in the current Master Plan, which forms a staggered priority junction will not be acceptable to RCT and is to be reviewed by the Developer;
- The principals of a Travel Plan are to be included;
- WAG to be informed of the proposals by the Developer and RCT.

8.41 Concerns raised by the Highways Development Control and Adoptions Manager of RCT were as follows:

- Some routes on the network are already suffering congestion, and thus any proposal to contribute to traffic flows along these networks would need to be investigated and may require mitigation;
- Link data may already be available, however RCT would expect counts to be facilitated at key junctions;
- A proposed site access junction on Fifth Avenue (as shown on the site plan at the time of consultation) forms a staggered priority junction and will not be acceptable to RCT.

8.42 In addition, public exhibition events have been held in the area local to the proposed development, in order to fully inform interested parties and to receive comments on the proposals. During the public engagement events, the following transport and access concerns were raised:

- How many vehicles will be attending site;
- Which route will they take – specific concern that HGVs would use Rhigos Road to travel west from the site;
- What will the resultant levels of air pollution and / or nuisance be?

BASELINE ANALYSIS

The current situation

8.43 The proposed Enviroparks development will be located off Fifth Avenue on the Hirwaun Industrial Estate, Hirwaun, Aberdare. The Hirwaun Industrial Estate has seen the closure of the Tower Colliery during 2008, and generally appears to be under utilised at present. The nearest neighbour of the site is Eden Industries located to the east with Dwr Cymru Welsh Water located to the west across Fifth Avenue. Other units on Fifth Avenue largely appear vacant or are currently in minimal use.

8.44 The transport network in the area largely consists of the highway linkages, although other facilities are available. The local road network is good, with the A465 Heads of the Valleys road and the A470 providing routes for national through traffic across Wales.

8.45 The nearest railway station to Hirwaun is at Aberdare, approximately 9 km from the proposed development, although other stations are available at Treherbert and Merthyr Tydfil. Each of these lines originates in Cardiff. The Aberdare railway station is served by a

bus to Rhigos which passes the Hirwaun Industrial Estate. Trains run to and from Cardiff and Aberdare or Treherbert half hourly during week days, and hourly to Merthyr Tydfil.

8.46 Limited buses pass through the industrial estate, and those which do would not currently be available to the proposed shift workers, with changes of the 12 hour shifts being at 06:00 hours and 18:00 hours.

8.47 Pedestrian footpaths and streetlights are available within the estate and out towards Rhigos, however these do not extend up Rhigos road towards Hirwaun. Sustrans are working towards extending the Valleys Network, and the proposed route will include a section from Aberdare and through Hirwaun, onto Rhigos and beyond. This route should be in place within 5 years.

The development

8.48 The proposed development will accept waste materials for recycling and processing, the material becoming a feedstock for the site energy producing processes. All of the incoming material and any out-going products or residual waste will be transported along the road network. This is due to:

- The requirement for the material to be collected and transported in suitable containers, e.g. skips, lorries or refuse vehicles;
- The availability of good highway links for deliveries, avoiding the requirement to use smaller roads on the network;
- The lack of other suitable freight facilities in the area.

8.49 Depending on the nature of the waste, the vehicle trips created by the movement of feedstock to the site will be diverted from other facilities, however for the purpose of the TA, all trips are assumed to be new to the network. This ensures that the TA provides a robust assessment of the worst case traffic impacts from the development.

8.50 The development will result in a total number of daily traffic movements of 428, for both the Enviroparks energy producer and the high energy user. These are two way vehicle movements and account for all deliveries and staff. Consideration has been given to the likely distribution across the highway network, based on information provided by Enviroparks. Although some vehicles will travel from the west of the site along the A465 towards Neath, it is anticipated that most will originate from, and return to, the east.

8.51 Staffing distribution is currently unknown, although an estimated split has been provided for the purpose of the TA. This suggests that staff will come from areas such as Neath, Rhigos, Penderyn, Pen-y-Waun and Hirwaun, as well as from slightly further afield, from areas such as Merthyr Tydfil and Aberdare. Local staff are expected to use local routes to and from their place of work, however all delivery and collection vehicles will be strictly instructed to enter and exit the industrial estate via the nearest A465 junction. The one exception to this will be local refuse collection vehicles which currently use alternative routes and would continue to do so.

8.52 Facilities are expected to operate on a 24 hour, 7 day week basis, although vehicle movements are expected to occur between 05:00 and 19:00 hours. The earliest and latest movements between these hours will be associated with staffing only, material deliveries and product / waste removals only taking place between 08:00 and 18:00 Monday to Friday.

8.53 Assuming the site is operating at full capacity, a maximum of 214 vehicles will visit the Enviroparks site daily. These will consist of a total of 105 staff trips and 109 refuse

collection vehicles (RCVs) or HGVs. As noted above, this equates to a total of 428 movements.

8.54 Weekend movements will be greatly reduced, consisting of two shifts (up to 64 staff and therefore 128 vehicle movements), and 13 deliveries (26 movements). The trip rates and distribution created by the development are detailed within the TA and assumes that all movements are by road.

8.55 All vehicles will have to enter the site via the estate roads. The estate roads are in relatively good condition and are currently under utilised, ensuring that the additional flows created by the development can be easily accommodated. The junctions have been designed for full and easy access by staff directly into the car park, and deliveries into the waiting area. A cycle lane is also provided at the main entrance to the site.

8.56 The estate has pedestrian footpaths and street lighting, and thus there is the ability for some staff to walk to work, although it must be noted that there is no full footpath out towards Hirwaun, with the path stopping at the entrance to / exit from the Industrial Estate. The nearest bus stops to the proposed development site are located on Rhigos Road, approximately 700 m from the site.

8.57 The only proposed modifications to the public highway comprise the provision of three new site access points, two from Ninth Avenue and one from Fifth Avenue. As an operational site, the proposed development will not generally be open to the public, and the site will be fenced and, as required, gated. Security facilities will be provided and the site will be a 24 hour, 7 day week process, thus staff are always on site.

8.58 The site does include a Visitors Centre which will be used for educational purposes, with groups from schools, colleges and other interested parties welcome to visit the site by arrangement, for tours and information on the processes. It is anticipated that these visits may occur up to once per fortnight, and suitable parking facilities for a coach or minibus is available directly at the Visitors Centre entrance.

8.59 The site layout provides suitable and sufficient parking for staff and visitors, and the calculation for this is presented in the TA. Adequate provision of disabled parking spaces has been made available to accommodate staff or visitors who may require additional room to access or leave their vehicle, and these are located at the nearest point to the building they serve. Disabled parking spaces are available by the Visitors Centre / Offices, the Biomax plant and the high energy users building. All parking is in the immediate vicinity of a key building, predominantly the Visitors Centre / offices, although the Gatehouse and Biomax pants have dedicated parking. The high energy user also has dedicated parking.

8.60 The reception area will be clearly signed from the parking areas. Dropped kerbs are available along the walkways of the site, and consideration will be given to the internal layout of buildings to facilitate access to all areas by all who may require it, with a lift to access the first floor of the Visitors Centre / Office building. A disabled toilet and shower room is also available.

8.61 In the event of an emergency, access to and egress from the site will be strictly controlled, and the site emergency plan will be implemented. Access to the site by the emergency services will be facilitated quickly through any one of the three junctions which adjoin the public highway. A maintenance / emergency lane is also located along the southern edge of the anaerobic digestion tank farm, and this can be used by the emergency services as required. A full fire and evacuation alarm system will be in place and special

consideration will be given to any disabled staff or visitors which may require assistance to vacate the premises.

PREDICTION OF POTENTIAL IMPACTS

8.62 The operation of the Enviroparks site is expected to require 214 vehicle trips per week day, which equates to 428 vehicle movements. The precise nature of the high energy user has not yet been finalised and therefore a reasonable judgement has been made on the likely staffing and transport requirements of the unit. Although there is some uncertainty associated with this, the assessment has been undertaken on the basis that the energy production of the Enviropark is working at maximum capacity, and therefore can be considered robust.

8.63 The TA has considered the likely impact on the network based on the proposed vehicle movements, with all materials and staff movements considered as additional trips. Although all staff have been assumed to travel in single occupancy cars, the promotion of a travel plan by Enviroparks will promote alternative travel options, and thus this should present a worst case assessment.

8.64 Count data was obtained from 2007 for key link routes, and new counts were undertaken at 5 strategic junctions in 2008. Junctions were identified through discussion with RCT, and represent those in the immediate vicinity of the development and some which, although not major routes for the development and will likely carry staff only, are already known to be suffering from congestion. Count data was therefore obtained from:

A The Estate Roads; Junction with Fifth Avenue and Main Avenue;
B A4061 and Hirwaun Industrial Estate Junction;
C A465 and A4061 Junction;
D A465 and A4059 Junction; and
E A4059 and B4275 Junction.

8.65 Discussion regarding committed development which may require consideration identified that although the land to the south of Hirwaun and Pen-y-Waun has been highlighted for development, there is no firm committed plan for the land at this stage. Therefore the growth rates applied as a matter of course to the count data should be adequate to consider any potential development of this area. There were other committed developments identified that upon investigation, were either already in place, or were in a location where the proposed development was unlikely to have any significant impact, or would likely add most vehicles to the roads outside of the peak development movement periods.

8.66 The trip rates of the development were modelled against count data from key junctions, which had been identified where the percentage increase in movements created by the development over the baseline was 5% or more. The ARCADY model was used to predict the impact on the flow of traffic at the junctions. All of the junctions were shown to have sufficient capacity and traffic queues were predicted to consist of a maximum of 2 vehicles at peak times. Modelling considered the base year (2008), opening year (2010) and an operational year in the future (2025).

8.67 Once the sufficiency of the network had been proven, an assessment of the likely environmental impacts of the transportation from the proposed development was considered. From the checklist of environmental effects requiring consideration in a transport

assessment, those of significance for this development were considered to be noise and vibration, driver and pedestrian delay and safety, and air pollution.

8.68 A noise assessment follows in ES Chapter 10, and an assessment of the predicted effects on local air quality is presented in ES chapter 11.

8.69 Driver and pedestrian delay, as demonstrated by the modelling, are considered insignificant. The slight increase of queuing at the A465 junction in future years (to a maximum of 2 vehicles) may assist in pedestrian crossing of the junction, as vehicles are required to slow more or stop at the junction.

8.70 ARCADY modelling has identified that the junctions have sufficient spare capacity and thus the increase in traffic loading should not place un-due stress on drivers or the infrastructure.

8.71 The proposed development will result in an increased traffic loading on the local highway network, and the majority of the movements will be undertaken during the day. The potential does exist for an increase in collisions, based purely on the additional volume of traffic. However, there is no proposed change to the highway layout apart from the creation of three access points to the site. These will be subject to a road safety audit, and all requirements for safe access and egress will be met

8.72 As there is no proposed change to the highway layout, the impact on pedestrian safety will be minimised. However not all areas are served with pedestrian walkways to and from the proposed development, and the increase in vehicle movement close to the development site, may mean that pedestrians have to take additional care to consider vehicles on the roadways. The modal split of traffic is insignificant and thus there is unlikely to be an increase in pedestrian fear or intimidation. The impact on pedestrian safety can therefore be considered negative but minimal.

MITIGATION

8.73 Enviroparks intended that all RCV and HGV movements would use the main A465 to the junction with the A4059 and A4061 (unless as part of their route, an RCV travels along the A4061 from the Rhondda Valley). However, public consultation revealed local residents' concerns that vehicles may travel towards Rhigos and on to the A465 in the west. In response, Enviroparks will offer a commitment that neither RCV or HGV will travel along that route for the purpose of accessing or leaving the site. Whilst the traffic generation of the proposed development is relatively small when considering the available highway links and capacity in the area, mitigation measures will control vehicle access routes into the industrial estate in order to minimise the chance of nuisance to local residents.

8.74 Although within the TA it has been assumed that all staff will travel by in single occupancy cars, the promotion of more sustainable transport options through the Transport Plan should reduce the impact on the highways and the site junctions.

8.75 The Transport Plan identifies that once operational, the Enviroparks site will promote car sharing, alternatives to car use and walking / cycling buddies. With staff facilities including 40 cycle stores and showers with changing facilities, this will encourage alternative methods of travel. It is notable that provision of a Sustrans cycle route running directly into the Hirwaun Industrial Estate is projected.

8.76 In addition, consideration will be given to the extension of the current bus service so that it can be used by shift workers, or the provision of a staff shuttle bus. Further investigation into these options will be necessary once the site is operational, and an assessment can be made of the needs of staff, specifically their home location, and the available facilities at the time.

EVALUATION OF RESIDUAL EFFECTS

8.77 The residual effects of the proposed development have been defined using the following significance matrix:

Table 8.1 Significance matrix for the assessment of transport

Significance of effect	*Description of impact*
Significant	Significant negative impact on the highway or local environment
Moderate	Moderate negative impact on the highway or local environment
Minimal	Small negative impact on the highway or local environment
Neutral / Negligible	Impact barely perceptible

8.78 Although increases in the traffic flows will occur, these have largely been calculated as less than 5% of the current or future flows on the network. Where an increase of more than 5% was calculated, modelling work has identified that the capacity of the junctions is still suitable and sufficient. Thus the overall effect on the road network can be considered **Minimal**.

8.79 Driver and pedestrian delay have been considered and the effect is assessed as **Negligible**.

8.80 Whilst improvements to the local infrastructure (A465 dualling) should lead to long-term improvements in road safety, increases in traffic movements may slightly increase the risk of accidents associated with traffic, involving either drivers or pedestrians. A **Minimal** effect on road safety through increased vehicle movements associated with the development thus remains. It is important to note that for the purpose of achieving a robust assessment, the modelling added all of the proposal's predicted vehicle movements to the network, without allowing for existing trips that would be diverted. Road safety audits will ensure that the design of the site access is suitably safe.

REFERENCES

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2. South East Wales Transport Alliance. Regional Transport Plan; Consultative Draft. July 2008
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4. Planning Policy Wales Technical Advice Note 18 - Transport. The Welsh Assembly Government. March 2007. ISBN 978 0 7504 4195 7
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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

1. Planning Policy Wales. Welsh Assembly Government. March 2002. ISBN 0 7504 2854 6

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

3. Technical Guidance Note (Dispersion) D1. Guidance on Discharge Stack Heights for Polluting Emissions. Environmental Protection Act 1990. Her Majesty's Inspectorate of Pollution. June 1993. HMSO London.

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.

Chapter Ten
NOISE AND VIBRATION

INTRODUCTION

10.1 This chapter of the ES assesses the potential noise effects that may arise within the study area as a result of implementing the proposed development. Within the scope of this development, it is proposed to construct and operate a waste recycling and energy recovery facility on site with the generated power offsetting the power requirements of an associated adjacent commercial operation.

10.2 Broadly, the assessment of noise undertaken has involved the following:

- Identification of appropriate standards and guidance for use in the assessment of noise impacts;
- Collection of daytime and night-time background and ambient noise level data in order to determine the existing baseline noise climate at potentially sensitive properties in the vicinity of the site;
- Qualitative assessment of noise levels at potentially sensitive local receptors during the construction phase of the development;
- Quantitative/qualitative prediction and assessment of operational noise levels at a selection of residential receivers, which have the potential to be affected by a change in noise level in future years as a result of the development;
- Quantitative/qualitative prediction and assessment of road traffic noise on the wider road network as a result of the proposed development;
- Determination of the significance of the impacts associated with the operation of the development;
- Provision of proposals for mitigation measures, where appropriate, in order to minimise any potential negative impacts arising from the development.
- Prediction of the magnitude of any residual effects that may remain following the implementation of any recommended mitigation measures.

10.3 Elements of the proposed facility will operate on a continuous 24 hours a day, seven days a week basis. However, HGV and vehicle movements will only occur between the hours of 08:00 to 18:00 Monday to Friday.

10.4 Within the scope of the application, it is proposed to operate a 'high energy use' within a structure located on the north western part of the site as detailed on the master plan. At the time of writing, the final occupant of this is unconfirmed, therefore the details of any potential future uses have not yet been concluded.

10.5 However, any future operator has the potential to generate cumulative effects with the proposed waste recycling and energy recovery operation through noise from static and mobile plant and by on-site and off site traffic noise.

10.6 As details are unconfirmed this limits the extent to which the cumulative effects can be assessed. The cumulative effects of noise have been assessed within this chapter in relation to:

- On-site static plant sources – Qualitative/Quantitative assessment based upon assumptions regarding the generated internal noise levels:

- On and off site traffic movements – Quantitative as the TA for the proposals includes aspects relating to the high energy use.

LEGISLATION AND PLANNING CONTEXT

10.7 A detailed review of the development plan documents and planning context in relation to the development proposals is provided in Chapter 5. This section summarises those policies that are directly relevant to noise issues.

The Control of Pollution Act 1974 (CoPA)[1]/Environmental Protection Act 1974 (EPA)[2]

10.8 There are various standards and legislation applicable to construction activities associated with a development of this type and these are outlined below.

- Section 60, Part III of Chapter 40 of the CoPA – Control of noise on construction sites. This provides legislation by which Local Authorities (LAs) can control noise from construction sites to prevent disturbance occurring.

- Section 61, Part III of Chapter 40 of the CoPA – Prior consent for work on construction sites. This provides a method by which a contractor can seek consent to undertake construction works in advance of their commencement. If consent is given, and the stated method and hours of work complied with, then the LA cannot take action under Section 60.

- Section 79, Part III of Chapter 43 of the EPA – Statutory nuisances and inspections thereof. This defines statutory nuisances with regard to noise and other aspects and determines that LAs are under a duty to inspect their areas to detect such nuisances. This section also considers and defines the concept of 'Best Practicable Means' (BPM) which originates from Section 72, Part III of Chapter 40 of CoPA where BPM is defined as 'reasonably practical having regard, among other things, to local

conditions and circumstances, to the current state of technical knowledge and to the financial implications'.

- Section 80, Part III of Chapter 43 of the EPA – Summary proceedings for statutory nuisances. This provides LAs with powers to serve an abatement notice requiring the abatement of a nuisance or requiring works to be executed to prevent their occurrence.

Planning Guidance (Wales): Technical Advice Note (TAN) 11 [3]

10.9 TAN 11 is Wales' primary, overarching, noise guidance document. It provides guidance to local authorities in Wales on the use of their planning powers to minimise the adverse impact of noise. Within the scope of the document TAN 11:

- outlines the considerations to be taken into account in determining planning applications both for noise-sensitive developments and for those activities which will generate noise;

- introduces the concept of noise exposure categories for residential development, encourages their use and recommends appropriate levels for exposure to different sources of noise; and

- advises on the use of conditions to minimise the impact of noise.

10.10 Within Annex B of TAN 11, 'THE ASSESSMENT OF NOISE FROM DIFFERENT SOURCES' guidance is given within paragraph B17 with regard to 'Noise from industrial and commercial developments', as detailed below:

'B17. The likelihood of complaints about noise from industrial development can be assessed, where the standard is appropriate, using guidance in BS 4142, 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that "a difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance." Since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week……'

10.11 With regard to construction noise, paragraph B20 of Annex B states:

'B20. Detailed guidance on assessing noise from construction sites can be found in BS 5228, parts 1-4. In particular, Part 1: 1984, "Code of practice for basic information and procedures for noise control" will be useful because as well as giving general advice it describes a method of predicting noise from construction sites'.

10.12 BS5228, Part 1, 1984 has been superseded by the 1997 version but the same principles apply.

10.13 Within BS5228, Annex 4 provides 'EXAMPLES OF PLANNING CONDITIONS' with Annex 5 providing guidance on 'SPECIFYING NOISE LIMITS', BS5228 further advises that consideration should be given to the type of limit, the noise index, monitoring points and meteorological conditions to ensure that limits are set sensibly in accordance with appropriate guidance and best practice for monitoring.

METHODOLOGY

Relevant Guidance

10.14 As a matter of best practice, this assessment has been undertaken based on the relevant guidance on noise and vibration. This includes:

- BS4142 'Method for Rating Industrial Noise affecting Mixed Residential and Industrial Areas', 1997.[11]
- Calculation of Road Traffic Noise (CRTN), Department of Transport (Welsh Office), 1988.[14]
- BS5228: Noise and Vibration Control on Construction and Open Sites (Part 1: 1997).[4]
- BS7445:Description and Measurement of Environmental Noise, 1991.[17]
- BS6472: Pt1:Guide to Evaluation of human exposure to vibration in buildings: Vibration sources other than blasting, 2008 [8]
- BS7385:Evaluation and measurement for Vibration in Buildings Part 1: 1990 and Part 2:1992[9,10]
- BS5228: Noise and Vibration Control on Construction and Open Sites (Part 4: 1992).[6]

10.15 These guidance and methodology documents are discussed in the following sections in relation to construction and operational phases.

Construction

BS5228 [4,5,6]

10.16 TAN 11 cites the use of British Standard 5228 to assess noise and vibration from construction sites. BS5228: *Noise and vibration control on construction and open sites*, Parts 1,2 and 4 provide guidance on the control of noise from construction and open sites. Part 4

of the standard deals specifically with noise and vibration generated by piling operations. This Standard, in its various parts, has been adopted under s. 71 of CoPA (Control of Pollution Act 1974).

10.17 Part 1, Code of practice for basic information and procedures for noise and vibration control, gives recommendations for basic methods of noise and vibration control relating to construction and open sites where work activities/operations generate significant noise and/or vibration levels. It includes sections on: legislative background; community relations; training; occupational noise effects; neighbourhood nuisance; project supervision; and control of noise and vibration. Annexes include: a list of EC and UK legislation; noise sources, remedies and their effectiveness (mitigation options); guide to sound level data on site equipment and site activities (source terms that are used for modelling); estimating noise from sites (calculation procedures which form the basis of the modelling packages); and noise monitoring.

10.18 Part 2, Guide to noise and vibration control legislation for construction and demolition including road construction and maintenance, provides further detail on the legislation applicable to construction and related aspects.

10.19 Part 4, Code of practice for noise and vibration control applicable to piling operations, provides specific advice and information on legislation, source terms, prediction, monitoring etc of noise and vibration from piling operations. Also included is guidance on human response to vibration and the response of structures.

BS6472 [8]

10.20 BS6472: Pt1:Guide to Evaluation of human exposure to vibration in buildings: Vibration sources other than blasting provides guidance on human response to vibration experienced in buildings. The Standard includes weighting curves related to human response to groundborne vibration.

BS7385 – Parts 1 and 2 [9,10]

10.21 BS7385: Parts 1 and 2 provide guidance on the evaluation and measurement for vibration in buildings. Part 1, Guide for measurement of vibrations and evaluation of their effects on buildings, provides advice on measurement, measurement instrumentation, location and fixing of transducers, and data evaluation. Annexes also provide advice on classifying buildings with regard to their likely sensitivity; estimating peak stress from peak particle velocity and random data.

10.22 Part 2, Guide to damage levels from ground-borne vibration, provides guidance on the levels of vibration above which building structures could be damaged. It identifies the factors that influence the vibration response of buildings, and describes the basic procedure for carrying out measurements. It also states that there is a major difference between the sensitivity of people feeling vibration and the levels of vibration, which have the potential to damage structures.

10.23 The Standard further states that levels of vibration at which adverse comment from people is likely are considerably below the levels of vibration at which buildings and structures may be damaged, except for vibration at lower frequencies.

Operation
BS4142 [11]

10.24 In addition to the above, TAN 11 cites the use of British Standard (BS)4142 to assess noise from industrial and commercial premises.

10.25 The method is based upon a comparison between the rating level of the noise from the specific source being considered and the background noise level (measured as an L_{A90}), in the absence of the specific source. The noise level from the specific source is increased by 5dB(A) if the source has any distinctive characteristics (tones or impulses such as whines, hums or bangs), or if it is irregular enough to attract attention and becomes known as the rating level.

10.26 As stated above, the Standard states that, if the rating level of the noise exceeds the background noise by around 10dB(A) or more, complaints are 'likely'. An increase of 5dB(A) is deemed to be of 'marginal significance' whilst a difference of minus 10dB(A) or more indicates that 'complaints are unlikely'. These descriptions are summarised in Table 10.1 below:

Table 10.1: BS4142 Significance Criteria

BS4142 Assessment Level, dB(A) (Rating Level relative to Background Level)	BS4142 Semantic (as described in the Standard)
< -10	'If the rating level is more than 10dB below the measured background level then this is a positive indication that complaints are unlikely'
-10 to +5	No BS description but the more negative the difference, the less the likelihood of complaints
+5	'A difference of around +5dB is of marginal significance'
+5 to +10	No BS description but the more positive the difference, the greater the likelihood of complaints
> +10	'A difference of around 10dB or more indicates that complaints are likely'

10.27 In situations where the L_{A90} background noise level at night is 'low' (less than 30dB(A)) and the Rating Level is low (less than 35dB(A)), the standard states that the rating method of BS4142 is not applicable. In these circumstances, it is standard practice to assess the noise effect by considering sleep disturbance criteria and other aspects such as noise change.

BS8233 [12]

10.28 BS8233 defines a range of ambient noise levels for a number of design criteria for good or reasonable conditions in certain habitable rooms. Table 10.2 shows a summary of the levels recommended in BS8233 for rooms used for resting and sleeping.

Table 10.2: Indoor Ambient Noise Levels as Recommended in BS8233

Criterion	Typical Situation	Designed Range, $L_{Aeq,T}$ (dB)	
		Good	Reasonable
Reasonable resting/ sleeping conditions	Living Rooms	30	40
	Bedrooms	30	35

World Health Organisation (WHO) [13]

10.29 A report was submitted to the WHO in 1995 for consideration as a revision to the 1980 WHO document and revised community guidelines were issued in 2000. These were published on behalf of the WHO but the authors alone were responsible for the views expressed. In the 2000 guidelines, it is considered that the sleep disturbance criteria should be taken as internal noise levels of 30dB L_{Aeq} and 45dB L_{Amax} or external levels of 45dB L_{Aeq} and 60dB L_{Amax}, with windows open.

10.30 For daytime levels, the 2000 WHO document states that 'To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB L_{Aeq} on balconies, terraces, and outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB L_{Aeq}. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development.'

10.31 However, the National Noise Incidence Study 2000 found the following:

'The National Noise Incidence Study 2000 has found that 55±3% of the population of England and Wales live in dwellings exposed to day-time noise levels above the WHO level of 55 dB LAeq,day. In 1990 we now estimate that 60±3% of the population were exposed above the level of 55 dB LAeq,day. This change represents a statistically significant decrease in the proportion of the population exposed above this level in 2000 when compared to the results of the 1990 study.

The National Noise Incidence Study 2000 has found that 68±3% of the population of England and Wales live in dwellings exposed to night-time noise levels above the WHO level of 45 dB LAeq,night. In 1990 we now estimate that 66±3% of the population were exposed above the level of 45 dB LAeq,night. This change represents a statistically non-significant increase in the proportion of the population exposed above this level in 2000 when compared to the results of the 1990 study. It should be noted that this is the only (one) of the established guideline values where we have detected an increase in population exposure in 2000 when compared to the 1990 study.'

10.32 Furthermore, in a review of health effects based noise assessment methods undertaken for the Department Environment Transport and the Regions (DETR) just before the issue of the 2000 WHO guidelines, it is noted that:

'Perhaps the main weakness of both WHO-inspired documents is that they fail to consider the practicality of actually being able to achieve any of the stated guideline values.'

10.33 The report goes on to say:

'The percentages exposed above the WHO guideline values could not be significantly reduced without drastic action to virtually eliminate road traffic noise and other forms of transportation noise (including public transport) from the vicinity of houses. The social and economic consequences of such action would be likely to be far greater than any environmental advantages of reducing the proportion of the population annoyed by noise. In addition, there is no evidence that anything other than a small minority of the population exposed at such noise levels find them to be particularly onerous in the context of their daily lives.'.

Calculation of Road Traffic Noise (CRTN) - Road Traffic Noise

10.34 The main method of calculating road noise is defined in Calculation of Road Traffic Noise (CRTN) [14]. This method of predicting noise at a reception point from a road scheme, a formal procedure originally issued in accordance with the requirements of the Noise Insulation Regulations 1975, consists of five main parts:

- Divide the road scheme into one or more segments such that the variation of noise within the segment is small;
- Calculate the basic noise level at a reference distance of 10m away from the nearside carriageway edge for each segment;
- Assess for each segment the noise level at the reception point taking into account distance attenuation and screening of the source line;
- Correct the noise level at the reception point to take into account site layout feature including reflections from buildings and façades, and the size of the source segment;
- Combine the contributions from all segments to give the predicted noise level at the reception point for the whole road scheme.

Summary of Prediction and Assessment Methods

10.35 The noise and vibration effects associated with the construction and operation of the proposed facility have been assessed using standard methods and criteria. For assessment purposes, the project has been divided into distinct elements, as follows:

- construction of the new facility;
- operation of the facility under normal circumstances; and

- traffic movements associated with operational activities.

10.36 The assessment methods used are summarised below.

Construction

10.37 Within the scope of the construction noise assessment undertaken as part of this chapter, no direct, specific prediction of noise from construction operations has been undertaken. The assessment has been undertaken on a qualitative basis with recommendations being made for mitigation and control measures as appropriate.

Operational (inc off site traffic noise)

10.38 Noise from the operation of the facility has been predicted based upon the information supplied and has been assessed in line with the following methodologies and standards:

- Operational Activities – ISO9613 [7], BS5228, BS4142, BS8233 and noise change
- Operational Traffic – CRTN

10.39 From the traffic assessment (Chapter 8), it can be seen that all operational traffic will enter the site from the purpose built access off Ninth Avenue. Therefore the assessment of off site vehicle related noise will be undertaken to cover this and other industrial estate roads together with other public roads in the vicinity of the site as covered within the scope of the Traffic Assessment.

10.40 All predictions with regard to noise were undertaken utilising the commercially available Braunstein + Berndt GmbH computer noise mapping software SoundPLAN 6.4 implementing the above relevant standards and prediction methodologies.

Assessment Criteria
Noise from Construction of the facility

10.41 It is proposed that, upon the conclusion of an exact construction methodology, scheme details regarding specific controls and measures to be adopted to control noise within the construction will be contained within a Section 61 agreement.

10.42 Generalised evaluative criteria for on-site construction noise have been derived for use on other construction projects drawing upon the guidance in BS5228. However, it is noted that the guidance of BS5228 Part 1 does not extend to provide an absolute noise criteria but merely identifies key factors to consider, these include:

a) Site location
b) Existing ambient noise levels
c) Duration of site operations
d) Hours of work
e) Attitude of the site operator

f) Noise and vibration characteristics
g) Effect of vibration on buildings and humans

10.43 It is generally recognised that, for operational noise, the likelihood of complaints is related to the difference between the industrial noise and the existing background noise level. However, BS5228 recognises that this relationship between responses and noise level differences may well be different for construction noise activities, and a greater difference may be tolerated when it is known that the activities are of a relatively short duration.

10.44 It is considered that under normal circumstances, in order for a property to be significantly affected by construction noise, a daytime level of 75dB L_{Aeq} or above must be experienced for a period of 12 weeks or more.

10.45 Where existing free field ambient noise levels are already elevated above or close to the proposed construction noise limit of 75dB $L_{Aeq,12hours}$ due to existing ambient noise sources, the threshold level of 75dB $L_{Aeq,12hours}$ can be increased by a further 5dB(A)

10.46 It is common practice to attempt to minimise construction noise impacts through environmental controls defined in a S61 Agreement, an Environmental Management Plan or a Code of Construction Practice.

Vibration from construction of the facility

10.47 Within the scope of any construction operations associated with such a development, the only operation that would be considered likely to generate sufficient vibration levels, such to have a potential effect outside of the site boundary, is the undertaking of certain ground stabilisation techniques (Dynamic compaction) or the installation of any supporting piles below the foundations and floor slabs.

10.48 No confirmation has been supplied to RPS regarding any requirement for any ground stabilisation or piling to be undertaken within the scope of the development proposals.

10.49 Once this requirement for this aspect of the construction works has been concluded, a detailed assessment of potential resulting vibration levels associated at the closest sensitive receptor locations would require to be undertaken. The predicted vibration levels would require to be assessed against the standards below to conclude the suitability of the system and any requirements for alternative methodologies should vibration levels be unacceptable.

10.50 The significance of vibration levels affecting building occupants arising from construction activity can be determined from the criteria defined in BS6472:Pt1; these are presented in Table 10.3. Impact would be considered significant if the predicted/measured levels are likely to be at or above those defined as ‘Adverse Comment Possible’.

Table 10.3: Construction Vibration - Threshold of Significant Impacts on Building Occupants

Receptor	Low Probability of Adverse Comment VDV ms-1.75	Adverse Comment Possible –VDV ms-1.75	Adverse Comment Probable –VDV ms-1.75
Residential Buildings 16 hour day	0.2-0.4	0.4 -0.8	0.8 -1.6

10.51 The potential for significant impact upon structures would be deemed to occur if the conservative limits derived from BS7385-2, which are presented in Table 10.4, are exceeded.

Table 10.4: Construction Vibration – Threshold of Potential Cosmetic Damage

Category of Building	Threshold of Potential Cosmetic Damage (Peak Particle Velocity)
Industrial or heavy commercial buildings	50mm/s
Standard residential buildings	15mm/s

10.52 The above presented vibration limits are for transient vibration, for continuous vibration the levels presented should be reduced by up to 50%. However, BS6472 defines vibration as continuous when 'it is uninterrupted for the assessment period. This can be either a daytime period of 16h e.g. 07h00 to 23h00 or a night time period of 8h, e.g. 23h00 to 07h00'. Piling operations would not fulfil this criterion and as such are not considered as continuous vibration.

10.53 Vibration from piling activities also has the potential to damage underground structures such as water pipelines running within or close to the site boundary. BS5228 Part 4 section 8.5.3 provides guidance on the assessment of vulnerability of underground services. The guidance levels provided are as follows:

Table 10.5: Construction Vibration – Threshold of Potential Damage to Underground Services

Vibration Duration	Maximum Peak Particle Velocity
Intermittent or transient vibrations	30mm/s
Continuous Vibrations	15mm/s

10.54 The values presented within Table 10.5 are generally applied to the crown (top) of the pipe unless the lateral extent of the service is considered to be large in relation to the separation distance between said service and the closest pile location.

10.55 BS5228 Part 4 goes on to say:

'It should be noted that even a p.p.v of 30 mm/s gives rise to a dynamic stress which is equivalent to approximately 5% only of the allowable working stress in typical concrete and even less in iron or steel.'

'In the event of encountering elderly and dilapidated brickwork sewers the base data should be reduced by 20% to 50%. For most metal and reinforced concrete service pipes, however, the values [Table 8.6] should be quite tolerable.'

Noise from operation of the facility

10.56 TAN 11 cites the use of BS4142 where assessing noise from proposed industrial and commercial premises that has the potential to adversely affect residential properties.

10.57 At night, the resultant noise levels inside properties are considered to be of more significance in order to assess any potential for sleep disturbance. TAN 11 also makes reference (para B17) to BS8233 which provides general guidance on acceptable noise levels within buildings. In sleeping areas, the recommended maximum indoor ambient noise levels range from 30dB L_{Aeq} (good conditions) to 35dB L_{Aeq} (reasonable conditions). These correspond to external noise levels of 40 to 45dB(A) L_{Aeq} with windows open.

10.58 Similar advice is provided within the WHO guidelines for community noise. This states that to avoid the negative effects on sleep, the L_{Aeq} sound pressure level during the sleeping period should not exceed 30dB(A) for continuous noise and the recommended night-time noise levels outside of dwellings should not exceed 45dB(A) to enable residents to sleep with bedroom windows open.

10.59 The Department of Transport document 'Design Manual for Roads and Bridges' (DMRB) [15] provides a method for the assessment of road traffic effects by predicting the change in the $L_{A10, 18hr}$. A similar approach was set out in its precursor, the 'Manual of Environmental Appraisal for Trunk Road Assessments' (MEA) [16].

10.60 The approach has been used in the UK over the last ten years in the assessment of road traffic schemes and is based upon the premise that subjective response to noise from a new source is proportional to the change in overall noise level.

10.61 In the case of road traffic noise, the DMRB rates impacts through consideration of the change in 18-hour L_{A10} measurement by noise change bands. These are similar to the original noise change bands presented in the MEA, with an additional band being included for an increase of 1- 3, however, it does not indicate whether this change is significant. Noise change bands comparable with those recommended in the MEA are therefore used for the rating of noise impact. The limits of the bands have also been altered slightly to avoid the ambiguity in the MEA bands at the 5 and 10dB noise change levels, which overlap.

10.62 It is often considered useful to categorise the degree of impact according to the extent of the predicted noise change. This is frequently implemented by the use of descriptors associated with noise change bands. A commonly adopted scale is shown in Table 10.6 below.

Table 10.6: Scale for Describing Noise Change – Thresholds of Significance (Permanent Sources and Operational Traffic)

Impact Magnitude	Noise Level Change
Severe	Increase of more than 15dB (A)
Substantial	Increase of 11 – 15dB (A)
Moderate	Increase of 6 – 10dB (A)
Slight	Increase of 3 - 5dB (A)
No significant change	Increase of less than 3dB (A)

10.63 In order to determine the significance of an impact, not only must the magnitude of the impact be determined but the sensitivity of the receptors to the impact must also be defined. This has been scaled within Table 10.7 below based upon professional judgement, taking into account the nature of the receptor:

Table 10.7: Receptor Sensitivity

Receptor Sensitivity	Type of Receptor
High	Dwellings/residential properties including houses, flats, old peoples' homes, hospitals, schools, churches, caravans and open spaces/conservation areas where the existing noise level is low.
Moderate	Commercial premises including retail and offices etc.
Low	Industrial premises, warehousing and distribution etc.

10.64 Based upon the assessment of impact magnitude and the sensitivity of individual receptors, the following matrix has been developed in order to provide an indication of the possible significance of each predicted operational noise impact.

Table 10.8: Significance Matrix

Impact Magnitude	Receptor Sensitivity		
	High	Moderate	Low
Severe	Major	Major/Moderate	Moderate/Minor
Substantial	Major/Moderate	Moderate	Minor
Moderate	Moderate	Moderate/Minor	Minor/Neutral
Slight	Minor	Minor/Neutral	Neutral
No Significant Change	Neutral	Neutral	Neutral

Summary of Assessment Criteria - Construction Noise and Vibration from Construction

10.65 Noise within the construction phase of the development would be controlled within a Section 61 agreement with the Local Authority.

Summary of Assessment Criteria - Operational Noise from the Operation

10.66 A significant noise impact will be deemed to occur if:

- The Rating Level should exceed the Background Level by more than 5dB(A) at any sensitive residential receptor
- Noise Level inside residential properties of more than 30dB L_{Aeq} at night with windows open

Ground-borne Vibration from Operation

10.67 No ground-borne vibration impacts are expected to occur outside of the site boundary as a result of the operation of the proposed development.

Operational Traffic

10.68 A significant noise impact will be deemed to occur if:

- The traffic noise level increases by 3dB or more $L_{A10(18\ hour)}$ at any sensitive residential receptor.

Cumulative Impacts

Assessment has been undertaken on a qualitative/quantitative basis of the cumulative impacts associated with the 'high energy use' on the north western area of the development site.

CONSULTATIONS

10.69 As detailed in Chapter 6, a formal scoping exercise has been undertaken to inform the scope of the Environmental Assessment.

10.70 In addition to the formal scoping exercise, discussions with Mr Christopher Morgan, Head of Planning Services at Brecon Beacons National Park Authority and Mr Christopher Jones, Development Control Manager at Rhondda Cynon Taf County Borough Council during July 2008 have informed the noise assessment. The key element of the consultations was the agreement of suitable monitoring locations, durations and assessment methodologies.

10.71 The detail of the agreements made with BBNPA and RCT within the above consultations is presented within the Baseline Conditions below.

10.72 A site visit was undertaken by the Northern Acoustics Group of RPS Planning & Development on 15th August 2008 in order to carry out a qualitative and quantitative assessment of the prevailing noise conditions on and in the vicinity of the proposed development site.

10.73 It was considered that the key source of noise audible on site during the daytime period was vehicle movements on the surrounding road network coupled with overhead aircraft movements, natural noises and general human activity. During the night-time period, the noise climate was again governed by distant road traffic noise coupled with natural noises.

Potentially Sensitive Receptors

10.74 Identification of the key potentially sensitive receptors closest to the development site boundary was concluded in conjunction with both the BBNPA and RCT. This issue of sensitive receptors was concluded based upon the assessment of detailed OS topographical data and the findings of the site visit.

10.75 The following properties have been selected for assessment purposes:

1) Ty Newydd (Hotel) – to the east of the development site.

2) Residential Dwelling (Reservoir House) adjacent to the Penderyn Reservoir – to the north of the development site - .

3) Tai-cwplau – to the west of the development site.

4) Tre-banog-uchaf – to the north of the development site.

10.76 The monitoring locations as detailed above are presented highlighted within the mapping information shown on Figure 10.1 at the end of this chapter.

Baseline Noise Monitoring

10.77 Noise monitoring surveys were undertaken in order to define baseline noise level conditions in the vicinity of the proposed development site.

10.78 The scope of the monitoring surveys was discussed and agreed with Mr Christopher Jones of RCT prior to the undertaking of the monitoring exercise. Representation was also made to BBNPA regarding the proposed noise assessment scheme although no response was received.

10.79 Daytime and night-time ambient noise monitoring surveys were undertaken on 15th August 2008. The surveys comprised monitoring at 4 locations in total as presented in Table 10.9 below, and identified on Figure 10.1.

Table 10.9: Noise Monitoring Locations

Loc. No.	Address and Description	Potential Receptors	Existing Key Noise Sources
1	Ty Newydd (Hotel) The Sound Level Meter (SLM) was positioned on the landscaped area adjacent to the entrance. Approx. Grid Ref – 294622, 206930	Hotel accommodation and adjacent residential property.	Distant road traffic noise and activities in and around the hotel complex.
2	Reservoir House The SLM was positioned adjacent to the access road to the east of the dwelling. Approx. Grid Ref – 294135, 207270	Residential properties.	Road traffic noise and natural noises, coupled with periodic human activity noise.
3	Tai-cwplau The SLM was positioned within the boundary of the farm complex adjacent to the residential dwelling. Approx. Grid Ref – 293518, 207033	Working Farm and residential dwelling.	Natural and agricultural noises coupled with distant road traffic and human activity noise
4	Tre-banog-uchaf The SLM was positioned outside the church and next to residential properties on Old Kent Road. Approx. Grid Ref – 294059, 207402	Residential dwelling.	Distant road traffic and machinery noise coupled with natural and human noises.

Survey Measurement Timings

10.80 Table 10.10 below provides details of the timings and durations of the noise surveys undertaken.

Table 10.10: Noise Monitoring timings and locations

Monitoring Location	Daytime and Night-time	
	Date	Time
1	15th August 2008	09:00 – 11:00 00:00 – 01:00
2	15th August 2008	11:10 – 13:10 01:14 – 02:14
3	15th August 2008	15:50 – 17:50 03:39 – 04:39
4	15th August 2008	13:25 – 15:25 02:20 – 03:20

Monitoring Protocol

10.81 The daytime noise monitoring surveys comprised at minimum 120 minutes of noise measurements monitored in 15-minute sub-periods. During the night-time survey, a minimum of 60 minutes of noise level data was measured at each location divided into separate 5-minute periods.

10.82 The instrumentation used during the noise surveys was 1No. Norsonic 118 (Serial No. 31314) with all-weather kit. The instrumentation was calibrated before and after each survey using a Bruel & Kjaer Electronic calibrator (Type 4231, Serial No. 2393954). No significant deviations were noted. Instrumentation calibration documentation can be supplied upon request.

10.83 The instrument was configured with a 'fast' time constant and a dynamic range of 20-120dB. The microphones were mounted on tripods and the Sound Level Meter (SLM) was set to measure L_{Aeq}, L_{A90}, L_{A10} and L_{Amax}.

10.84 Weather conditions were periodically noted during the survey periods to be as detailed below:

Friday 15th August 2008

10.85 The weather conditions during the night-time (early hours) of 15th August 2008 were noted to be mild, clear (0% cloud cover) and dry (7°C). The wind speed was measured to be of less than 5ms^{-1}.

10.86 The weather during the daytime period of 15th August 2008 was noted to be fine and dry (17°C) with periodic sunny spells. The wind speed was measured to be of less than 5ms^{-1}. Cloud cover was noted to be approximately 70%. The weather conditions remained relatively constant throughout the daytime survey period although the cloud cover increased to approximately 95% by the early afternoon.

10.87 During all of the periods of monitoring (daytime and night-time) undertaken, the road surfaces within the area were noted to be dry.

Measured Noise Level Data

10.88 A summary of the daytime and night-time survey results is presented within Table 10.11 and Table 10.12 below, with the entire data set being presented within Noise Appendix 10.5.

Table 10.11: Summary of Measured Daytime Noise Levels

Location	Time	Measured Statistical Parameters in (dB)			
		LAeq	LA90	LA10	LAmax
1	09:00 – 10:00	46.1	40.2	47.0	82.1
	10:00 – 11:00	44.6	40.4	46.5	65.3
2	11:10 – 12:10	46.1	41.7	46.3	71.2
	12:10 – 13:10	46.6	42.9	46.5	79.6
3	15:50 – 16:50	50.1	40.9	48.7	75.6
	19:50 – 17:50	48.3	43.0	49.9	70.5
4	13:25 – 14:25	49.0	45.9	50.9	66.0
	14:25 – 15:25	48.7	44.5	50.6	79.2

Table 10.12: Summary of Measured Night-time Noise Levels

Location	Time	Measured Statistical Parameters in (dB)			
		LAeq	LA90	LA10	LAmax
1	00:00 – 01:00	40.8	34.5	42.2	67.1
2	01:14 – 02:14	39.0	37.7	40.2	61.7
3	03:39 – 04:39	54.6	31.6	38.9	81.1
4	02:20 – 03:20	37.7	35.7	39.2	60.7

Limitations

10.89 The baseline survey was undertaken by way of snapshot noise monitoring undertaken during a typical working week day and overnight period. However, the acceptability of this approach was agreed with RCT. The scheme was also presented to BBNPA, and whilst given sufficient time, BBNPA did not advise of any adverse comment to proposals put forward.

10.90 The data supplied to RPS for inclusion within the noise modelling was as discussed an agreed with Mr Don Ridley of Ennertec on 2nd October 2008 based upon the current knowledge regarding the technology to be implemented on site. Following any planning approval, once more detailed information is available relating to the exact specifics of the technology to be installed on site, further noise modelling works would be required to be undertaken to verify the results of this assessment.

10.91 No information is currently available relating to the noise issues associated with the high energy use located on the site except for an estimation of the expected vehicle flow numbers which is contained within the scope of the traffic assessment. Therefore, the impact of this aspect of the development site cannot be categorically quantified at this time. Once a future user and a design of the operational plan confirmed, further acoustic assessment works could be undertaken for the following aspects:

- Noise associated with fixed air conditioning/refrigeration or extraction plant to be assessed in order to ensure that the noise received at the closest sensitive receptor locations would not breach an acceptable limit to the local council;
- Noise associated with other operations on and around the site would not breach an acceptable limit to the local council;
- Off site vehicle movements would not significantly affect noise sensitive receptors around the local road network.

INCORPORATED ENHANCEMENT AND MITIGATION

Construction Activities

10.92 All issues relating to mitigation measures required to reduce noise impact associated with the construction operations will be contained within the scope of a Section 61 agreement.

10.93 Furthermore, within the construction phase of the development, it has been assumed that, as a minimum, the principal contractor will be required to submit a detailed method statement giving construction plant schedules, working hours, proposals to minimise noise emissions and a programme of sample monitoring. Furthermore, the principal contractor will be required to:

- Reduce noise to a minimum, as defined in section 72 of the Control of Pollution Act, 1974 using the best practical means at all times and in agreement with the Local Planning Authorities.
- Maintain/replace exhaust silencers to ensure they are effective.
- Use well silenced compressors in noise-sensitive areas.
- Maintain plant regularly and ensure that noise abatement measures (e.g. covers) are fully operational and used correctly.
- Confine construction activity to within a time period agreed with the Local Authority.
- Keep local residents and Local Authority informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern.
- Provide a helpline/contact number for any complaints or concerns from members of the public.
- Employ a manager to ensure that all works are being carried out in accordance with BPM.

Operational Activities

10.94 The following mitigation measures, integral to the design of the proposed facilities, have been introduced to mitigate the potential noise emissions during the operational phase. The noise model and the results presented within the scope of this report assume that all of the below specified mitigation measures are implemented:

Waste Recycling and Energy Recovery Facility

- Buildings will be fully enclosed and will be insulated as specified with appropriate wall and roof systems providing attenuation of –25dB(A) (R_W) or greater;

- As and where specified on Figure 10.2 within the design of the site certain wall/roof sections of the Fuel Preparation Building (Building 3) and the Pyrolisis Building (Building 7) would require an increased specification of cladding providing attenuation of –42dB(A) (Rw) or greater

- All vehicle access and exit doors within the facility including rapid closing doors will require to provide attenuation of between -12 to -17dB(A) (Rw) or greater when closed as detailed on Figure 10.2. When not in use, these doors require to be closed at all times;

- All personnel doors, maintenance doors (including infrequently used access points for cleaning/maintenance purposes) will require to provide acoustic attenuation equivalent to or bettering than the wall cladding specified around it. Doors would require to be appropriately fitted to maintain a constant barrier and would require to remain closed other than when in use.

- All main plant, equipment and operations associated with Fuel Preparation, Biomax operations, Pyrolisis and power generation will be located, operated and undertaken within the confines of the proposed building environments;

High Energy Use

- Any air conditioning/refrigeration/extraction plant associated with the high energy use should be such designed and mitigated as necessary to achieve a noise limit agreed by the local planning authority.

- Within the model it has been assumed that all operations within the high energy building would require to be mitigated to produce noise levels within the limits of the Noise at Work Regulations. It has therefore been assumed within the model that the internal noise generated by any operator of this building would be 85dB(A).

- Further acoustic assessment works would be required to be undertaken following conclusion of a use, design and specification of this aspect of the development site to ensure that no adverse impact occurs.

10.95 These mitigation measures have been incorporated within the base scenario of the modelling exercise and assessment undertaken as presented within Noise Appendices 10.1 and 10.2.

IDENTIFICATION AND EVALUATION OF KEY IMPACTS

10.96 The proposed facility has the potential to impact upon existing local receptors. Impacts are possible in both the long and short-term, during operational and construction phases respectively. The magnitude and significance of the impacts will be evaluated further in this section.

Construction Phase

10.97 Within the scope of the construction operations required for the development of the facility, the following operations have the potential to cause short-term disturbance to the amenity nearby receptors.

- Site establishment activities (inc. ground works) – this is typically the activity which employs the greatest amount of large earth moving equipment;
- Building construction – typically undertaken with less large-scale equipment than the ground works phases;
- Construction traffic – the road traffic movements associated with the construction operations have the potential to generate short-term increases in traffic movements on the surrounding highways.

10.98 It has not been concluded as to whether there is any requirement for piling/ground stabilisation operations. If it is a requirement then some form of assessment of noise and vibration levels associated would require to be undertaken. This assessment, if necessary, could be covered within the works leading to the s.61 agreement.

Operational Phase

10.99 The key elements of the operational phase of the development which could potentially generate long-term disturbance to the amenity of adjacent receptors are as detailed below:

- Operation of the facility equipment both within and exterior to the building structures during the daytime period;
- Operation of the appropriate elements of the facility during the overnight period;
- Operation of the high energy usage facility.
- Daytime HGV movements on the site roads;

- Increases in daytime road traffic volumes on the surrounding highways as a result of development generated traffic movements.

PREDICTION OF IMPACT MAGNITUDE

BS4142 Assessment of Residential Receptors

10.100 A BS4142 assessment has been undertaken to the closest residential receptor locations to the proposed development based upon measured background noise level data and predicted operational noise levels from the entire facility.

10.101 Within a BS4142 assessment, there is a requirement to impose a 5dB character correction to a predicted noise level where tonal or impulsive aspects are envisaged or do occur. It is considered within the scope of this assessment that as a result of all plant, equipment and operations on site being housed within the confines of bespoke designed buildings this correction would not be required as the acoustic attenuation of the building cladding would adequately remove these elements of the noise.

10.102 The plant and equipment utilised within the modelling exercise undertaken is included within Appendix 10.6. Details regarding locations and noise levels for each of the items of plant included within the model were concluded within discussions on the 2nd October 2008 with the Ennertec design engineer Mr Don Ridley.

10.102 Account has been taken of HGV vehicle movements within the service yard areas of the high energy use building as well as assumed noise levels associated with the internal building operations based upon the upper limits of the Noise at Work Regulations.

10.103 Only the incorporated mitigation measures as discussed within paragraph 10.98 of this Chapter have been included within the assessment presented below.

10.104 The output of the noise model constructed is presented within the grid noise map plots contained within Appendices 10.1 and 10.2.

10.105 Table 10.13 below shows the results of the daytime and night-time BS4142 assessment at each of the residential properties assessed. Within the assessment, the averaged one-hour 'background' noise level measured during the daytime and the averaged 5-minute data during the night-time have been used. The assessment has been undertaken in whole decibels as required by BS4142.

Table 10.13: BS4142 Noise Assessment

Parameter	Receptor 1		Receptor 2		Receptor 3		Receptor 4	
	Day	Night	Day	Night	Day	Night	Day	Night
Specific Noise Level of Proposed Facility (dB L_{Aeq})	38	37	40	39	38	37	40	39
Rating Level (dB L_{Ar}) No penalty included as discussed in para 10.105.	38	37	40	39	38	37	40	39
Measured Background Level (dB L_{A90})	40	35	42	38	42	32	45	36
Assessment Level (dB L_{Ar} – dB L_{A90})	-2	+2	-2	+1	-4	+5	-5	+3

10.106 BS4142 states that the lower the assessment level, the less the likelihood there is that complaints will arise. The Standard states that an assessment level of -10 would provide a positive indication that complaints are unlikely, whilst increases of 5dB(A) above background are deemed by the Standard to be of marginal significance.

10.107 The daytime BS4142 assessment for the proposed development shows that, based upon the measured noise level data and predictions undertaken, the rating levels are shown to be between -5dB(A) and -2dB(A) below the measured backgrounds. In accordance with the guidance of BS4142 this is considered to be of less than marginal significance with the more negative the difference the less the probability that complaints regarding the operational facility would occur.

10.108 The overnight assessment undertaken concludes that the predicted rating level is shown to be between +1dB(A) and +5dB(A) above the measured background. This is concluded within the BS4142 assessment methodology to be of marginal significance or less with the potential for resulting complaints being considered to be low.

BS8233 Internal Noise Assessment

10.109 During the overnight period, it is considered that external noise levels are not appropriate for quantifying impact associated with a new noise generating development. This conclusion is drawn as a result of the fact that during this time period people are inside buildings either asleep or trying to get to sleep and it is very rare that an external garden would be occupied during this period. It is therefore considered prudent to present an

assessment of the potential resulting internal noise levels from the overnight operation of the facility.

10.110 It is stated within BS4142 that the method is not appropriate for assessing noise inside buildings; therefore, in order to adequately assess internal noise levels the guidance of BS8233 is referenced. BS8233 states that a 'Good' design criteria for resting and sleeping conditions within bedrooms during the overnight period is 30dB(A), 'Reasonable' conditions are defined within the standard as 35dB(A).

10.111 Given the varied nature of the constructions of the surrounding residential dwellings and in order to present an absolute worst-case assessment, a conservative -13dB(A) attenuation has been assumed to be provided by the façade. This equates to the level presented within PPG24 (paragraph 4, Annex 6) for a façade construction of any detail with a window partially open for ventilation.

10.112 Comparison of the presented predicted external noise levels from the facility during the overnight period (37 to 39 dB(A)), inclusive of this –13dB(A) attenuation, with the criteria presented within BS8233 as stated above, concludes that the internal noise levels attributable to the facility would be expected to be between 24 to 26 dB(A), wholly within the 'Good' design range criteria (30dB(A)).

Vehicular traffic off-site

10.113 The TA has assessed and evaluated the impact of the development-generated flows on identified junctions on the existing local road network from the proposed development. The Junctions which have been assessed are termed A to E.

10.114 When undertaking road traffic noise assessments, it is common practice to assess the potential increase in the LA10 noise level over an 18-hour period between 0600 - 0000hrs using annual average weekday traffic (AAWT) flow data. The predicted noise levels in columns 4 and 5 are for indicative purposes only, normalised to 20m from the carriageway edge. However, the difference in noise level (Column 6) will be experienced at any given distance from the carriageway edge where road noise from the given link is the dominant source.

10.115 The results of the traffic noise assessment are presented within Table 10.14 below.

Table 10.14: CRTN traffic noise calculation results

Junction Name	Route link	Assessment Methodology	Baseline	With Development	Difference
2010 – Opening Year					
A	5th Ave. - Industrial Estate road	CRTN (low flow corrected)	49.2	52.9	+3.7
	Estate Rd - Industrial Estate road	No development flows using this link – no change in noise			
	Main Ave. - Industrial Estate road	No development flows using this link – no change in noise			
	5th Ave. to A4061- Industrial Estate road	CRTN (low flow corrected)	53.2	55.3	+2.1
B	5th Ave. - Industrial Estate road	CRTN (low flow corrected)	52.7	54.9	+2.2
	A4061 (E)	CRTN	59.4	60.0	+0.6
	A4061 (S)	No development flows using this link – no change in noise			
	Rhigos Rd	CRTN	54.6	54.6	0.0
C	A4061	CRTN	60.9	61.3	+0.4
	A465 (Neath)	CRTN	66.8	66.8	0.0
	A4059 (Penywaun)	CRTN	60.7	60.7	0.0
	A465 (Merthyr)	CRTN	67.3	67.5	+0.2
2025 – Design (Operational) Year					
A	5th Ave. - Industrial Estate road	CRTN (low flow corrected)	49.9	53.3	+3.4
	Estate Rd - Industrial Estate road	No development flows using this link – no change in noise			
	Main Ave. - Industrial Estate road	No development flows using this link – no change in noise			
	5th Ave. to A4061- Industrial Estate road	CRTN (low flow corrected)	53.8	55.7	+1.9
B	5th Ave. - Industrial Estate road	CRTN (low flow corrected)	53.2	55.3	+2.1
	A4061 (E)	CRTN	59.9	60.4	+0.5
	A4061 (S)	No development flows using this link – no change in noise			
	Rhigos Rd	CRTN	55.1	55.1	0.0
C	A4061	CRTN	61.4	61.8	+0.4
	A465 (Neath)	CRTN	67.2	67.3	+0.1
	A4059 (Penywaun)	CRTN	61.2	61.2	0.0
	A465 (Merthyr)	CRTN	67.8	68.0	+0.2

Note – Rows highlighted in light grey depict Industrial estate roads with no adjacent residential receptor locations.

10.116 Assessment of the traffic flow turning count drawings (Transport Appendix 2) concludes that the proposed development imparts no impact on the flow patterns of Junctions D and E. Therefore, there will be no resulting changes in the level of traffic generated noise resulting from the proposed development at these junctions.

10.117 It is noted that there are no residential properties in the vicinity of Junction A, which is an internal industrial estate junction. The closest residential dwellings along the road network are adjacent to Junction B off the A4061 (E) toward the A465 (Junction C). The maximum noise increase at residential property due to road traffic flow changes resulting from the proposed development is therefore predicted to be in the region of +0.6dB(A) and +0.5dB(A) during 2010 and 2015 respectively.

10.118 The noted larger increases in road traffic noise around Junction A and link 1 into Junction B (IE road leading to 5th Avenue) are within the industrial estate and do not affect any sensitive residential receptors.

10.119 The impact of the increased traffic associated with the proposed development is rated within Table 10.15 below.

ASSESSMENT OF IMPACT SIGNIFICANCE

10.120 Table 10.15, presented below, references the predicted and measured noise levels to the impact assessment schemes presented and discussed within this Chapter, to conclude the significance of any potential impact.

10.121 Only the BS4142 assessment methodology requires the inclusion of any character correction penalties. As such, the following impact significance assessment is based upon the predicted specific noise levels as presented within Table 10.13.

Table 10.15: Predicted Significance of Impacts (Noise)

Potential Impact Identified	*Receptors Considered*	*Impact Magnitude (as predicted above)*	*Sensitivity of Receptor*	*Overall Impact Significance*
Daytime - All Operational Plant, and on site vehicle movements	1) Ty Newydd (Hotel) and adjacent properties	No significant Change	High	Neutral
	2) Reservoir House and adjacent properties	No significant Change		Neutral
	3) Tai-cwplau and adjacent properties	No significant Change		Neutral
	4) Tre-banog-uchaf and adjacent properties	No significant Change		Neutral

Potential Impact Identified	Receptors Considered	Impact Magnitude (as predicted above)	Sensitivity of Receptor	Overall Impact Significance
Off site 18hr daytime vehicle movements	Residential and Sensitive receptors adjacent to the surrounding road network	No significant Change	High	Neutral
Night-time – operation (no on site vehicle movements)	1) Ty Newydd (Hotel) and adjacent properties	No significant Change	High	Neutral
	2) Reservoir House and adjacent properties	No significant Change		Neutral
	3) Tai-cwplau and adjacent properties	Slight		Minor
	4) Tre-banog-uchaf and adjacent properties	No significant Change		Neutral

During Construction

10.122 The key activities, which arise as a result of the construction phase of the proposed development, would fall broadly into the following categories:

1) Site Works, including site establishment, site clearance, installing access roads and landscaping;

2) Construction of Site Buildings;

3) Traffic associated with the Construction Phase.

10.123 Construction activities associated with developments of this type have the potential to result in significant noise impacts dependent upon the proximity of existing sensitive properties and the need for significant earth moving and use of 'heavy' plant and machinery.

10.124 Increased noise may also result on the local road network due to an increased volume of HGVs travelling to and from the site during the construction programme. The potential effects of these construction noise sources on local receptors will be most significant within close proximity to specific works sites, which may change as the construction phases proceed.

10.125 Given that exact details regarding construction techniques and types of plant likely to be used are not available at present, it is difficult to predict accurately the potential impacts of construction noise on local receptors. Nevertheless, it is considered useful to present potential worst-case noise levels from a selection of typical construction plant, which may be used within a development of this type, and to calculate noise levels back to different distances, which may reflect noise levels at local receptors. The noise levels calculated at distance from each item of plant do not take into account any attenuation due to screening and have been based upon hard reflective ground between source and receiver as a worst-

case scenario. The figures presented are also based upon a 100% on-time, which is unlikely to occur in practice.

10.126 Table 10.16 below presents details for assumed plant, which could reasonably be used during the construction programme, with corresponding worst-case sound power levels for each item of plant as taken from BS5228.

Table 10.16: Potential noise levels of typical construction plant

Plant	Sound Pressure Level in dB(A) at 10m	Sound pressure level at given distance (dB LAeq)						
		20m	50m	100m	200m	300m	600m	1km
Vibratory Sheet Piling rig	88	82	74	68	62	58	52	48
44tn Tracked 360° Excavator	85	79	71	65	59	55	49	45
Articulated Dump Truck	80	74	66	60	54	50	44	40
14tn Tracked 360° Excavator	83	77	69	63	57	53	47	43
Wheeled 360° Excavator	68	62	54	48	42	38	32	28
Telescopic Handlers	71	65	57	51	45	41	35	31
Vibratory Roller	79	73	65	59	53	49	43	39
Water Pump	62	56	48	42	36	32	26	22
Concrete Pump	78	72	64	58	52	48	42	38
Generators	57	51	43	37	31	27	21	17
Cement Mixers	75	69	61	55	49	45	39	35
Crane	78	72	64	58	52	48	42	38
Road lorry (Drive by)	80*	74*	66*	60*	54*	50*	44*	40*
Tracked Excavator with hydraulic breaker	96	90	82	76	70	66	60	56
Wheeled Loader	80	74	66	60	54	50	44	40
Tracked Loader	90	84	76	70	64	60	54	50
Mechanical Crusher	84	78	70	64	58	54	48	44
Tracked Crane	88	82	74	68	62	58	52	48
Hydraulic Pecker	94	88	80	74	68	64	58	54
Pneumatic Chipper	89	83	75	69	63	59	53	49

*Drive by maximum sound pressure level, LpA (max), at speed in km/h as shown

10.127 It is considered that potentially the most affected properties from construction noise would be those located as detailed below.

North of the site – Reservoir House, Tre-banog-uchaf and any other adjacent residential dwellings;

East of the site – Ty Newydd (Hotel) and any adjacent residential dwellings;

West of the site – Tai-cwplau working farm.

10.128 To the south of the proposed development site is located the Hirwaun Industrial Estate. As such the uses within the industrial estate land are not considered to be noise sensitive.

10.129 The following table details a qualitative assessment of the impact of the construction noise associated with the development:

Table 10.17: Potential Noise Levels of Typical Construction Plant

Assessment Location	*Approximate worst case closest approach Separation Distance*	*Average LAeq of Locality**	*Qualitative Assessment*		
			Impact Magnitude	*Receptor Sensitivity*	*Impact Assessment*
North of the site	360	46.4	No significant Change to Substantial	High	Neutral To Major
East of the site	580	45.4	No significant Change to Substantial		Neutral To Major
West of the site	200	49.3	No significant Change to Substantial		Neutral To Major

*Measured LAeq of locality if available.

10.130 It is noted that the assessment results presented are entirely dependant upon the activities that are being undertaken at the time and the associated plant utilised, the less noise generating plant utilised the lesser the impact would be.

Construction Traffic Assessment

10.131 Increased noise may also result on the local road network due to an increased volume of HGVs travelling to and from the site during the construction programme.

10.132 Details regarding the expected numbers of vehicles (HGVs) associated with the construction phase of the development were supplied by Environmental Visage. The assessment of construction generated vehicle movements is based upon either 18hr supplied data where the flows are sufficiently high to allow the use of CRTN or peak hour traffic levels where BS5228 has been required to be used (where flows are too low for the methodology of CRTN). All data used is from the base year of 2008.

10.133 With regard to the 2008 18hr 5th Avenue link data into Junction A the flows are outwith the criteria of CRTN (too low). Therefore assessment along this route has been undertaken based upon the peak hour haul road calculation methodology of BS5228. The calculations are based upon an SPL of 80dB(A) at 7.5m and 74dB(A) at 7.5m for HGV and car movements respectively as taken from EC Directive 92/97/EC (limits for vehicles under acceleration).

10.134 The table below details the increases in percentage HGV movements due to the construction operations along the given links. Furthermore, the percentage increase has been calculated into a noise level increase that would be associated.

Table 10.18: Assessment of Construction Generated HGV Traffic – 2008 Base year

Junction Name	Route link	Baseline 18hr traffic flows	Construction generated flows per day	Percentage increase	Estimated Difference in dB(A)
A	5th Ave. - Industrial Estate road	71 car 13 HGV	50 car 5 HGV	70% Car 38% HGV	+1.9 dB(A)
	Estate Rd - Industrial Estate road	*No Construction flows using this link – no change in noise*			
	Main Ave. - Industrial Estate road	*No Construction flows using this link – no change in noise*			
	5th Ave. to A4061- Industrial Estate road	1400 car 265 HGV	90 car 58 HGV	6.4% Car 21.9% HGV	+0.8 dB(A)
B	5th Ave. - Industrial Estate road	1318 car 231 HGV	90 car 58 HGV	6.8% Car 25.1% HGV	+0.9 dB(A)
	A4061 (E)	6502 Car 878 HGV	90 car 58 HGV	1.4% Car 6.6% HGV	+0.2 dB(A)
	A4061 (S)	*No Construction flows using this link – no change in noise*			
	Rhigos Rd	*No Construction flows using this link – no change in noise*			
C	A4061	7029 Car 1440 HGV	90 car 58 HGV	1.3% Car 4.0% HGV	+0.1 dB(A)
	A465 (Neath)	16719 Car 1696 HGV	45 Car 29 HGV	0.3% Car 1.7% HGV	0.0 dB(A)
	A4059 (Penywaun)	*No Construction flows using this link – no change in noise*			
	A465 (Merthyr)	19903 Car 1809 HGV	45 Car 29 HGV	0.2% Car 1.6% HGV	0.0 dB(A)

Note – the calculations associated with 5th Ave – Industrial Estate road on Junction A were undertaken based upon peak hour flows in line with the methodology of BS5228 due to the flow data being too low for CRTN. All other data was calculated in line with CRTN.

Note 2 – Rows highlighted in light grey depict Industrial estate roads with no adjacent residential dwellings.

10.135 The impacts of the construction phase traffic, based upon the impact assessment scheme presented within this Chapter, are concluded to be of a **Neutral** nature based upon High receptor sensitivities.

Vibration Assessment from Piling Operations

10.136 As previously detailed, it has not been confirmed whether any level of ground improvement work would be required within the scope of the construction works.

10.137 Once any requirement for ground improvement works has been concluded assessment would be required to be undertaken of the suitability of the system proposed both in view of noise and groundborne vibration issues. These assessment works, if required, would be undertaken as part of the S.61 justification works.

Operational Phase

10.138 Based upon the site layout, plant compliment and noise levels, as well as the incorporated mitigation measures as detailed, it is apparent that during normal daytime operation of the proposed development, impacts of **Neutral** adverse significance might be anticipated at receptors in close proximity to the development site.

10.139 During the normal overnight period when all site operations are assumed to be occurring, with the exception of vehicle movements impacts of **Neutral** adverse significance are predicted to occur at locations 1,2 and 4. However due to the influence of the High Energy Building the impact at location 3 is predicted to be of a **Slight** adverse nature. However, notwithstanding the above all predicted internal noise levels associated with the overnight operations at the closest residential properties are comfortably within the 'Good' design range criteria of BS8233.

10.140 Therefore with regard to the sensitive receptor locations 1, 2 and 4 it is not considered necessary that further detailed mitigation measures would be required above those specified within the incorporated mitigation section. However, with regard to assessment location 3, an isolated farm complex, it is considered prudent that additional control measures may require to be implemented within the design of the high energy building.

10.141 At the current time the use of the high energy building has not been concluded and therefore the associated noise characteristics of the operations involved are also unknown. Within the scope of this model it has been assumed that as a worst case the use would generate internal noise levels in line with the limits of the Noise at Work Regulations (85dB(A)). Within the Table below is shown the predicted noise levels at each of the assessment locations resulting from the increase of the facade attenuation of the high energy building to a 42dB(A) enhanced acoustic system (Figure 10.3). All other modelling

assumptions remain the same. This mitigation strategy will also have positive effects on the predicted noise levels at the other assessment locations.

10.142 The results of the mitigated assessment are presented within Table 10.19 below, with the daytime and nighttime grid noise map model outputs of this operational scenario presented within Noise Appendices 10.3 and 10.4.

Table 10.19: Mitigated BS4142 Noise Assessment

Parameter	Receptor 1		Receptor 2		Receptor 3		Receptor 4	
	Day	Night	Day	Night	Day	Night	Day	Night
Specific Noise Level of Proposed Facility (dB L_{Aeq})	37	35	38	36	35	33	38	37
Rating Level (dB L_{Ar}) No penalty included as discussed in para 10.105.	37	35	38	36	35	33	38	37
Measured Background Level (dB L_{A90})	40	35	42	38	42	32	45	36
Assessment Level (dB L_{Ar} – dB L_{A90})	-3	0	-4	-2	-7	+1	-7	+1

10.143 The result of the remedial actions to the assumed high energy building results in the noise impact of the entire facility being reduced to **Neutral** during the daytime and nighttime at all assessment locations.

10.144 However, it is noted that the noise associated with the high energy building has been based upon assumptions due to the lack of detailed information available at the time of this assessment. The remedial mitigation is presented purely to demonstrate that by increasing the specification of the building suitable impacts at adjacent residential receptor locations can be achieved. Following the conclusion of the use of this aspect of the development, further more detailed acoustic modelling and prediction would require to be undertaken to ensure that resulting impacts of this aspect of the development remain acceptable to the local planning authority.

MITIGATION

10.145 Furthermore with regard to both the waste recycling and energy recovery aspect of the development and the high energy user, in the interests of good operational practice, the following issues may be investigated in order to further reduce any impact:

- Provision of specific measures relating to delivery traffic associated with the development, including, for example, reduced speed limits on-site, no waiting or queuing of delivery vehicles with engines running and no unnecessary idling of vehicles.

Construction

10.146 Impacts to specific identified receptors during the construction phase of the development are expected to be relatively short-term. During the construction period, impacts of **Major to Neutral** significance might be anticipated at local receptors dependant upon the activities occurring at the time as well as the area of the site in which the work is being undertaken.

10.147 It is recommended that 'Best Practicable Means' be employed where possible to minimise construction impacts, including, for example:-

Plant and Equipment

- modern, silenced and well-maintained plant should be used at all times, conforming to standards set out in EU Directives;
- equipment including vehicles should be shut down when not in use;
- engine compartments should be closed when equipment is in use and the resonance of body panels and cover plates should be reduced by the addition of suitable dampening materials. Any rattling noise should be addressed by the tightening of loose parts or the addition of resilient materials;
- semi-static equipment is to be sited and orientated as far as is reasonably practicable away from noise-sensitive receptors and to have localised screening if deemed necessary;
- generators and water pumps required for 24-hour operation should be super-silenced or screened as appropriate;
- crane spindles, pulley wheels, telescopic sections and moving parts of working platforms should be adequately lubricated in order to prevent undue screeching and squealing;
- where possible, mains electricity should be used rather than generators.

Methods of Working

- where practical and ground conditions permit, first preference should be given to reaction piling methods ('silent piling'). Otherwise vibratory piling methods, together with pre-augering, should be used. Percussive piling should only be considered where ground condition precludes the use of other methods and prior agreement should be sought from the Local Authority;

- where practicable, pile caps should be cut and then broken with hydraulic rams to minimise the use of heavy air-powered breakers;

- burning equipment should be used in preference to cold cutting where possible;

- large concrete pours (for which an extension of working hours may be necessary) should commence as early as possible within normal working hours so that the activities can be completed within normal working hours as far as possible.

Management of Works Programme

- wherever practicable, noisy works, which are audible at the site boundary, should be undertaken during normal daytime hours, e.g. between 0800 and 1800 Monday to Friday and between 0800 and 1300 on Saturdays;

- routes and programming for the transportation of construction materials, fill, personnel etc. are to be carefully considered in order to minimise the overall noise impact generated by these movements;

- personnel should be instructed on BPM measures to reduce noise and vibration as part of their site induction training;

- shouting and raised voices should be kept to a minimum e.g. in cases where warnings of danger must be given;

- use of radios should be prohibited except where two-way radios are required for reasons of safety and communication.

10.148 A Site Management Plan is proposed for the site preparation and construction stage which will ensure that full consideration is given to potential creation of noise. A copy of the Draft Site Management Plan can be found in ES volume 2.

RESIDUAL EFFECTS

Construction Operations

10.149 The short-term effects of the construction operations could result in an impact significance of **Major to Neutral** dependant upon the works being undertaken at the time and the area in which they occur. With the investigation and implementation of the proposed temporary mitigation measures and careful consideration when planning the construction programme, operational methodologies and plant complement the resulting impact significance could be further reduced.

10.150 Furthermore, it is noted that noise from the construction operations required within the scope of the development could be entirely controlled to within acceptable limits as agreed between Rhondda Cynon Taf CBC and the construction contractor within a 'Prior consent for work on construction sites' agreement under s.61 of the Control of Pollution Act (CoPA) 1974.

Normal Site Operations

10.151 The development of the site at Hirwaun Industrial Estate will result in changes in road traffic flow patterns and volumes in the vicinity of the site. Overall, these traffic flow changes are predicted to result in noise level increases within the vicinity of these major routes of a maximum of 0.6dB(A). The assessment has demonstrated that the increase in noise associated the proposed scheme based upon the traffic flow information supplied will have **Neutral** impact significance on the existing traffic noise levels of the area.

10.152 The impact of operational noise from the proposed development with the implementation of the incorporated enhancement and mitigation measures as detailed within this chapter is predicted to be of **Neutral/slight** significance. Therefore, it is not deemed to have an adverse effect on the noise environment in the vicinity of the proposed facility either during the daytime or the night-time periods.

10.153 However as demonstrated within Table 10.19 and Appendices 10.3 and 10.4 it is shown that, based upon the assumed noise characteristics of the high energy use, increasing the specification of the building façade to an enhanced acoustic system (RW = 42dB(A)) would result in all impacts at the assessment locations being **Neutral** in nature.

10.154 Residual impacts, their magnitude and significance are summarised in the table overleaf.

Table 10.20: Summary of Residual Impacts

Resource	Phase	Residual Effect	Sensitivity of Receptor	Magnitude of Impact	Duration	Nature	Significance	Geographical Level of Importance of Issue				
								I	N	R	D	L
Noise & Vibration	Construction	Construction Noise and Vehicle Movements	High	Slight to Moderate	Short term	Adverse	Minor to Moderate					✓
	Operation	Road Traffic Noise	High	No Significant Change	Permanent	Slight Adverse	Neutral					✓
		Daytime Operational Noise										✓
		Night-time Operational Noise										✓

Key: I: International N: National R: Regional D: District L: Local

Conclusions

10.155 Considering that the long-term impacts are predicted to be **Neutral** at the identified receptors during the operational phase of the development, it is considered that normal operation of the proposed development will not result in significant effects on the surrounding community.

10.156 The short-term effects of the construction operations will be controlled by the agreement of a 'Prior consent for work on construction sites' under s.61 of the Control of Pollution Act (CoPA) 1974. This will ensure that any noise impacts during this phase are suitably controlled.

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Chapter Eleven
GROUND CONDITIONS, DRAINAGE AND FLOOD RISK

INTRODUCTION

11.1 When choosing a site for development consideration is naturally given to the supply and demand for the proposed operation in the area concerned. Planning policy is increasingly directing the development regime in order to protect the amenity and environment of towns, cities and the countryside in the public interest while promoting high quality, sustainable development. This chapter aims to give an understanding of the ground conditions, water resources and drainage in relation to the site for the proposed Enviroparks development, taking into consideration the current resources and their quality, any contamination either historic or potential, and the potential impact of the development on flood risk.

11.2 The Enviroparks Hirwaun Ltd development on the Hirwaun Industrial Estate proposes to use a currently empty, brownfield site to co-locate a recycling and commercial operation. By recycling diverse streams of waste using advanced and integrated technologies, Enviroparks hope to demonstrate maximum recycling rates and energy generation, with minimal residual waste and environmental impact.

11.3 The site chosen is located over boulder clay, a material with a low permeability, and historical and recent evidence suggests that areas of the site can become saturated. That said, the development proposes to incorporate appropriate measures to manage the quantities of water likely to be experienced at the site, and thus ensure that the risk of damage to the site operations, and the potential impact of the site on other local receptors is minimised.

11.4 This chapter is divided into two main sections. The first, details the current status of the site ground conditions, with consideration of historical activities and potential pollution, before going on to detail the proposed development of the site and assessing potential future impacts. The second section of the chapter presents the details of the current water resources at and around the site, and provides information on the local water quality. A flood risk assessment has also been undertaken for the proposed site, and considers the present flood risk to the existing site and the potential impacts on the hydrological characteristics of the area resulting from the proposed changes to the site use.

Legislation

11.5 Details included in the Planning Policy Wales document[(2)], highlight the key planning principles and policy objectives in Welsh planning. Specific policy objectives appropriate to the flood risk and choice of site of the proposed development include:

11.6 *Promoting resource-efficient settlement patterns that minimise land-take and urban sprawl, especially through preference for the re-use of suitable previously developed land and buildings, wherever possible avoiding development on greenfield sites.* The development is to be situated on a brownfield site.

11.7 *Minimise the risks posed by, or to, development on, or adjacent to, unstable or contaminated land and land liable to flooding. This includes managing and seeking to mitigate the effects of climate change.* The proposed site is not liable to flooding, although may have flooded historically, as suggested by the presence of drift deposits. Historical site investigations suggest that an old refuse tip on the site contained wastes such as bricks, concrete, cinders, glass, metal and wood, and no elevated levels of contaminants have been found in soils from analysis undertaken thus far.

11.8 Additionally, Local Authorities are required to:
Support the shift towards a green economy by encouraging the development of clusters of industrial and commercial uses deriving environmental benefit from co-location, especially through the development of waste stream technologies and practices (i.e. eco-industrial networks). The Enviroparks scheme is such a development, with the co-location of the recycling park and energy production with a high energy use industry.

11.9 *Waste should be managed (or disposed of) as close to the point of its generation as possible, in line with the proximity principle. This is to ensure, as far as is practicable, that waste is not exported to other regions. It also recognises that transportation of wastes can have significant environmental impacts. The waste hierarchy, the proximity principle and regional self-sufficiency should all be taken into account during the determination of the BPEO for the network of waste management installations that provides the best solution to meet environmental, social and economic needs.* The proposed site aims to provide localised waste management facilities for the Rhondda Cynon Taf area. It is situated approximately 5 miles from the Bryn Pica landfill site and waste management facility, which is the main site in the area presently. Therefore any diversion from Bryn Pica to enable the Local Authority to meet its recycling and diversion from landfill targets, will result in minimal disruption to the current waste transportation, providing appropriate waste management facilities within the Borough and enabling the small percentage of waste arising from the Enviroparks facility to be disposed of locally.

11.10 As well as establishing an integrated and adequate network of waste disposal installations Local Authorities are also required, in conjunction with the Environment Agency to ensure that waste is recovered or disposed of without harming the environment, without endangering human health, without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest, including areas of acknowledged importance in relation to the natural and cultural heritage.

11.11 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 (the environmental regulatory regime may well have an interest in these issues, particularly if the development would impact on an Air Quality Management Area or a SAC);

- prevention of nuisance;

- the need, where relevant, and feasibility of restoring the land (and water resources) to standards sufficient for an appropriate after use.

11.12 Water-related issues should be taken into account from an early stage in the process of identifying land for development and redevelopment. New development should be located and its implementation planned in such a way as to allow for sustainable provision of water services. Design approaches and techniques that improve water efficiency and minimise adverse impacts on water resources, on water quality, the ecology of rivers, and on groundwater are encouraged.

11.13 Development proposals in sewered areas are expected to connect to the main sewer, and the proposed Enviroparks site will indeed connect to the nearest main sewer for foul waters. Surface water run off will be used in the process where possible, discharging excess surface water via a Sustainable Urban Drainage System.

11.14 It is noted that the Rhondda Cynon Taf (Rhondda) Local Plan(3) which now forms part of the Development Plan, includes Policy DCP5 which states that development in areas liable to flood risk will not normally be permitted unless in exceptional circumstances. Additionally, the Brecon Beacons National Park Authority includes several policies within the Local Unitary Development Plan(4) which consider water quality and flood risk:

11.15 Policy G3: Development in the National Park

All proposals for development or change of use of land or buildings in the National Park must comply with the following criteria, where they are relevant to the proposal:

- *the proposed development does not have an unacceptable impact on, nor detract from or prevent the enjoyment of, the special qualities, natural beauty, wildlife and cultural heritage of the National Park;*
- *the proposed development does not have an unacceptable impact on surface waters or groundwater resources in either quality or quantity;*

11.16 Policy ES47: Water and Sewage Supply for New Development

Development will only be permitted if adequate water and sewerage infrastructure exists or can be provided without detriment to water quality, nature conservation interests or residential amenity. Where appropriate the National Park Authority will impose a planning condition or obligation to ensure that adequate services are available to serve the development.

11.17 Policy H2: Development and the Risk of Flooding
Development, including the raising of land, will not be permitted where that development would:

- *be on land at high risk of flooding*
- *result in an unacceptable risk of flooding either on or off site;*
- *adversely affect flood management or maintenance schemes;*
- *impede flood flows or result in changes in flow regime; or*
- *result in a net loss of flood-plain storage.*

11.18 *Where, exceptionally, development is allowed on land at high risk of flooding, such exceptional circumstances will be justified where it can be demonstrated that:-*

- *It needs to be located in a high risk area, or be part of a local strategy sustaining the settlement; or*
- *It is necessary to contribute to key employment objectives; and*
- *The proposal is on previously developed land; and*
- *The potential consequences of flooding have been considered and found to be acceptable.*

11.19 Highly vulnerable development will not be permitted on land at high risk of flooding where that land is without significant flood risk infrastructure.

11.20 Policy H3: Reducing the Risk of Flooding
Development will only be permitted where:-

- *it can be demonstrated that there is no increased risk of flooding locally or elsewhere due to additional surface run-off or changes in flow regime; or*
- *where adequate mitigation works which are necessary to achieve such aims can be provided.*

11.21 This chapter will consider the potential impact of the proposed Enviroparks development, and will consider how the site proposals will ensure that national and local policies are met. It begins with baseline analyses of the site. These consider the current ground and water quality conditions at the site, as well as the likelihood of flooding and whether or not the proposed location is appropriate for the development.

GROUND CONDITIONS

METHODOLOGY USED

11.22 The land earmarked for the proposed development of the Enviroparks Hirwaun Ltd site is located within the Hirwaun Industrial Estate. The site is located immediately north of Fifth Avenue, and immediately west of Ninth Avenue. The aim of this sub-chapter is to identify the soils and geology at the site, and to assess the potential for any historic contamination which may be present in, on or under the ground. The purpose of the study is to consider the suitability of the land on which the proposed development will sit, and coupled with details of any pollution prevention measures, to demonstrate that the likelihood of future pollution of the land either beneath the site, or adjacent to it, is limited.

11.23 The study will also work towards the provision of a baseline of pollution for the site, which serves to inform the planning process, but which will also be beneficial to the Environmental Permitting process. Although there are currently limited signs of development at the site, the area is brownfield land, having historically been developed as an ordnance works, and the study will assess the levels of any natural pollutants in the ground, those which may be present as a result of historical contamination, and the future potential for the Enviroparks site to further contribute to contamination of the land. Any residual impacts predicted to remain despite the pollution prevention measures which will be incorporated into the development, will be assessed for potential impact on the land quality of the site and the surrounding area.

11.24 The assessment begins with a desk based study of available information. Several reports have been prepared for the site and date from the 1970's to a very recent study which specifically considers the proposed Enviroparks development. The studies and other sources of local information are reviewed to provide a baseline of information regarding the geology and soil quality of the current site as a result of natural features and historic uses. Study data have been obtained for the site and the surrounding area and a site visit has been undertaken in order to develop an understanding of the physical environment of the site and of the likely environmental impacts of the proposed development.

11.25 Once the initial desk study information has been compiled, it will be possible to identify any requirement for further site investigation works, and a description of any such works undertaken and their findings will be presented.

11.26 Should any unacceptable levels of contamination be found at the site, potential remediation measures will be considered using an options appraisal methodology. The options appraisal will assess the nature of available remedial methods, the work, disruption and timescales involved in remediating the site, and the costs associated with each proposal, as well as the likely effectiveness of the methods in removing contamination. Where remediation is required, this will not be undertaken prior to the submission of the planning application, and thus no final baseline of pollution will be available for inclusion in the planning application. That said, the assessment of the future potential for contamination and the likely impact of any such pollution can continue, as the impact of the proposed site can be considered independently of any baseline.

11.27 Once the current status of the site is detailed, it will be possible to assess the likely impact of proposed future operations at the site, and hence details of the construction and operational phases of the development, coupled with information on the pollution prevention measures which are planned for the site will be presented in the impacts section. The likely impact will be considered by assessing the 'pollutant linkage'; that is the source, pathway and receptor of potential future pollution. Essentially, where the source, pathway and receptor linkage is complete, the possibility for pollution to occur exists, and further mitigation measures should be considered. Without a complete pollutant linkage either through a lack of source, pathway or receptor, there is no risk of land contamination.

11.28 Any further proposed mitigation measures will be detailed, and an assessment of the residual effects of any pollutant linkage will be detailed. Note that specific effects on the water environment are discussed in the Drainage and Flood Risk section of this Chapter

11.29 The methodology employed is broadly in accordance with current UK guidance 'Model Procedures for the Management of Land Contamination' (CLR11)[1].

BASELINE ANALYSIS

11.30 Baseline data has been gathered from various sources including a site visit, library studies, maps and plans, an EnviroCheck report procured from Landmark, and a review of historical surveys and studies of the site. The first stage of the baseline analysis is to investigate the history of the site and determine the potential impact which may have occurred due to earlier operations. The potential for impact is largely dependant on the nature of the geology and hydrology at the site, and where this is known, an assessment of likely contamination can be made. Where it is considered that the potential for historical contamination exists, or where the study data has deficiencies, further intrusive investigation should be commissioned at the site. This has been the case for the proposed Enviroparks site, and thus the detail of the investigation most recently commissioned is included, and a summary of the findings of the investigation to date will complete the baseline study. All available studies and surveys of the proposed site are included in full as appendices to this chapter.

Geology

11.31 The most recently available geological map of the area has been obtained (BGS 1:50,000 series map of Merthyr Tydfil. Sheet 231) and shows the site to be two thirds covered in alluvium, above boulder clay. The north eastern corner of the site lies directly over boulder clay. Below this glacial drift sits Farewell Rock, and indeed an outcrop of Farewell Rock is located immediately west of the site. The Farewell Rock formation (Langsettian; Westphalian A) is an outcrop is around the margins of the productive coal basin. The strata consists of a series of coarsening upwards cycles with marine bands at there bases and thick fluvial sandstones above. The sandstones are collectively known as the 'Farewell Rock'. This quartzitic sandstone unit has the Gastrioceras Subcrenatum marine band at its base. Below the marine bands is a basal grit strata, which lies over limestone stratum. The surrounding area is heavily faulted, although no faults are noted as running through the site. Figures 1 and 2 present copies of the relevant area of the Ordnance Survey and Geological map.

History of the Site

11.32 The proposed development site was greenfield land until the H-N Royal Ordnance Factory, Hirwaun, South Wales was set up as part of the 1939-45 war emergency expansion plan. As can be the case with ordnance works, there is limited data available on the operations at the site, however it is understood to have been located on the proposed development site and was involved in the production of .303 cartridges in only a very limited way(3). The site engineered shell cases and other small metal based components(4), and no evidence has been found to suggest that it was also involved in filling the cases. Therefore the site is understood to have been an engineering works only, with no explosives or filling. The site ceased operations after the war and was demolished in full sometime between 1969 and 1979. The site has since remained empty, although some works have been facilitated in order to improve the drainage at the site for potential future use.

Historical Investigations and Site Status

Proposed development of the Northern Section of Hirwaun Industrial Estate; Wimpey Laboratories Ltd; Reference S/8731 January 1972 (See Appendix 1)

Review of Body of Report

11.33 This report details work undertaken at the site between 12th and 30th November 1971. The works were commissioned in light of the proposal at the time to develop the northern section of the Hirwaun Industrial Estate. Three distinct areas were investigated:

- The northern area; the land previously occupied by the Ordnance Factory and the currently proposed location for the Enviroparks site.
- The south eastern area; situated between the old disused railway line (essentially Fifth Avenue) and the Heads of the Valley's Road.
- The south western area; again, between the old disused railway line and the Heads of the Valley's Road, but further west and separated by the sewage works.

11.34 Therefore, it is the detail of the northern area from this study which is of most concern to the Enviroparks site. The report notes that the remains of the factory were evident at the time of the investigation, including concrete, roads, disused pill boxes, old foundations, sub-station buildings and a rubbish tip.

11.35 Geological maps available at the time of the report were viewed and identified that the site was covered by glacial drift (Boulder Clay) with areas of peat underlain by the Fairwell Rock Sandstone. Conflicting records between the two geological maps viewed, of the extent of peat to the north of the disused railway line, was confirmed by the site investigation, which recorded the area consisting of mainly alluvium, although some small areas of peat were recorded.

11.36 The northern area of the site under investigation was assessed extensively through a series of boreholes, trial pits and probe holes. Five of the eight bore holes drilled were to the north of Fifth Avenue. Nine of the sixteen trial pits were dug to the north of Fifth Avenue, and twenty two of the fifty one Mackintosh probes (which determine the presence or otherwise of peat) were made in this northern area. Although some peat was identified, no extensive deposits of peat were found. Although some laboratory analysis was undertaken, this was limited to soil moisture contents, compaction testing, sulphate and pH. A summary of the borehole logs from the northern area is provided below:

Table 11.1 Borehole 1 (North western corner of the site)

Depth	Description
0 – 1.5 m	Dark grey silty Clay
1.5 – 3 m	Boulder
3 – 4 m	Firm grey sandy silty Clay with gravel, cobbles and boulders
4 – 4.5 m	Very dense grey slightly clayey sandy fine to coarse Gravel with cobbles

Table 11.2 Borehole 2 (North mid point of the site)

Depth	Description
0 – 1.5	Brown sandy silty Clay with gravel, cobbles and some organic matter
1.5 – 2	Boulder
2 – 3	Very dense brown fine to coarse Gravel and medium to coarse Sand
3 - 4	Fine grey Sandstone with brown staining on fracture planes

Table 11.3 Borehole 3 (North eastern corner of the site)

Depth	Description
0 – 2 m	Stiff grey sandy silty Clay with gravel, cobbles and boulders
2 – 4 m	Dense grey clayey fine to coarse Gravel with cobbles and boulders

Table 11.4 Borehole 5 (Centre of the site)

Depth	Description
0 – 1 m	Fill – concrete
1 – 4 m	Firm becoming stiff grey sandy silty Clay with gravel, cobbles and boulders
4 – 4.5 m	Grey slightly clayey sandy fine to coarse Gravel with cobbles
4.5 – 5 m	Firm grey sandy silty Clay with gravel, cobbles and boulders

Table 11.5 Borehole 6 (South eastern corner of the site)

Depth	Description
0 – 0.2 m	Organic Topsoil
0.2 – 4 m	Grey clayey medium to coarse Gravel, Cobbles and Boulders; very dense below 3 m
4 – 5 m	Firm mottled blue grey and yellow brown sandy silty Clay with gravel, cobbles and boulders
5 – 10 m	Boulders

11.37 Ground water was observed in Boreholes 1-3. Water was present in Boreholes 5 and 6, however water had had to be added to assist boring and thus no groundwater depth could be determined. The report notes that ground water in the northern area was observed at depths between 0.35 m and 1.3 m below ground level. It was also encountered in trial pits, and filled trial pits 1,2,4,6 and 9 quickly. The report suggests that groundwater is unlikely to present problems when excavating the higher parts of the site providing that cuts are shallow and that proper attention is paid to drainage.

11.38 Trial pits were dug to shallower depths and revealed the following general stratum:

Trial Pit 1, 2, 7 and 8
Fill to between 0.6 and 1.85 m
Sandy silty Clay to 2.75m with gravel, cobbles and boulders (to 3.65 in TP 8).

11.39 Note: trial pits 1 and 2 are in the vicinity of the old rubbish tip. Fill included cinders, bricks, glass, metal and wood fragments, bricks, building rubble, reinforcing steel, concrete and pulp cardboard.

Trial Pit 3, 4, 10
Topsoil to between 0.1 and 0.3 m
Some Fill over sandy silty Clay with gravel, cobbles and boulders to 2.75 m

Trial Pit 6
Dark brown Peat to 0.6 m
Various Clay strata to 2.45 m
Sandy fine to coarse Gravel with cobbles and boulders to 2.75 m

Trial Pit 9
Topsoil to 0.3 m
Sandy silty Clay with gravel, cobbles and boulders to 1.2 m
Clayey sandy fine to coarse Gravel with cobbles and some boulders to 2.15 m

Trial Pit 11
Fill to 0.95 m
Topsoil to 1.15 m
Stiff Clay with gravel, cobbles and boulders to 2.45 m

11.40 The results of the moisture content determinations indicate that the natural moisture content of the clayey glacial drift is wet of optimum. The results of chemical testing suggest that the deterioration of good quality cement concrete in foundations or other buried structures due to sulphate attack is unlikely to occur at this site, although the report does note that adequate site drainage should be provided to avoid the contact of potentially acidic waters with the concrete.

Trial Pits of the Hirwaun Industrial Estate, Dated 15th July 1988; Provided by Thomas Morgan Associates. (See Appendix 2)

11.41 No information is available as to the location of the trial pits on the Estate, however they were provided to Exploration Associates, by the Welsh Development Agency in 1995 for use in undertaking an investigation and preparing a report. A summary of the findings of the logs is presented below.

11.42 Seven logs are provided and demonstrate the following general stratum:

Ground Level to 75-100 mm	Subsoil
75-100 mm to 600-1,000 mm	Light brown clay with angular stone
600-1,000 mm to 1,100-1,900 mm	Dark brown clay with cobbles
1,900 mm to 2,900 mm	Peat observed in two trial pits
1,100-2,900 mm to 2,200-3,000 mm	Clay ranging from dark brown clay with cobbles / stones to organic stiff clay.

17 Acre Site, Hirwaun Industrial Estate; Interpretive Report on Ground Investigation; Exploration Associates; Report Number 155102. (See Appendix 2)

11.43 This report was prepared on the instruction of Thomas Morgan & Associates and was intended to determine the nature, depth, chemical and engineering properties of the materials underlying the site to assess bearing capacities and likely differential settlements, together with groundwater and gas levels present at the site.

11.44 Fieldwork was undertaken at the site between 12th and 28th June 1995 and comprised eight cable percussive boreholes drilled to depths of between 3.1 and 10 m, and thirteen excavated trial pits. All excavations were logged and samples were taken for subsequent analysis. The works also included a series of eighteen dynamic cone penetration tests to determine the extent of any peat deposits, which had been highlighted in the earlier, 1972 report. Laboratory testing of samples includes analysis for moisture content, Atterberg Limits, particle size distribution, specific gravity, pH, total sulphate and standard compaction tests. Additionally, four samples were tested for chemical content.

11.45 Similarly to the earlier studies, the geological map of the area was assessed and identified the site as being underlain by Recent Alluvium and Glacial Boulder Clay. The boreholes and trial pits showed the ground to be underlain by Made Ground overlying Alluvial Clay deposits or Glacial Sands and Boulder Clay. Several metres of Sand and Gravel were encountered in all boreholes. Where bedrock was encountered this was Grey Mudstone and Grey Sandstone.

11.46 The findings of the intrusive investigation are summarised below:

11.47 Made ground was encountered in all locations to a maximum depth of 4.2 m below ground level (BGL), based on information provided in the borehole logs. The material generally consisted of very compact sandy clayey gravel and cobbles of sandstone with some stiff, silty, sandy, gravelly clay. The report considered this likely to be Reworked Sand and Gravels and Boulder Clay.

11.48 Alluvial deposits were encountered in all boreholes except 2 and 3, located to the north and south east of the site respectively, and were present to depths of between 1.7 and 6.1 m BGL. The alluvium, consisted of brown grey silty, slightly sandy gravelly clay with occasional woody relics.

11.49 Some trial pits revealed a dark, black clayey stratum directly below the Made Ground, and this is considered to be decomposed plant material, perhaps from a grassed area which has subsequently been buried by the Made Ground.

11.50 Glacial Boulder Clay was encountered in trial pits 2 and 3 at between 2.8 and 4 m BGL. The Clay consisted of a stiff grey, silty, sandy clay with some gravel and cobbles of sandstone.

11.51 Sands and Gravels were encountered below the Alluvium / Glacial Clay and comprised the remainder of most of the logs. The Sand and Gravels were generally brown, very sandy, angular to sub rounded fine to coarse gravels of mudstone and sandstone.

11.52 Investigations in boreholes 1, 2, 3 and 7A encountered bedrock, a fine grained grey sandstone, from depths as little as 2.45 m BGL, but generally deeper than 6.5 m BGL.

11.53 Groundwater was struck in all boreholes apart from the shallow (1.4 m BGL) borehole 7. Strikes occurred between 2.8 and 6.5 m BGL and generally corresponded to the Sand and Gravel strata. The report does note however that groundwater levels fluctuate at different times of the year, and this is supported by the earlier findings of the 1972 report. Groundwater movement is considered to be in a southerly direction generally, although no movement of groundwater was proven during the 1995 investigation.

11.54 Similarly to the 1972 report by Wimpey, the Exploration Associates report provides an engineering assessment and significant information on foundation design etc. Of key interest to the land quality study, is the provision of the results from the chemical tests on soil samples, which enable an initial baseline assessment to be provided. Four samples were taken from trial pits and were analysed in accordance with the Interdepartmental Committee for the Redevelopment of Contaminated Land suite of contaminants (ICRCL suite)[5]. The results are reported below and are compared against the more recent Soil Guideline Vales (SGV) (a)[6], where available. Where no SGV is available, the New Dutch List (b)[7] has been applied, and where no other reference value is available, or where the ICRCL limits are lower than the Dutch List limits, the ICRCL assessment limit* has been included, despite these limits no longer being in use in the UK.

11.55 The levels of contaminants recorded do not exceed the relevant Soil Guideline Values, the ICRCL threshold levels, or the action levels of the Intervention values and target values - soil quality standards issued by the Ministry of Housing, Spatial Planning and Environment, The Hague (The New Dutch List).

11.56 Whilst the analysis over page suggests that the site has not suffered from contamination, it is noted that the samples were drawn from trial pits and were taken at relatively shallow depths. Since the site has been re-graded, including the removal of unsuitable overburden, it may be that much of the strata from which the samples were drawn may have been removed. Additionally, the samples were taken from the north of the site, approximately half way along the northern boundary line (TPB), or along the southern boundary line (TP1, TP2 and TP4). Therefore no samples have been taken from key areas such as that which is known to have been used as a small landfill area. Additionally, further pH and sulphate results collected from across the site during this investigation suggests that some pH results were as low as 4.5, and elevated sulphate conditions can be experienced in some locations. Thus, the report suggests that there may be a requirement for an increased class of concrete.

Table 11.6 Results and Assessment of Identified Pollutant Concentrations. Thomas Morgan and Associated 1995

mg kg^{-1} unless otherwise stated	*TP1(2.5 m)*	*TP2(1.0m)*	*TP4(1.55m)*	*TPB(2.0m)*	*Assessment Limit*
Arsenic	8	1.8	27.4	2.2	500 (a)
Cadmium	2	1.7	3.8	0.8	1,400 (a)
Chromium	5	5	17	9	5,000 (a)
Copper	20	5	19	3	130*
Lead	53	5	86	15	750 (a)
Mercury	< 0.5	< 0.5	< 0.5	0.6	480 (a)
Nickel	25	7	16	9	5,000 (a)
Selenium	1.9	< 0.5	0.7	< 0.5	8,000 (a)
Zinc	94	25	147	36	300*
Water Soluble Boron	< 0.5	< 0.5	0.6	< 0.5	3*
pH Value	6.5	6.3	5.5	6.1	No Limit
Phenols	< 1	< 1	< 1	< 1	21,900 (a)
PAH	< 0.5	< 0.5	< 0.5	0.9	40 (b)
Total Cyanide	< 1	< 1	< 1	< 1	50 (b)
Total Sulphate (% as SO_4)	0.14	0.07	0.11	0.14	-
Sulphide	< 1	< 1	< 1	< 1	250*
Elemental Sulphur	570	146	1,880	2,820	5,000*
Thiocyanate	No result	< 2	No result	No result	50*

**Report on 17 Acre Site at the Hirwaun Industrial Estate;
Thomas Morgan Associates; Reference P329.01 September 1995. (See Appendix 3)**

11.57 This report presents a proposal for works at the site, presented to the Welsh Development Agency in September 1995. It provides a summary of the aforementioned studies, and presents advice on the likelihood of mining subsidence and the nature of supplies to the site.

11.58 The report identifies that the areas of peat identified in the 1972 report have been further assessed and the area does not extend as widely or deeply as originally anticipated, with only shallow depths of peaty soil at the site. The dynamic probe investigations did identify a soft area of peat or very soft clay in the extreme south eastern corner of the site and it is suggested that structures are not placed in this area without the use of piled foundations. The site also appears to be outside of the zone of influence from two local mining subsidence zones.

11.59 The report notes that the level of the roadways is slightly elevated above general ground level in the area, and thus the site appears to be relatively low lying. The report details a building and a subsurface tank on the site, however the building has since been removed and the tanks has been filled in. The site is noted as having poor ground drainage. Although no issues of flooding were raised, and it was considered suitable that the storm water from any proposed development could drain into the Camnant as do the storm water systems for the southern and northern areas of the estate, it was suggested that any storm water run off be routed through a dedicated drain to avoid possible overloading of the current system. The local foul water system is routed adjacent to Fifth Avenue and connects to the sewage pumping station, joins the foul water system from the eastern and western areas of the estate, and enters the sewage treatment works located to the south west of the proposed development site. It is considered possible for any new development to join this system.

11.60 It is noted that servicing of the site should not present a problem as all mains facilities are in close proximity. At the time of writing, the report notes that the sewage treatment works, situated to the south west was receiving 1,000,000 litres per day, approximately 50 % of its design inflow, and thus dealing with effluent flow from any proposed development was not considered to be a constraint.

**Summary of Works at Hirwaun 17 Acre Site;
Provided by Thomas Morgan Associates. (See Appendix 4)**

11.61 In additional description of the site provided by Thomas Morgan and Associates notes that the original factory was demolished at some point in the 1960's and a cut and fill operation ensured, followed by capping with sub soil. This suggests that the site would have been suitably cleared of any potential ordnance at this point. The description of works undertaken by Thomas Morgan identifies that the site had become heavily waterlogged prior to their works, assumed to have been undertaken in the mid 1990's. The ensuing re-grading included removing the unsuitable overburden, placing this at the extremities of the site for landscaping purposes, and re-grading the boulder clay to give acceptable cross grades to the site. The site was then drained with temporary open channels and ditches, assumed to be the existing herringbone ditches.

Hirwaun Ecopark. Phase 1 Environmental Desk Study Final Report; November 2007. ERM. (See Appendix 5)

11.62 The report by ERM included as Appendix 5 was produced with full consideration of the proposed Enviroparks development. It provides an initial desk based study and give consideration to the two 1995 reports by Thomas Morgan Associates, and includes the provision of an EnviroCheck report from Landmark. In summary, the site is described as being located with the Penderyn Reservoir to the north, a manufacturing unit to the east with farm land beyond, further small industrial units to the south with the A465 beyond and farm land to the west. The site is described as having generally flat topography and being waterlogged to the southern end of the site.

11.63 The historical maps of the EnviroCheck report demonstrate that the site is undeveloped until between 1922 and 1951. The Penderyn Reservoir is first shown on a map of 1921. The first evidence of a refuse tip at the site is on the 1:10,560 Scale map of 1968-1969, which shows a refuse tip immediately east of the stream which intersects the site, in the north western corner of the site. As detailed in the Wimpey laboratories report of 1972, the fill included cinders, bricks, glass, metal and wood fragments, bricks, building rubble, reinforcing steel, concrete and pulp cardboard. The ordnance factory is then demolished at some point between 1969 and 1979, and remains undeveloped to the present day.

11.64 The remainder of the local area has developed gradually with the first identified industrial plant, an engine house, noted in 1891 to the south east of the site. By the map of 1900, this is associated with a brick works, and several quarries are noted in the area, although the Hirwaun Ironworks dates back to Roman times. The maps between 1900 and 1951 change little, however the 1:10,560 Scale map of 1951 show the development of the industrial estate to the north of the A465, as well as the ordnance factory, further north, below the Penderyn Reservoir. Since then, the Hirwaun Industrial Estate has gradually expanded to fill the area between the original factory units and the proposed Enviropark development. Industries which have located on the estate 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.

11.65 Two prosecutions have been brought against companies in the area which relate to authorise processes, and both relate to the illegal storing and treatment of wastes. Local waste and landfilling activities are listed as the historical Hugh Patches site, which was a landfill, operating approximately 800 m to the south west of the site between 1970 and 1980. The site accepted inert, industrial, commercial and household wastes. There was also a small landfill adjacent the Tower Colliery Washery approximately 925 m to the south east, which accepted hardcore, rubble and excavated natural minerals. This licence has since been cancelled. Two other waste management facilities are listed in the area, one of which is located on the Hirwaun Industrial Estate and is described as a material recycling treatment facility. The second licence is also for recycling or reclamation and is issued to EMS Togo Ltd in Rhigos for the recycling and reclamation of polyurethane, PVC and associated packaging.

Current Site Investigation

11.66 Although several rounds of intrusive monitoring have been undertaken at the site, these have primarily focussed on the engineering requirements of any future development.

In order to produce a representative baseline of any potential contaminative presence in the ground, it is considered prudent to undertake a further investigation to support those which have gone before. Although not anticipated that any significant contamination would be encountered, it was suggested that a survey of ground conditions be undertaken across the site, in order to ensure that the historical presence of industrial operations on and around the site, including refuse tips and underground storage tanks, had not resulted in any notable levels of contamination. The works will also enable a baseline of contamination to be drawn, against which any future investigation of the site can be compared.

11.67 The study was combined with further engineering investigations, however the study of contamination levels was limited to key sample areas and depths. The proposed sampling regime included a series of fifteen trial pits, five observation pits and nine boreholes across the site. Each of the boreholes was to have a combined gas and groundwater installation finished with a suitable sampling head.

11.68 The request to the geotechnical team was that samples should be representative of each soil type and any apparent pollution, and where additional samples were taken due to suspicions of contamination, these samples should be analysed. Spare samples were to be retained for potential leachability tests, and the samples of any permeable gravels from each borehole should be retained for potential particle size analysis, in the event that contamination was found.

11.69 The general suite of testing for soil samples included; Total Organic Carbon (TOC), pH, heavy metals suite (arsenic, antimony, barium, water soluble boron, cadmium, chromium (hexavalent and total), copper, lead, mercury, molybdenum, nickel, selenium, zinc), sulphate, sulphide, sulphur phenol, BTEX, chloride, fluoride, cyanide (free and complex), thiocyanate and 19 speciated plus coronene and total PAH.

11.70 Six groundwater monitoring visits were proposed to enable assessment of the hydraulic gradient at the site, and during two of these, groundwater samples should be taken assuming it was encountered.

11.71 The general suite of testing for groundwater samples collected from standpipes should include pH, Total Organic Carbon (TOC), heavy metals suite (arsenic, antimony, barium, water soluble boron, cadmium, chromium (hexavalent and total), copper, lead, mercury, molybdenum, nickel, selenium, zinc), sulphate, sulphide, sulphur, phenol, BTEX, 19 speciated plus total PAH, chloride, fluoride, cyanide (free and complex), thiocyanate, COD, BOD and ammonia and electrical conductivity.

11.72 The purpose of the site investigation detailed above is to identify the presence of any contamination in, on or under the site either due to naturally elevated concentrations or due to historical activities on or local to the site. The results of the survey will be used to inform the planning process and to create a baseline of the land quality at the site against which any future site investigation results can be compared.

Currently Available Results

11.73 The intrusive works were undertaken at the site between 18th August 2008 and 15th September 2008. The trial pit and borehole logs are presented in Appendix 6, along with a map of their locations, and initial analysis results. In summary, the trial pits revealed Made Ground to depths of 0.3 – 3.5 m in all but one location, trial pit 12, which was considered to possibly consist of weathered bedrock from ground level. Made Ground generally consisted of brown clayey, sandy Gravel, sometimes changing to Clay or Silt at deeper levels. Where natural ground was encountered in the trial pits, this was generally described as clayey Gravel although soft to firm orange Clay was also encountered in several pits which was described as possibly being reworked natural material. Some trial pits revealed strata of Silt or Cobbles and Boulders.

11.74 Borehole strata were similarly described for the most part, with lower strata consisting of Cobbles of sandstone and quartzite, or Sandstone. Groundwater was identified mainly in the northern and western sections of the site, but also in the south eastern corner.

11.75 Groundwater strike levels are detailed in Table 11.7 below, alongside the actual groundwater elevation. Groundwater contour plots which identify the assumed direction of flow are presented in Appendix 7, the Flood Risk Assessment report.

Table 11.7 Groundwater Levels Recorded by Soil Mechanics. August / September 2008

Location	Strike Level mBGL	Groundwater Elevation mAOD
Trial Pit 2	2.4	197.04
Trial Pit 11	1.4	198.58
Trial Pit 11A	1.4	198.43
Trial Pit 12	1.7	198.2
Trial Pit 12A	1.8	198.76
Trial Pit 14	1.8	198.59
Trial Pit 15	1.8	199.3
Trial Pit 16	0.3	201.18
Trial Pit 217	1.3	202.14
Borehole 103	8.4	190.48
Borehole 104	9.1	190.17

11.76 A summary of the preliminary available contamination test results are reported below and are compared against Soil Guideline Vales (SGV) (a)[6], where available. Where no SGV is available, the New Dutch List (b)[7] has been applied, and where no other reference value is available, or where the ICRCL limits are lower than the Dutch List limits, the ICRCL assessment limit*[5] has been included, despite these limits no longer being in use in the UK.

Table 11.8 Summary of Preliminary Results and Assessment of Identified Pollutant Concentrations. August / September 2008.

Contaminant	Concentration Range mg kg^{-1} unless otherwise stated	Assessment Limit
Elemental Sulphur	<20 - 306	20,000
SO4-- (acid sol)	82 -1,740	2,000 / No limit *
Antimony	<0.5 – 1.2	-
Arsenic	5.3 – 13.9	500 (a)

Contaminant	Concentration Range mg kg^{-1} unless otherwise stated	Assessment Limit
Cadmium	<0.1 – 0.76	1,400 (a)
Chromium	12 – 22.5	5,000 (a)
Copper	12.7 – 26.5	130 *
Lead	19.7 – 46.9	750 (a)
Mercury	<0.1	480 (a)
Molybdenum	<0.5 – 0.6	200 (b)
Nickel	11.7 – 28.2	5,000 (a)
Selenium	<0.5 – 1.4	8,000 (a)
Zinc	34.6 – 212.4	300 *
Total Moisture % at 105°C	11.6 – 21.8	-
Total Petroleum Hydrocarbons by GCFI	<11.3 – 114	5,000 (b)
>C12 - C16	<2 – 4.51	5,000 (b)
>C16 - C21	<2 – 2.62	5,000 (b)
>C21 - C35	<4.95 – 65.8	5,000 (b)
pH units	7.3 – 10.1	-
Boron (Water Soluble)	<0.5 – 2.3	3 *
Barium	<0.1 – 420	625 (b)
Chloride	20 – 102	-
Chromium VI	<0.1	No limit
PAH (screening)	<10 – 123	40 (b)
Cyanide (Free)	<0.6	20 (b)
Cyanide (Total)	<0.6	50 (b)
Phenol Index	<0.6	21,900 (a)
Thiocyanate (SCN)	<2.6	50 *
Sulphide as S	<0.6	1,000 *
Organic Carbon %	0.32 – 3.16	-
Asbestos (screening)	No bulk fibres observed	-

11.77 Benzene, Toluene, Ethylbenzene and Xylene were all below the laboratory limits of detection, as were PCB congeners and hydrocarbons within the C8-C10 and C10 – C12 ranges.

11.78 The results of analysis to date suggest that there are no elevated levels of pollution, when considering the contaminants assessed, and thus despite being a brownfield site, the status of the land is good, with minimal evidence of historical contamination.

PREDICTION OF POTENTIAL IMPACTS

11.79 The following section details the proposed development and its potential impacts on the land quality of the site.

Proposed Operations

11.80 The proposed development will handle incoming waste feedstocks, which will largely comprise solids, but will also include an element of liquid. Through processing, the material is converted largely to oil based and gaseous fuels, with the residual solid portion forming a

very small percentage of the original. The oil and gaseous fuels will be pumped from the process to holding tanks and then into engines where they will combust to release energy. The main sources of potential ground contaminants are therefore the incoming feedstock material, the processed or part processed feedstock in liquid form (effluent and oil), and the solid residues. Additionally, as with any industrial application, various cleaning chemicals, lubricants and fuels will likely be stored around the site for use in day to day operations. Any release of these substances could result in pollution of the ground.

11.81 The site is currently empty and undeveloped and as such the proposed development by Enviroparks will require new and comprehensive infrastructure to be installed at the site:

- All operational areas will be completely covered with impermeable hardstanding;
- Some areas of below ground operation will be required with pits and basements constructed within buildings or externally to house tanks. These will be constructed appropriately of impermeable concrete hardstanding;
- Roadways will be constructed of concrete or tarmacadam;
- Drainage channels will run below ground, however any additional below ground pipe runs will pass through a pipe gulley;
- All remaining landscaped areas of the site will be fully protected from site operations through the use of hardstanding and kerbs.

11.82 On-going maintenance of the site infrastructure will be promoted through the requirements of the site Environmental Permit, which Enviroparks is obliged to have in place prior to operation. Environmental Permits include the requirement to protect land and water resources during the course of the Permit lifetime by avoiding pollution risks resulting from the operation of the regulated facility, and also through the requirement to return the site of the regulated facility to a satisfactory state, which considers its status before the facility was put into operation. As a result, any operator of a permitted site must have a management system that produces and maintains adequate records on how the land and groundwater have been protected throughout the facility's lifetime. Enviroparks Hirwaun Ltd will therefore produce and work to a system which regularly assess the integrity of the infrastructure around the site and promotes preventative maintenance where possible, coupled with efficient and effective repairs where required.

11.83 Prior to operation, the site must be developed, and there is the potential for emissions from construction works to impact on the quality and status of the land. Potential releases would include:

- Raw materials, lubricants and fuels through improper handling, poor storage or accidental spills
- Emissions such as oils or fuels from vehicles working on and travelling across the site
- Incorrect storage of waste materials resulting in direct exposure of the ground to stored or escaping materials.

11.84 The potential for contamination of the land occurring during construction will be controlled through the use of a Site Management Plan (incorporated as Appendix 3 in Chapter 9 Air Quality), and the implementation of a Site Waste Management Plan. The Site Management Plan considers all elements of environmental control during construction and specifically, with regard to protection of the ground and water resources, it controls traffic movements, deliveries, energy use, water use and disposal, and waste. The implementation of the Site Management Plan, which will be implemented by the principal contractor and overseen by the developer, should ensure that as far as is practically possible, the protection of the land, water and sensitive features and receptors around the site are protected during construction.

11.85 The prediction of the potential impact of the proposed development on the quality of the ground beneath and surrounding the site have been considered using a “Source, Pathway, Receptor” template, presented in Table 11.9. This summarises how the proposed development could affect the land quality.

Table 11.9 Impacts of Proposed Development on Ground Conditions

Phase	*Source*	*Pathway*	*Receptor*	*Mitigation*	*Likelihood of Pollution*
Current	No known sources although the potential for illegal use and fly tipping could provide a source	Open land with no barrier between any potential source of pollution and the ground below	Upper Made Ground strata. Presence of Clay and clayey Gravels will slow movement through the strata and towards the minor aquifer and surface waters	None	Limited Likelihood of Pollution
Construction	Intentional or accidental release of: Raw Materials Lubricants Fuels Waste Effluent	Prior to the surfacing of the site, open land or permeable hardcore could provide a pathway for pollution.	Upper Made Ground strata. Presence of Clay and clayey Gravels will slow movement through the strata and towards the minor aquifer and surface waters	The Site Management Plan will ensure that systems are in place and maintained to prevent leaks and spills where possible, and to effect efficient clean up where they do occur. All materials will be stored in suitable containers with secondary containment where necessary or practicable. Impervious surfacing will be laid as soon as practicable	Some Possibility of Pollution
Operation	Intentional or accidental release of: Waste Effluent Oils/Lubricants/Fuels Chemicals (cleaning / maintenance)	Impervious hardstanding in all operational areas prevents pathway to ground or surrounding landscaped areas	If a pathway was to exist, the receptor would be the Upper Made Ground strata or the surrounding landscaping. Presence of Clay and clayey Gravels will slow movement through the strata and towards the minor aquifer and surface waters slow movement towards the minor aquifer and surface waters	Primary and secondary containment measures will be installed and will be subject to on-going monitoring and maintenance to ensure their integrity. Monitoring and operational procedures will be implemented where necessary	Limited Likelihood of Pollution

MITIGATION

11.86 A summary of the mitigation measures proposed for the development in order to prevent or minimise the potential of pollution of the land are detailed below:

- The use of a Site Management Plan to control construction site operations and potential environmental impacts.
- Suitable and sufficient containment and bunding facilities around the site, both during construction and operation.
- The provision of suitable effluent removal facilities (e.g. foul sewer or collection and bulk removal) from the construction site, and the provision of adequate treatment and removal facilities for the operational facility.
- The provision of impermeable hardstanding across all operational areas of the site.
- The provision of fully metalled road surfaces across the development.
- Kerbed roadways and site edgings to protect landscaped areas and natural features from potential run-off.
- On-going monitoring and maintenance of the suitability and integrity of equipment and infrastructure.
- The provision of relevant procedures to facilitate well managed operations, such as delivery and handling procedures, emergency procedures, and process change reviews.

EVALUATION OF RESIDUAL EFFECTS

11.87 The Enviroparks Hirwaun Ltd development on the Hirwaun Industrial Estate proposes to use a currently empty, brownfield site to co-locate a recycling and commercial operation. The development of the land will convert approximately 5.4 hectares of the seven hectare site to hardstanding or buildings, all of which require construction, but will ultimately result in a protective barrier being formed between site movements and operations, and the ground beneath.

11.88 To evaluate the potential impacts of the site and determine whether or not there are any residual effects which should be considered, the following matrix has been applied:

Table 11.10 Significance Matrix for the Assessment of Land Pollution Potential from the Proposed Development

Positive or Negative	Significance	Description of Impact
Negative	High	Serious probability of land contamination potential and / or Serious effects on groundwater
Negative	Medium	Moderate probability of land contamination potential and / or Moderate effects on groundwater
Negative	Low	Some possibility of land contamination potential and / or Slight effects on groundwater
Either	Negligible	Little likelihood of pollution potential to land or groundwater
Positive	Low	Some reduction in the potential for land contamination and / or Slight reduction in the effects on groundwater
Positive	Medium	Moderate reduction in the potential for land contamination and / or Moderate reduction in the effects on groundwater
Positive	High	Significant reduction in the potential for land contamination and / or Significant reduction in the effects on groundwater

11.89 The potential for effects on ground conditions differ during the two distinct phases of the development, those being the construction and operation of the site. Both phases have similar sources of pollution to consider, although the potential pathways vary greatly.

11.90 During construction, the currently undeveloped site will be stripped and excavated prior to the installation of infrastructure. During this time, the ground will be bare or will have minimal protection from construction works, raw materials storage and vehicle movements. It could therefore be considered that without the proposed protection and mitigation measures in place, there would be a moderate potential for pollution, however Enviroparks propose to ensure that their chosen contractor works to a Site Management Plan to control potential impacts, providing suitable and sufficient containment measures and clean up procedures, operated by fully trained staff. Therefore the residual effect of the construction phase on the land quality of the area is of **low negative** impact.

11.91 All operational areas of the Enviroparks site will be over areas of impervious hardstanding such as concrete. This will prevent the release of any pollution to the ground below. Additionally, adjoining natural and landscaped areas will be kerbed to prevent the release of pollution from run off. Therefore, the operation of the site over an impervious base results in a **negligible** or **low positive** change impact on the ground conditions from the current status of the site, which is presently at risk from potential fly tipping or unlawful use.

11.92 The on-going monitoring and maintenance procedures which will be implemented as required under the site Environmental Permit will ensure that site equipment and infrastructure is maintained for the lifetime of the Permit.

REFERENCES

1) Model Procedures for the Management of Land Contamination (CLR11). DEFRA and the Environment Agency. ISBN Number 1844322955 September 2004

2) Environmental Studies in the Cynon Valley. Mid Glamorgan County Council. (No date).

3) www.harringtonmuseum.org.uk

4) www.CommuniGate.co.uk

5) ICRCL 59/83 Guidance on the assessment and redevelopment of contaminated land. Second Edition, July 1987 – Now Withdrawn

6) www.environment-agency.gov.uk/subjects/landquality (Various documents)

7) Intervention Values and Target Values – Soil Quality Standards. The Ministry of Housing, Spatial Planning and Environment. Directorate-General for Environmental Protection. The Netherlands.

DRAINAGE AND FLOOD RISK

METHODOLOGY USED

11.93 The drainage and flood risk sub-chapter aims to detail the potential impact of the proposed development on local water resources. An initial review will detail the resources in the area and assess their current quality. A desk study assessment of the potential influences of the proposed development will then be made, which will consider the likely impacts upon water resources throughout the course of the development and the on-going operation of the site.

11.94 Consideration of flood risk is an important aspect of assessing the potential influence of a development and as such a flood risk assessment has been produced. This is presented as an appendix to this chapter, but the results of the study are summarised throughout. The flood risk assessment has been prepared in line with the requirements of the Welsh Assembly Government's Technical Advice Note (TAN) 15: Development and Flood Risk(1). The methodology applied is therefore one of a staged assessment, with each requirement and the level of detail provided, being dictated by the previous level of enquiry. The overall aim of the flood risk assessment is to ensure that appropriate consideration is given to flooding issues by applying a precautionary approach.

11.95 Once the current baseline of water quality and flood risk has been described, the potential impact of the development as a whole will be considered. This will include assessment of the impacts on the development itself, and on downstream receptors in the local area, with consideration to the potential impact of flood water contributions to other locations and the impact on local water quality from both normal site operations and site emergencies. The source, pathway, receptor methodology will be applied.

11.96 Where the suitability of the location is not immediately apparent, this will be justified appropriately, through consideration of the proposed mitigation and management measures.

11.97 The proposed mitigation measures will be detailed, with consideration given to any additional requirements identified by the potential impacts likely to be caused.

11.98 Finally, any residual risk will be detailed and a suitable management plan adopted to ensure that these are managed appropriately.

Water Resources and Water Quality

11.99 The proposed development will be situated on the Hirwaun Industrial Estate, on land to the north of Fifth Avenue. The site is in the northern portion of the industrial estate and is located between Fifth Avenue (north of the A465) and the embanked Penderyn reservoir. Ninth Avenue runs along the eastern boundary of the site and a wooded hedgerow follows the western boundary. The site is roughly square in shape and is approximately 7 hectares in area. The land has previously been developed, siting an Ordnance Factory between 1939 and 1945, with the last remaining buildings finally being demolished in the 1960s. The site has remained as flat scrub grassland since then, although was re-graded in the mid 1990s, and now has a series of well defined drainage ditches in a regular herringbone pattern.

11.100 No historical information on groundwater quality is available, however recent sampling and analysis has been undertaken. This information will enable Enviroparks to set a baseline of groundwater quality prior to their development of the site, and will therefore enable them to monitor and assess groundwater during the operation of the site. Historical and more recent ground water monitoring has however enabled groundwater contour plots to be prepared, which demonstrate the direction of flow of the groundwater beneath the site. These are presented in the flood risk assessment report in Appendix 7.

11.101 Hirwaun is located in the Cynon Valley, and thus is approximately 20 km from the nearest coastal waters (to the south west). Water features are in abundance in the area however, with brooks, rivers, ponds and reservoirs in the locality. The site is located over Lower Coal Measures and these are classified as a minor aquifer. Above the Lower Coal Measures however are Alluvium and Glacial Till stratum, and these, coupled with the Boulder Clay known to lie across the site will provide some protection to the minor aquifer. That said, the prevention of downward migratory movement promotes lateral movement and could therefore increase the risk of water or pollution flowing off site or to local surface waters.

11.102 An EnviroCheck report has been reviewed and confirms that the site is located over a minor aquifer of variable permeability. These can be fractured or potentially fractured rocks which do not have a high primary permeability, or may be other formations of variable permeability. Despite not producing large quantities of water for abstraction, they can be important for local supplies and for supplying the base flow to rivers. The boulder clay strata present at the site is of low leaching potential and therefore pollutants are less likely to penetrate the soil layer vertically, with lateral flow being of primary importance. As a result of lateral flow, surface water run off and ground water flow is likely to contribute to re-charge elsewhere in the catchment, rather than directly beneath the site, and the transportation of any pollutants in the upper made ground or topsoil layers can also result in pollution of areas away from the contaminating activity. There are five abstraction licences detailed in the area, although at least two of these will no longer be in use as they were used by the Tower Colliery which closed in January 2008. These two abstraction points were located to the south of the site. Two other abstraction licences are located to the north east and these supply the Welsh Whiskey Company and the Penderyn Reservoir (from the Penderyn borehole). Both are located more than 1,450 m away from the site. The final abstraction licence also serves the Penderyn Reservoir, and is the abstraction of water by Dwr Cymru from the Nant y Bwllfa, located to the east of the development site at almost 2 km distance.

11.103 As smaller abstraction rates (less than 20 cubic metres per day) are not necessarily registered with the Environment Agency through the Abstraction Licensing scheme, an assessment has been made of other buildings in the vicinity which may not be served by a mains water supply. The criteria applied to the assessment has assumed that any property which is equal to or more than 500 m from the nearest built up area, may not have access to mains water. It is not certain whether or not the buildings identified are or are not served by the mains, however by way of producing a robust assessment, each of the buildings detailed below will be assumed to abstract water from ground or surface water resources:

Table 11.11 Buildings within 2 km of the Proposed Development Which May Draw Supplies from Ground or Surface Waters

Location	Approximate Grid Reference	Nature of Building	Distance from Nearest Built Up Area
Close to Pen-Cae Drain	291550 207725	Likely residential / farm	Approximately 1 km from Pontneddfechan
Bodwigiad	295375208450	Residential / farm	Approximately 600 m from Pontbren Llwyd and Penderyn
Pen-y-Cae	295475 207500	Residential / farm	Approximately 500 m from Pontbren Llwyd
Bwllfa Cottage	295450 207125	Residential	Approximately 600 m from Pontbren Llwyd
Lletty-Rhys	295175 207000	Residential	Approximately 600 m from Pontbren Llwyd
North of Penderyn Reservoir	2941125 2075125	Likely residential / farm	Approximately 700 m from Pontbren Llwyd
North east corner of Penderyn Reservoir	294100 207250	Residential	Approximately 750 m from Pontbren Llwyd
Ty Newydd Hotel and local buildings	294350 206950	Hotel	Approximately 750 m from Pontbren Llwyd

11.104 There are seven discharge consents in the area, three of which are operated by Dwr Cymru as sewage discharges or as the overflow from the Penderyn Reservoir, and two of

which are operated by the Coal Authority. Of the other two consents listed, one has expired, and the other which is still believed to be current serves the drainage from an industrial site. There are seven Local Authority Pollution Prevention and Control Environmental Permits in the vicinity, and six of these are located within the Hirwaun Industrial Estate. Process operations include coating processes (5), oil extraction and refining and screening and crushing processes. There have been 23 pollution incidents to controlled waters since 1991. Seventeen of these were minor incidents and consisted of minor spills and leakages of oils, sewage or slurry. Of the remaining six incidents, each of which was classed as significant, four involved the release of sewage, one was the result of a release of milk / creamery effluent, and one involved the release of coal solids.

11.105 Initial discussions with Dwr Cymru Welsh Water, by way of a Pre-Planning Assessment and a Trade Effluent Consent Preliminary Information Form suggest that mains water can be supplied to the site. It is also considered that any domestic discharges from the site will be acceptable to the local waste water treatment works. With regards to the requirement of a Trade Effluent Consent, initial discussions suggest that the local treatment works could accept the proposed volume of discharge from the Enviroparks site, 240 m^3 per day, however it would not have sufficient capacity to treat effluent with high concentrations of biological oxygen demand (BOD), ammonia or total suspended solids (TSS). Copies of Dwr Cymru Welsh Water's response to the pre-planning and Trade Effluent Consent requests are provided in Appendix 8.

11.106 The information included in the Trade Effluent Consent Primary Information Form, provided details of potential BOD from the site as equivalent to a population of 20,000. This figure assumed limited treatment by Enviroparks prior to discharge to sewer, Following further discussions with Dwr Cymru Welsh Water, Enviroparks will ensure that the treatment systems in place, which will consist of sequencing batch reactors (SBR) / reverse osmosis (RO) / equivalent technologies, will treat the outgoing effluent to a standard acceptable for release to the local waste water treatment works.

11.107 Key sensitive features in the area are detailed in Table 11.12 overleaf, and include the Cors Bryn-y-Gaer lowland bog. This is the nearest Designated Site to the proposed Enviroparks development and is located approximately 500 m to the east.

11.108 The development will include the conversion of much of the site to hardstanding, with the current estimated area covering approximately 5.4 hectares. It is proposed that hardstanding will be impermeable across the operational areas of the site, and surface water from the building roofs will be collected and stored in tanks for use in the process. Surface water from the site surfaces will be directed to the sustainable drainage system holding pond, passing through interceptors en-route to remove any oils or grease collected from the site roadways. This will ensure protection of groundwater sources from any potential pollution impacts, and purpose built drainage and treatment systems will control the release of any surface water run-off or effluent. The remainder of the land will be left landscaped and will include a large water storage feature by way of a water holding pond running along much of the southern boundary line of the site. Should the proposed development not proceed, there would be no change to the site layout or drainage and hence the situation would remain much as it is today.

11.109 Details of other designated and sensitive sites have been obtained from the Countryside Council for Wales and are detailed below:

Table 11.12 Designated Sites within 2 km of the Proposed Development Site

Site and Designation	Location	Approximate Distance From Development	Reason for Designation
Cors Bryn-y-Gaer / Blaen Cynon (SAC and SSSI)	SN 945065	Within 500 m east	Cors Bryn-y-Gaer is of special interest for its lowland bog and for areas of soligenous flush, marshy grassland, dry neutral grassland and lowland acid grassland. These habitats occur in a complex with wet heath, swamp and semi-improved grassland. The site is also of special interest for the marsh fritillary butterfly Eurodryas aurinia. The site is located immediately north-west of Hirwaun and south of the Brecon Beacons National Park.
Woodland Park and Pontpren (SSSI)	SN 946077, SN 952075, SN 948071	1 km north east 1.25 km ENE 850 km east	Woodland Park and Pontpren is of special for the interest for the marsh fritillary butterfly Eurodryas aurinia. Additional special interest is provided by its mixture of habitat types, including marshy grassland, dry acid and neutral grassland, heathland and woodland, which add to the ecological and biodiversity interest of the site and which also provide food and shelter necessary for the survival of the marsh fritillary. This site consists of three separate blocks of land, approximately 1km south of the village of Penderyn.
Dyffrynoedd Nedd a Mellte (SSSI)	SN 907100, SN 921090, SN 937088	4.5 km NNW 2.6 km NNW 2 km north	Dyffrynnoedd Nedd a Mellte, a Moel Penderyn is of special interest for its extensive and diverse semi-natural woodland, important populations of several flowering plants and supporting outstanding assemblages of mosses, liverworts and lichens. The site includes a range of geological features, well-exposed in the cliffs and rocky river beds. This site includes the wooded valleys of the rivers Nedd and Mellte, and their tributaries above Pontneddfechan

Note; SAC is a Special Area of Conservation and SSSI is a Site of Special Scientific Interest.

11.110 Of the three Designated Sites detailed above, it is considered that the changes to the water characteristics of the site through the potential development could most impact the Cors Bryn-y-Gaer SAC, which is a lowland bog and therefore dependant on ground and surface waters.

Ground Water

11.111 Historical site investigations at the site suggest that the ground water level in the area is relatively high at times, with a study report from 1972[3] noting that "Ground-water was present in all boreholes and was observed at depths between 0.35 and 1.3 m below ground level in the northern area", that is, the area of potential development, although this was prior to the re-grading of the site, which used the underlying Boulder Clay to give acceptable cross grades to the site and incorporated drainage channels. Later assessments in 1995[4] were undertaken in June, and the ground water levels detected were much lower at this drier time of year, ranging from depths of 2.8 to 6.5 metres below ground level.

11.112 The low permeability of the Boulder Clay will result in slow ground water movement and surface water soakaway, and the site has been observed to be saturated in areas not served by the drainage channels. By plotting the ground water levels encountered during the historical site investigation, against the borehole locations, it is apparent that the southern area of the site experienced the higher ground water levels during the study in November 1971. This is also the area which appeared to be most saturated during a recent site visit (March 2008) although the whole site suffers from marshy conditions. That said, in the June study undertaken in 1995, the highest ground water levels were recorded to the north of the site, albeit these were all lower than the previous ground water logs.

Surface Water

11.113 Hirwaun is located within the Cynon Valley, and the River Cynon passes through the town. An extract from Environmental Studies in the Cynon Valley[5] identifies some of the geological characteristics which have influenced the river flow and drainage in the area.

> *"It is claimed that the original headwaters of the Cynon continued in a north westerly direction beyond Hirwaun. Indeed, a glance at a map would suggest that the Afon Pyrddin formerly flowed into the Cynon. That this is no longer so is a result of the capture of the Pyrddin, Mellte and Little Neath by the River Neath, which has cut back its valley along a major fault. This would explain the limited drainage to the west of Hirwaun and the gorge on the Sychryd."*

11.114 Copies of the Ordnance Survey and British Geological maps of today are presented in Figures 1 and 2 and demonstrate the theory above. The area is heavily faulted, however the major fault referred to is likely to be the Dinas Fault, and the Hirwaun Industrial Estate, which lies to the west of Hirwaun, certainly has areas of limited natural drainage.

11.115 The two main surface water features present at the site today are the small stream which intersects the north western corner of the site, continuing down the western boundary and currently accepting the surface water run off from the site, and the Penderyn reservoir located to the north. Historical maps do however show that the Nant Yr Ochain historically passed through the southern area of the site, having come from the south, beyond the extents of the current industrial estate. The Nant Yr Orchain flows into the River Camnant which is still present today extending to the south of Fifth Avenue around the sewage treatment works. The boundary between the Rhondda Cynon Taf County Borough Council and the Brecon Beacons National Park Authority jurisdictions follows the historical path of the Nant Yr Ochain from approximately half way across the southern edge of the site. The Camnant now accepts the waters of the stream which intersect the north western side of the site, however this historically flowed into the Nant Yr Ochain prior to joining the Camnant. The Nant Yr Ochain is shown on historical maps until the introduction of the present day Fifth Avenue, which replaced the original railway, at some point in the first half of the 1970's. From this point on the only indication that the Nant Yr Ochain ever flowed through the site is the lasting path etched by the Authorities boundaries. A series of drains and ponds has instead been formed to the south of the industrial estate, close to Pont Yr Ochain. Had the Nant Yr Ochain still been present on the site, it is possible that the saturated areas now experienced along the southern boundary may have remained better drained, with ground and surface waters flowing into the river channel.

11.116 The River Camnant is of marginal river quality, although this is a marked improvement as previously the river has significantly failed to meet its targets. Despite missing its targets, the overall quality of the river is C, fairly good. Appendix 9 provides details of the recent quality status of the river. By comparison, the River Sychryd has a good river quality (B), and the River Gwrangon to the west has a very good river quality (A).

11.117 The Penderyn Reservoir was built between 1911 and 1920. It is an Impounding Reservoir, which has virtually no catchment area of its own and is reliant on the support of three separate resource systems to maintain storage. These systems are:

- The Bodwigiad and Nant y Bwllfa streams
- Nant Hir and Nant Moel Reservoirs
- Pont Bren Llwyd Borehole

11.118 The dam is fed from these local streams and a pumped main. The water is fed from an adjacent inlet chamber which includes an overflow arrangement which enables the stream flow to by-pass the dam. Any overflow is discharged via the stream that runs through the proposed Enviroparks development site.

11.119 During normal operations the two stream sources at Nant y Bwllfa and Bodwigiad are sufficient to maintain storage in the Penderyn Reservoir. Under low flow conditions both the Bodwigiad and Nant y Bwllfa streams are required to maintain modest informal residual flow conditions to sustain raw supplies for local livestock watering. The Nant Hir and Nant Moel reservoirs are of small capacity themselves but are capable of contributing storage to Penderyn through a combination of gravity and low lift pumping. However given the hydraulic configuration of the intake arrangements, any flow in excess of a residual flow from any of these source will automatically gravitate to the Penderyn reservoir.(6) In the event of heavy flows, the mechanical means of water pumping from the two reservoir sources or the boreholes would not be activated.

11.120 In addition to the water courses in the immediate vicinity of the site, the area has numerous surface water courses including the Rivers Cynon, Neath, Mellte and Hepste; several reservoirs and ponds, plus smaller water courses such as brooks and streams.

Flood Risk

11.121 Full consideration has been given to the natural aspects of the area which may affect the water resources or contribute to flooding, through the provision of a flood risk assessment (Appendix 7).

11.122 The proposed development of the land adjacent Fifth and Ninth Avenues on the Hirwaun Industrial Estate for use as a waste recycling and energy production facility will entail major development of the site which is currently an open field. Despite the proposed conversion of 5.4 hectares of the 7 hectare site to impermeable hardstanding or buildings, it is considered that the development will not suffer from flood risk and will likely result in an overall reduced risk to down gradient receptors of flood waters. This is due to the proposed collection and use of a large quantity of surface water run-off, and the controlled discharge of excess run-off from that which is stored. The site is considered to have flooded at some time in the past due to the presence of alluvium at the site, however the overall risk of flooding at the site is believed to be less than 0.1 %.

11.123 The following section details the proposed development and its potential impacts on water resources, their quality and the potential for flooding at and around the site.

Water Resources and Water Quality

11.124 The proposed development consists of a combination of hardstanding and landscaped areas, with approximately 5.4 hectares housing buildings or roadways and 1.6 hectares being landscaped. By turning the majority of the to hardstanding areas with controlled drainage, the land and ground water management of the site can be controlled. Less of the site area will be absorbing water and therefore contributing to the ground water levels, reducing the likely risk of saturation and pooling of water. The captured water from the building roofs will be held separately in local storage tanks for use across the site. The hard surface drainage water from the site will be directed to a sustainable drainage system with 3,110 m^3 volume storage capacity, which will be used for water storage to feed the process. This will run along the southern boundary, alongside Fifth Avenue. Consideration of the ability of this system to retain flood waters has been made within the flood risk assessment (Appendix 7).

11.125 The holding pond will have a combination of an impermeable and a permeable lining and will include a one way flow system back to the natural stream. This will result in a set level of water being retained in the pond at most times, drought conditions perhaps causing the pond level to lower. The holding pond will discharge to the natural stream once a pre-determined capacity is reached, and further filling of the holding pond will then be subject to soak away, once the permeable liner is reached. This staged release will ensure that where possible, rain water and run off is used in the process, and the site release to water courses and ground waters is reduced from the present levels, whilst still providing higher level releases to the natural water courses to prevent any flood potential within the site.

11.126 Water resource flow will therefore be altered by the proposed development, with contributions to ground water and the stream to the west of the site being reduced. That said, domestic effluent and part treated site waters will be sent to the local waste water treatment works and waters will therefore re-join the River Camnant downstream of the works. Although the throughput of waste water at the waste water treatment works will increase, the quality of the Enviroparks process waters, which will have been pre-treated to a high standard prior to discharge, should assist in maintaining a higher output quality of waters from the treatment plant, through dilution of incoming effluent with cleaner waters.

11.127 Despite the conversion of 5.4 of the seven hectares to buildings and hardstanding, the measures proposed will benefit the site and wider area. Of particular note, the use of the storage pond to the south of the site, sits comfortably with the historical run of the Nant Yr Ochain, and may assist with control of the current water logging potential of the site.

11.128 As the Penderyn Reservoir is located upstream of the site, it is considered that it may impact on the water quality in the local area of the site, but that water and effluent discharges from the site will not impact on the reservoir.

11.129 Site impacts on water resources flow or water quality could be caused by:

Re-directing the Watercourse	Short term impact during re-routing
Waste Water discharges to controlled waters or sewer	Modification of flows and increased potential of pollution from discharges
Accidental Release	Pollution to ground or surface waters through accidental release

11.130 Whilst it is considered necessary to re-route and culvert the existing stream at the site, and therefore a short term impact on this water course is inevitable, the redirection and culverting of the stream will ensure the long term protection of the water course from any possible impact from the day to day operations of the proposed site. Additionally, it is acknowledged that the Enviroparks site will require a mains water supply and plan to discharge effluent into the public water treatment system, assuming Consent is approved by Dwr Cymru Welsh Water, however where possible, the site plans to utilise as much process and surface water run off from the site as possible in order to reduce the call on potable mains supplies, and will also pre-treat their effluent to ensure that the discharge is of an acceptable quality to Dwr Cymru Welsh Water.

11.131 The groundwater contour plots presented in the flood risk assessment in Appendix 7 have been produced from both recent and historical data. The plot produced from the recent site investigation work denotes the water strike level data. Each of the contour plots show the groundwater movement in a generally south westerly direction. Each of the three current holders of Abstraction Licences and the eight potential small abstractors are located to the north, north east or east of the proposed development site. As groundwater is moving in a south westerly direction, any potential impact on groundwaters caused by accidental pollution from the site would not therefore affect these abstraction points. Similarly, any impact on the groundwater beneath the site is unlikely to have an impact on the Designated Sites in the vicinity of the development, as those within a 2 km radius are all located to the north or east of the site.

Other Run-Off

11.132 There is no proposed modification to the routing of other surface run off.

11.133 The overall impact of the proposed development will be to reduce the likelihood of flooding. The individual impacts considered either have no overall effect on the release, or reduce the likelihood of flooding, when considering both the site itself and any down stream or down gradient receptors. The use of adequate drainage, storage and control techniques will result in less water entering surface and ground waters directly, and can control the release to sewer such that, although the loading on the treatment works will increase with this proposed additional source, the discharge can remain within its regulated limits.

Construction Impacts

11.134 Due to the close relationship between the site and a number of watercourses, including the stream running through the site, the River Camnant and the high groundwater (although this is possibly perched), the potential impacts to the water environment during the construction phase have the potential to be significant.

11.135 The primary potential impacts are related to:

- Diversion of the stream;
- Site drainage and the potential to silt surface waters;
- Delivery and storage of construction materials;
- Storage and handling of materials/oils/chemicals, including material preparation (concrete) and refuelling of plant and vehicles;
- Contamination of groundwater and geological strata during piling or excavation;
- Site staff rest and welfare facilities.

11.136 During construction, the greatest risk will be experienced initially, when preparing storage and work areas and when a suitable and satisfactory drainage system may not be in place. Sudden rainfall events can mobilise silt and materials held within the site, and if not controlled these could be conveyed to the local surface waters. Some of the earliest activities at the site will involve the protection of the watercourses, through the provision of a site connection to the foul sewer for all suitable wastes, and the provision of an earth bund to protect the stream. Hardstanding will be laid and / or secondary containment measures such as bunds or spill trays will be used to protect land and watercourses from accidental spillages on site. Additionally, a regular visual assessment of the stream and the River Camnant will be undertaken, and emergency equipment such as booms will be maintained on site for use as required.

Waste Water

11.137 Site water will be controlled in one of four ways once the site is operational. As discussed earlier, roof water run off will be captured and stored in holding tanks for use around the site, in process and domestic facilities. Run off from hard surfacing across the site, including that from the Anaerobic Digestion base, which will incorporate anti-floatation valves, will pass through Class 1 interceptors, through a reed bed drainage system and into the holding pond. Should the roof water holding tanks reach full capacity, they will also over flow to the holding pond.

11.138 The holding pond, which contains clean and treated surface water run off is used to provide process waters across the site, however should this become full, it will initially overflow to the stream, which currently takes all of the undeveloped site drainage. Should the pond level continue to increase, this stored surface water run-off will reach a permeable layer in the pond liner and will pass to soak away. This clean and treated surface water run-off should have no negative impact on the ground or surface waters it may enter, and will be similar to the run off from the undeveloped areas of the site which are proposed to continue to pass to the stream running along the western boundary.

11.139 Dirty site water will either pass directly to sewer when considering waste from domestic facilities such as toilets and showers, or in the case of process waters, will

initially pass through one of two water treatment plants for processing, before being discharged to sewer. The proposed water treatment plants will consist of sequencing batch reactors / reverse osmosis or equivalent technology which can be operated to very high standards, thus ensuring that the discharge to sewer will remain within any limits specified by Welsh Water. The sewer directs waste to the Hirwaun Sewage Treatment Works. As the Enviroparks site will endeavour always to meet the limits of discharge placed on it by Welsh Water and the Environment Agency, and the Hirwaun Sewage Treatment Works must also operate within the limits of their discharge consent, it is not considered that the proposed site will have any significant negative impact on the River Camnant during normal operating conditions.

Accidental Release

11.140 As an operational industrial facility, which stores and treats waste, the Enviroparks site at Hirwaun has the potential to affect ground and surface water quality through the accidental release of polluting matter to land or directly to water course. Materials stored on site which could impact on ground and water quality include wastes, oils and concentrated liquors. All roads and operational areas of the site are to be located over impermeable hardstanding and materials storage will be strictly controlled, meeting all environmental legislative requirements, such as the Oil Storage Regulations. Where necessary through legislation or best practice, secondary containment facilities will be incorporated, and the provision of oil interceptors across the site to control discharges from the drainage runs will ensure that the release of oils to the holding pond and thus to the stream or soak away are prevented. Spillages will be dealt with efficiently, being contained and cleared away promptly, and the integrity of the hardstanding across the site will be reviewed on a regular basis to identify any damage or cracks in the hardstanding which could result in a pathway for pollution.

11.141 The prediction of the potential impact of the proposed development on the flow and effect of water have been considered using a “Source, Pathway, Receptor” template presented in Table 11.13 below. This summarises how the proposed development will affect the sources of water to and from the site, their impact on the site and the receptors affected, both currently and when considering the development’s ability to influence water flow and quality, and flood potential.

Table 11.13 Impacts of Proposed Development on Water Resources and Quality and Flood Potential

Source	Current Pathway	Current Receptors	Modifications and Mitigation	Likely Pathway	Likely Receptors	Increase or Reduction in Impact
Ground water	Site drainage is currently poor with hydrogeological movement restrained by the low permeability boulder clay	Slow movement of ground water and inadequate drainage facilities results in rainfall water logging the site. The groundwater contour plots suggest that ground water movement is to the south west	The site will have approximately 5.4 hectares turned over to hardstanding areas. Contributions to ground water from the site area will therefore be reduced. Water will continue to pass to groundwater from non developed areas of the site, and from the part permeable holding pond liner, which will allow a controlled level of soakaway from the pond. Direct releases to watercourses will therefore continue to be from uncontaminated sources.	The general pathway for ground water movement will remain unchanged, with ground water moving in a south westerly direction.	Although the receptors will remain unchanged the contribution of rainwater to the ground waters beneath the site will reduce (see below) and thus the overall ground water levels down gradient of the site will be reduced.	The development will result in a site which is more effectively drained thereby avoiding water logging, and will reduce the ground water levels down gradient of the site. Thus the likelihood of flooding either at the site or at other local receptors from ground water sources will be **reduced**.

Source	Current Pathway	Current Receptors	Modifications and Mitigation	Likely Pathway	Likely Receptors	Increase or Reduction in Impact
Stream to the west	The stream passes through the site and the banks were raised in the 1990s to eliminate the risk of flooding. The stream accepts water from streams to the north and run off from the local area including the French Drains associated with the reservoir and the current site drainage.	The stream flows to the River Camnant.	The stream currently accepts all of the drainage from the site. Development will reduce the surface water run off sent to the stream.	5.4 hectares of the 7 hectare site will become hardstanding. Surface water run-off from this area will be diverted away from the stream. Drainage from the 1.6 remaining hectare will continue to be directed to the stream.	The River Camnant remains the receptor for the stream. The flow to the stream and thus to the Camnant will be reduced, however the SUDS system will overflow to the stream. Pre-treated effluent from the process will be sent to the STW, which discharges clean water back into the Camnant.	The **reduced** drainage from the site into the stream will reduce the likelihood of the stream, and the River Camnant which it joins, from flooding.
Penderyn Reservoir	Penderyn Reservoir has minimal impact, with maintenance and repair removing pathways for potential impact. The reservoir is a man-made tank with flow directed via pipes for use. Any small failings in the bank are managed through a system of French drains.	Penderyn Reservoir supplies the Hirwaun Water Treatment Works, which will supply the site with potable water. Water is directed to the water treatment works for use. French drains discharge into the stream which passes through and to the west of the site.	None.	No Change.	No Change.	The Penderyn Reservoir is unlikely to impact on the proposed development and the proposed development is unlikely to impact on the Penderyn Reservoir. **No change in impact.**

Source	Current Pathway	Current Receptors	Modifications and Mitigation	Likely Pathway	Likely Receptors	Increase or Reduction in Impact
River Camnant	The River Camnant receives water from the stream which runs to the west of the site and accepts treated water from the Hirwaun STW.	The River Camnant flows to the River Sychryd.	Run-off water will be diverted from the stream which flows to the Camnant, reducing the flow from this source, however the overflow from the SUDS storage system will still enter the stream, and treated waste water from the site will re-join the Camnant down stream of the sewage treatment works.	The Camnant will receive less water run off directly from the site via the stream as rainwater will be collected for use in the process. However pre-treated waste water which cannot be used in the process will pass through the STW and will enter the Camnant at the discharge.	Although the pathway will undergo some diversion, the receptor, the River Sychryd will remain the same.	Overall flow to the Camnant from the site will increase through the use of water resources in the process which are then discharged via the STW. There will be **no additional potential for flooding** of the Camnant through the proposals, as the STW must regulate their flow. Passage of effluent from the site, some of which is pre-treated through the site effluent plants, should minimise the reduction in dilution potential of the run off from the present site in the River Camnant, helping to maintain the river quality.

Source	Current Pathway	Current Receptors	Modifications and Mitigation	Likely Pathway	Likely Receptors	Increase or Reduction in Impact
Rainfall	Rainfall across the site currently accumulates due to poor drainage. Rainfall will partially seep to the soil and enter the ground water and will partially enter the drainage channels and ultimately the surface waters.	Movement of ground water is towards the south west. The surface water runs to the River Camnant and on to the River Sychryd.	Approximately 5.4 hectares of the site will be developed to buildings and hardstanding. Rainfall from building roofs will be stored in tanks, whilst surface water runoff from hardstanding will pass via a SUDS system for use in the process. Overflow from the SUDS system will discharge back into the stream and treated effluent from the water treatment systems will be sent to sewer. Proposal to store water in tanks and holding pond enables controlled and suitably managed release.	Pathway of rainfall from landscaped areas remains unchanged. Pathway of rainfall from hardstanding areas is diverted for use in the process. Should the SUDS holding pond reach critical levels, it will first overflow to the stream and, will then be served by the upper permeable bank, removing excess water to soakaway. Quantity of rainwater entering the Camnant directly will reduce, however the volume of treated effluent from the site entering the Camnant after the sewage treatment works will increase.	Although receptors remain unchanged the contribution of rainwater to the ground waters and the stream will reduce due to the reduction in surface area discharging run off directly. Thus the overall ground water levels down gradient of the site will be reduced. Quantities of pre-treated effluent discharged to sewer and therefore the Camnant and Sychryd, will increase, but will be well controlled for volume and quality.	Discharges to ground water and the stream alongside the site will **reduce**, thereby reducing the likelihood of flooding. Discharge will be of un contaminated rainwater only. Overall flow to the Camnant will increase, however discharge from the STW must remain within regulated limits. There will therefore be **no additional potential for flooding** of the River Camnant arising from the proposed operations, than that which may currently be present due to the STW. Additionally, as the process discharge from the Enviroparks site will be pre-treated, the reduction in dilution potential from the diversion of the water should be minimised.

Source	Current Pathway	Current Receptors	Modifications and Mitigation	Likely Pathway	Likely Receptors	Increase or Reduction in Impact
Construction	None	None	Construction sites can impact on water courses through the release of pollution directly to surface waters or indirectly to groundwaters. A site management plan will be implemented and will consider the potential for water pollution. Mitigation measures will include the installation of earth bunds, the use of other bunding and spill protection, emergency response equipment and the early laying of hardstanding areas.	Release to the stream or to permeable ground – this can be exacerbated through piling or excavations.	The stream, and then on to the River Camnant and River Sychryd, or the groundwaters and minor aquifer below the site	The potential impact from the construction process increases, however comprehensive control measures will be implemented to minimise the risk of pollution, and the local surface waters will be inspected on a regular basis.
Site Effluent / Water	None	None	Proposed development will include a holding pond to receive the surface water run off from the hardstanding areas of land. The location of this proposed water feature takes into account the most marshy area of the site and the area through which the Nant Yr Ochain historically ran. The site effluent treatment plants will discharge to sewer.	Water stored in the holding pond will largely be used within the process. Should levels rise, the pond will first overflow to the stream and then to the upper permeable bank to remove water to soak away.	Releases to the stream will flow to the River Camnant. Releases to sewer will also discharge into the River Camnant, which flows to the River Sychryd.	Any discharge will be in line with the capacity of the WWTW, and thus there will be **no change in the potential impact** arising from this source. Volume of water sent directly to surface waters and ground water will **reduce** due to controlled drainage systems, reducing the site's marshy and waterlogged status and the quantity of water flowing from the site to down gradient receptors.

Source	Current Pathway	Current Receptors	Modifications and Mitigation	Likely Pathway	Likely Receptors	Increase or Reduction in Impact
Waste Water	None	None	Waste water will be treated in sequencing batch reactor water treatment plants, to a quality which is at least acceptable for discharge to sewer. Surface water run off from hardstanding areas around the site will pass through interceptors and the SUDS system.	Dirty process water will pass through the site treatment plants, and will discharge to sewer for further treatment by Welsh Water. STW releases to the River Camnant. Surface water run off from higher risk areas around the site will pass through site drains and interceptors before treatment in the SUDS system	Effluent discharged to sewer will pass to the Camnant. Treated surface waters will pass to holding pond and are ultimately used as process water. In the event of elevated levels, some of this water will discharge to the stream and onto the River Camnant, and some will discharge to groundwater via a soak away.	Similarly to the flow from the STW any discharge must be of a suitable quality. Enviroparks will ensure that their treated water at least meets the acceptable standard for the STW, however additionally, Welsh Water will be required to remain within the terms of their Discharge Consent and thus there will be **no change in the potential impact** on water quality from this source through the proposed development than that which is currently present due to the STW.
Accidental Release	None	None	Site process and storage areas to consist of impermeable hardstanding. Secondary containment measures incorporated where required and spills cleared away immediately. Regular review of hardstanding areas to be incorporated into procedures.	None.	None.	Potential for an accidental impact from the site to occur will increase as site is currently vacant and thus no incident is likely, however proposed control and mitigation measures, will result in **little likelihood of an accidental release from the site impacting on water quality.**

MITIGATION

11.142 A summary of the mitigation measures proposed for the development in order to control the potential impacts on water quality and quantity are detailed below:

- Recirculation of process waters where possible and the collection and use of surface water run off;
- Provision of adequate storage for surface water run off, with the provision of tanks for clean roof run-off and a SUDS system with holding pond for other waters;
- Abatement techniques such as interceptors and reed beds to ensure that potentially dirty run-off water is cleaned prior to entering the holding pond;
- Provision of high performance effluent treatment systems to enable the site to re-use water where possible, or to discharge within any potential consent;
- The provision of comprehensive impermeable hardstanding in operational areas, whilst retaining landscaping in non-operational areas;

11.143 Enviroparks will also implement a comprehensive system of management and maintenance procedures in order to ensure that the mitigation measures implemented remain effective and efficient operations.

EVALUATION OF RESIDUAL EFFECTS

11.144 The Enviroparks Hirwaun Ltd development on the Hirwaun Industrial Estate proposes to use a currently empty, brownfield site to co-locate a recycling and commercial operation. The development of the land will convert approximately 5.4 hectares of the seven hectare site to hardstanding or buildings, and thus the water flows from the site will be altered.

11.145 To evaluate the potential impacts of the site and determine whether or not there are any residual effects which should be considered, the following matrices have been applied:

Table 11.14 Significance Matrix for Inherent Flood Risk from the Proposed Development

Significance	Description of Impact
High	Significant flood potential at the site
Medium	Flooding likely at the site
Low	Some evidence of historical flooding at the site
Negligible	No risk of flooding at the site

Table 11.15 Significance Matrix for the Assessment of Water Movement and Water Quality from the Proposed Development

Positive or Negative	Significance	Description of Impact
Negative	High	A significant deterioration in the water or drainage quality of resources on / around the site and / or A significant potential to increase flood risk down gradient of the site
Negative	Medium	A moderate deterioration in the water or drainage quality of resources on / around the site and / or A moderate potential to increase flood risk down gradient of the site
Negative	Low	A small deterioration in the water or drainage quality of resources on / around the site and / or Some potential to increase flood risk down gradient of the site
Either	Negligible	Minimal modification to the flow or quality of water around the site
Positive	Low	A small improvement in the water or drainage quality of resources on / around the site and / or Some potential to reduce the risk of flooding down gradient of the site
Positive	Medium	A moderate improvement in the water or drainage quality of resources on / around the site and / or A moderate potential to reduce the risk of flooding down gradient of the site
Positive	High	A significant improvement in the water or drainage quality of resources on / around the site and / or A significant potential to reduce the risk of flooding down gradient of the site

11.146 The site is considered to have a less than 0.1 % annual probability of river or sea flooding, although the presence of alluvium at the site suggests that the site may have flooded historically and therefore the flood potential is considered to be **low**.

11.147 The land is currently often water logged due to poor drainage. The strata beneath the site is Boulder Clay, which naturally has a low permeability, and thus installing suitably designed, comprehensive drainage at the site will assist in keeping the site free from standing water. It is not thought that the site is in hydraulic continuity with any of the environmentally sensitive areas in the vicinity, and the gradient of water flow is to the south west, whereas each of these sites is located to the north or east. The presence of Bolder Clay across the site will prevent the groundwater in any surface stratum from being in hydraulic continuity with the minor aquifer beneath the site. The conversion of much of the site to hardstanding with controlled drainage will also reduce the quantity of water flowing to surface waters and draining to ground water, thereby reducing the flood potential of down stream or down gradient sources. As such, the development proposal is considered to have a **medium positive** impact on the site.

11.148 The anticipated flow of surface water from the site to the stream which runs to the west, can be assumed to reduce by more than 75 % during normal conditions, as a result of the proposed development. During the re-grading works of the 1990's, low lying areas adjacent to the stream were raised to remove any risk of flooding, however the reduction in potential run off from the site to this water course can only assist in ensuring sufficient defence during high flow events. The reduction of the site's contribution to the stream will also assist in protecting down stream receptors. In times of drought, the reduction of flow from the site will reduce the stream's ability to continue to flow, and a reduced contribution to the River Camnant may result in a reduced water quality of the river downstream of the sewage treatment works. That said, pre-treated effluent from the site will be discharged to the sewage treatment works and may therefore assist firstly in diluting the incoming waste effluent to the works, and subsequently re-contributing to the flow of the River Camnant from the works discharge.

11.149 As the requirements of Dwr Cymru Welsh Water have not been finalised, coupled with the Enviroparks commitment to pre-treat their waste effluent to any required level, the overall impact of the Enviroparks site is considered to range from a **low positive** impact to a **low negative** impact.

11.150 As the only proposed releases from the site are of surface water run off from the landscaped area, the overflow of clean run off from the SUDS system, or the discharge of domestic and treated process effluent to sewer, and these have been demonstrated to have reduced or minimal effects on the potential for flooding or deterioration of water quality, the overall impact of the proposed site on the water quality and flood risk in the area is considered to be **low**.

REFERENCES

1. Planning Policy Wales Technical Advice Note 15: Development and Flood Risk. July 2004. Welsh Assembly Government. ISBN 0 7574 3501 1.

2. Planning Policy Wales. March 2002. Welsh Assembly Government. ISBN 0 7504 2854 6.

3. Rhondda Cynon Taff (Rhondda) Local Plan 1991 – 2006 (adopted 1998)

4. Brecon Beacons National Park Authority. Authority Approved Unitary Development Plan; March 2007

5. Welsh Industrial Estates Corporation. Proposed Development of the Northern Section of the Hirwaun Industrial Estate. Report on Site Investigation. Lab Ref No S/8731. January 1972.

6. 17 Acre Site, Hirwaun Industrial Estate. Interpretive Report on Ground Investigation. Exploration Associates. Report Number 155102. July 1995.

7. Environmental Studies in the Cynon Valley. Mid Glamorgan County Council. (No date).

8. Dwr Cymru Drought Plan.

Chapter Twelve
LANDSCAPE AND VISUAL EFFECTS

INTRODUCTION

12.1 This chapter of the Environmental Statement (ES) assesses the potential landscape and visual effects that may arise within the study area as a result of implementing the proposed development. The assessment presents a summary of the current baseline landscape character and features of the site and the study area, highlights important views towards the site and potential visual receptors that may be affected. It goes on to describe the changes predicted as a result of the proposals, both during construction, and once the entire development is operational. It includes an assessment of the potential changes in the view in winter. The assessment takes into account where appropriate, the inclusion of any identified mitigation measures to address any significant negative effects that are identified.

12.2 The term 'landscape' is used throughout, although the assessment covers both landscape and townscape effects. Where the term landscape is used, it should also be taken to include townscape. The assessment is based on the proposed development as described in chapters 1-4.This consists of a combined recycling, commercial and energy generation 'park' located on previously developed land at the Hirwaun Industrial Estate north of Aberdare. The figures that accompany this chapter are listed below:

- Figure 12.1 Site Location and Context
- Figure 12.2 Landscape Related Designations
- Figure 12.3 Landscape Character Areas
- Figure 12.4 Approximate Boundaries of CCW Landmap Visual and Sensory Aspect Areas
- Figure 12.5 Vegetation, Ridgelines and Public Access
- Figure 12.6 Zone of Visual Influence and Viewpoint Areas
- Figure 12.7 Photographic Viewpoint Locations
- Figures 12.8 – 12.17 Photographic Viewpoints
- Figures 12.18 – 12.22 Photomontage Sheets

CONTEXT

Methodology

12.3 The methodology used for the study is based on the principles and criteria set out in the Landscape Institute and Institute of Environmental Management & Assessment's Guidelines for Landscape and Visual Impact Assessment Second Edition (2002), hereafter referred to as the 'LI and IEMA Guidelines'. The assessment has included:

- Baseline landscape and visual surveys

- Mitigation recommendations
- Identification and assessment of potential landscape and visual effects

12.4 The study area was defined generally by the area within which it could be expected that there may be a view of the site, owing to the topography of the surrounding landscape and location of potential visual receptors. The area extends from Hirwaun Common to the south, as far as the parking and viewing point at Mynydd Beili-glas, to Penderyn to the north, and from the Hirwaun settlement to the east, to Rhigos and Pontneddfechan to the west. The study area, showing the location of the site, and areas and roads mentioned in this chapter is shown on Figure 12.1. The baseline landscape and visual appraisal was based on a desk study and a field survey.

Desk Study

12.5 The desk study included a review of the 1:25,000 Ordnance Survey maps of the area, aerial photographs and relevant designations and planning policies that cover both the Brecon Beacons National Park (BBNP) Authority as well as the Rhondda Cynon Taf (RCT) Borough Council administrative areas. Details of the relevant landscape, townscape and visual policies are set out in Appendix 12.5.

12.6 Data covering relevant designations was also checked via information received from RCT Borough Council and via the Countryside Council for Wales's (CCW) web-based databases. As part of this, the study included a review of level 3 Visual and Sensory Aspect data from the CCW Landmap database, which has been compiled by others in accordance with the Landmap methodology.

Field Survey

12.7 The field survey was undertaken by a chartered landscape architect on 7 and 8 September 2008. The site visit was used to confirm the information arising from the desk study, to appraise any landscape features not already highlighted, and to assess views into and out of the site. By assessing the existing baseline character and views, an assessment could be made as to the predicted changes to these arising from the development.

12.8 The site assessment was undertaken from the following places within the study area:

- The site and its immediate environs
- Roads
- Public rights of way/ open access land areas
- Public and private recreation and amenity areas
- Commercial sites
- Interpretation of assessments from residential properties – taken from the nearest available publicly accessible location.

12.9 During the site visit the weather was mostly dry, but overcast with occasional bright spells. Visibility was changeable and varied from poor, through moderate to good. Photographs for the purpose of the assessment were taken with a high resolution digital camera - Canon EOS 400D (focal length equivalent to 1.6x the focal length of the lens), set

to auto-focus with the lens set to 50mm to give the same perspective as a 35mm SLR set at 50mm.

Proposed Landscape Mitigation

12.10 The description of the proposed mitigation is based on the plan, section and elevation drawings for the development produced by PRC Architects, as well as discussion with them on the proposals including heights of buildings and structures, proposed materials and finishes and treatment of the external areas to the development.

Significance Criteria

12.11 Changes brought by the development on landscape character or views, whether adverse or beneficial, will have different levels of significance depending on their magnitude or scale, the landscape character and sensitivity or tolerance to change, and the visual receptors affected and their sensitivity. The significance criteria used to provide a consistent identification of effects in the assessment are shown in the tables below.

Table 12.1: Landscape character impact significance criteria
(Source: Modification of criteria contained in the Guidelines for Landscape and Visual Impact Assessment Second Edition. 2002).

Significance	*Criteria*
Moderate Adverse	Where the development: • would be a new element in the landscape, but has consistencies with existing landscape characteristics or features by way of its scale, layout, mix or appearance, and is one of a number of elements in the landscape setting, • can be mitigated by the retention or replacement of key features, • is consistent with planning policy relating to landscape, and would result in a recognisable effect on the existing landscape character.
Minor Adverse	Where the development: • would be a minor element in the landscape, • has some consistencies with existing landscape characteristics or features by way of its scale, layout, mix or appearance, and is one of a number of elements in the landscape setting, • can be mitigated by existing landscape features such as vegetative screening, • is consistent with planning policy relating to landscape and would result in a barely perceptible effect on the existing landscape character.
Negligible / None	Where the development would form none or only a minor component within the landscape, and would have an insignificant effect on landscape character.

Minor Beneficial	Where any changes arising from the development would result in a slight enhancement of the landscape character.
Moderate Beneficial	Where any changes arising from the development would result in a moderate enhancement or improvement in the landscape character.
Major Beneficial	Where any changes arising from the development would result in a substantial enhancements or improvements to the landscape character.

Table 12.2: Visual impact significance criteria – Visual receptors with a higher sensitivity to visual change
(Source: Modification of criteria contained in the Guidelines for Landscape and Visual Impact Assessment Second Edition. 2002).

Significance (Adverse or Beneficial)	*Criteria*
Major	*Where the development would form a dominant feature and immediately apparent part of the scene that affects and changes its overall character and therefore the view.*
Moderate	Where the development would form a visible and recognisable new element within the scene and may be readily noticed by the observer. The development may be one of a number of other elements in the view.
Minor	*Where the development would be a minor component of the wider view and may be missed by the casual observer – awareness of the proposals would not have a marked effect on the scene.*
Negligible	Where none or only a very minor part of the development would be discernable, or is viewed from a distant location, so that it would be scarcely appreciated and on balance, would have little effect on the scene.
No change	Where no part of the development would be discernable.

Table 12.3: Visual impact significance criteria – Visual receptors with a lower sensitivity to visual change
(Source: Modification of criteria contained in the Guidelines for Landscape and Visual Impact Assessment Second Edition. 2002).

Significance (Adverse or Beneficial)	*Criteria*
Moderate	*Where the development would form a dominant feature and immediately apparent part of the scene that affects and changes its overall character and therefore the view.*

Minor	*Where the development would form a visible and recognisable new element within the scene and may be readily noticed by the observer. The development may be one of a number of other elements in the view.*
Negligible	*Where the development would be a minor component of the wider view and may be missed by the casual observer – awareness of the proposals would not have a marked effect on the scene.*
No change	*Where no part of the development would be discernable.*

Scale or Magnitude of Visual Effects

12.12 The evaluation of the effects on views and visual amenity has taken into account the scale or magnitude of change as defined in the LI and IEMA Guidelines. These are set out below:

- *'The scale of change in the view with respect to the loss or addition of features in the view and changes in its composition including the proportion of the view occupied by the development;*
- *The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line, height, colour and texture;*
- *The duration and nature of the effect, whether temporary or permanent, intermittent or continuous, etc;*
- *The angle of view in relation to the main activity of the receptor;*
- *The distance of the viewpoint from the proposed development;*
- *The extent of the area over which the changes would be visible.'*

Assessment of Landscape Character and Sensitivity

12.13 The LI and IEMA Guidelines indicate that analysis of the baseline landscape and effects on it requires an understanding of landscape character and characterisation, condition or quality and landscape value as well as its sensitivity. Reference is made to the Countryside Agency's 'Landscape Character Assessment Guidance' to analyse the way in which the various components of the landscape interact to create its distinct character and unique sense of place. Condition refers to the state, quality or integrity of the landscape and the elements or features that are a part of it. Value is a judgement placed on the landscape. At policy level, this may be through designation, but at the local level, a community may value an undesignated landscape due to its physical or visual amenity.

12.14 The criteria for evaluating character, quality, value and sensitivity, on a scale of High, Medium or Low that have been adapted from criteria set out in the Guidelines for Landscape and Visual Impact Assessment are set out in Appendix 12.2.

12.15 A broad overview of the main character areas of the site is described based on the field survey, together with an assessment of character, quality, value and sensitivity based

on the criteria described above. More specific details about the character, condition, value and sensitivity of the landscapes has been derived from existing data available from CCW Landmap. Landmap sets out methodologies for each aspect of its mapping process, including the visual and sensory aspect. The visual and sensory methodology was updated in 2008, however, since the assessments of the aspect areas were carried out previous to this, a copy of the previous Landmap 2003 visual and sensory methodology is included in Appendix 12.3. It states that the methodology is similar to the Landscape Character Approach used in England and Scotland, '*to map what is perceived through our senses, primarily visually, from the physical attributes of landform and landcover to their visible patterns of distribution and their consistent relationships in particular areas*'. An objective approach is taken by using consistent definitions, methods of assessment and wording for each area. Visual and sensory 'aspect areas' are defined through desk study and then refined by field assessment. They are classified in a hierarchy from levels 1 to 4 according to the level of detail of the captured data, with level 1 being the least detailed.

12.16 Technical Reports or Annexes set out the justification and explanation of the decisions for the visual and sensory aspect. The landscape areas surrounding the site are mainly located within the Bridgend/ Caerphilly/ Rhondda Cynon Taf Technical Report area. Outlying or more distant areas from the site are included within the Neath Port Talbot Technical Annex and Brecknockshire Technical Annex. The reports list the level classification and evaluation for the aspect areas located within the study area. Copies of the reports are included in Appendix 12.4.

12.17 The data captured for each aspect area includes elements such as landcover and topography, and qualities such as diversity and scale is recorded on standard forms. The data capture form includes an overall summary description of the aspect area, together with management recommendations such as conserve, enhance or change. In addition, an 'evaluation matrix' makes judgements about the evaluation criteria that are scenic quality, integrity, character and rarity, and then combines these to give an 'overall evaluation'. The Landmap methodology scale for scoring this evaluation is shown below. Copies of the Visual and Sensory Aspect Area data capture forms that cover the study area are included in Appendix 12.7.

Table 12.5: CCW Landmap visual and sensory definitions for evaluation criteria
(Source: Adapted from the Countryside Council for Wales' LANDMAP Information Visual & Sensory guidance methodology 2003).

Evaluation	*Definition*
Outstanding	Of international or national importance to the Aspect
High	Of regional or county importance to the Aspect
Moderate	Of local importance to the Aspect
Low	Of little or no importance to the Aspect
Unknown	Insufficient information exists to evaluate this Area

12.18 There is an option to include 'tolerance to change' as part of the data capture, however the subject area is under review, and it has not been recorded for the aspect areas within the study area for this development proposal. It is stated that the likely defining factors will be:

- *'The intrinsic capacity of the landscape to absorb development through characteristics such as scale, topography and presence of vertical elements.*
- *The sensitivity of the landscape derived from its perceived value or the presence of sensitive viewpoints.*
- *The magnitude of the effect of development derived from its scale and extent.'*

Visual Assessment

12.19 Due to the large scale of the landscape of the study area, variable topography including areas of open high ground, and presence of large areas of vegetation, the desk study alone could not identify all of the areas from which the site may be visible. A visual assessment was carried out on site to determine the locations of the visual receptors within five viewpoint areas as shown on Figure 12.6 and listed below:

- Site Environs
- Brecon Beacons National Park
- Hirwaun
- Hirwaun Common
- Rhigos

12.20 The visual receptors within these viewpoint areas include users of roads, occupiers of residential and commercial properties, and users of public rights of way and open access land as defined by the Countryside and Rights of Way Act (2000). Nine of the visual receptor locations within these areas were chosen on the basis of a request from Members of Rhondda Cynon Taf Council that these were checked for any potential views of the proposed development. These were given as:

HIRWAUN WARD – from:

- Rhigos Road
- The nearest residential property
- Mount Pleasant Inn pub
- The Fairview estate (residential)
- The Welfare Ground

RHIGOS WARD – from:

- The houses on Halt Rd
- The new hotel near the industrial estate
- Rights of way
- The nearest bus stop

Sensitivity of Visual Receptors

12.21 The criteria for assessment of sensitivity of the visual receptors are shown in the table below. The sensitivity arises from a combination of the type of receptor as well as their location, for example, views from a designated landscape have a greater significance than those from a landscape with a lower value assessment.

Table 12.6: Sensitivity of visual receptor
(Source: Adapted from the Landscape Institute and Institute of Environmental Management & Assessment's Guidelines for Landscape and Visual Impact Assessment Second Edition. 2002).

Sensitivity	*Definition*
High Sensitivity	Views of or from within valued/ designated landscapes Views from public rights of way or access land Views from residential properties
Medium Sensitivity	Views from sports and recreational facilities Views from commercial properties with residents, namely hotels
Low Sensitivity	Views from roads Views from commercial/ employment sites including public houses

Assessment of residual effects

12.22 Residual effects have been assessed on the assumption that all of the mitigation measures described have been implemented, and that the proposed landscape structure planting has been successfully established, is subject to regular maintenance and management, and is achieving the objectives for which it was proposed.

Scope of the landscape and visual assessment

12.23 The assessment has been based on the proposed development designed by PRC architects and other technical specialists. The main features of the proposed development are described in detail earlier in this Statement and summarised in Section 12.4. Four flare stacks are proposed on the site. The assessment is based on the understanding that the flare stacks would have the flame contained within a cowl and would therefore run 'clean'. The proposals include one stack up to 40m in height and 2.5m diameter that would enclose 3 flues. It is understood that there is a possibility that some dark smoke may be emitted at the very start up of the diesel tallow engines, however technical design details would be incorporated to minimise this. In addition, it is possible that in very cold weather, there may be some condensation in the plume that would be seen some distance from the stack. It is understood that this would be infrequent and seen as a thin steam plume. When the red light of sunrise or sunset shines through this steam plume, it may appear black in colour. The assessment of the landscape and visual effects are based on the stack structures themselves rather than any possible short-lived emissions.

12.24 Consideration of any potential effects from lighting has been considered based on discussions regarding a preliminary lighting design prepared by Pell Frischmann. It is understood that the site will operate 24hours, seven days a week, and at all times between dusk and dawn there would be a requirement to light parts of the development to allow safe access to working areas. However, specific details regarding the operation and use of the site are subject to further design and discussion, and would determine the lighting requirements around the site. As such, the assessment has been based on the current available information. It is understood that lighting would be designed such that there would not be any significant spillage of light from the development or light pollution, and possible measures are set out in the mitigation chapter.

BASELINE CONDITIONS

Planning Policy

12.25 The relevant national and local policy documents and guidance that have been have been taken into consideration are listed below. Details of the main aims and objectives of each are then set out in Appendix 12.5.

- Welsh Assembly Government. Planning Policy Wales (2002), Technical Advice Note 12: Design
- Brecon Beacons National Park Authority Local Plan (Adopted May 1999)
- Brecon Beacons National Park Authority Unitary Development Plan (Approved April 2007)
- Brecon Beacons National Park Authority Draft Management Plan 2009-2014 (2008)
- Brecon Beacons National Park Authority Walking Tourism Strategy (undated)
- Rhondda Cynon Taf County Borough Council. Mid Glamorgan (Rhondda RCTCB) Replacement Structure Plan 1991-2006 (Adopted January 1999)
- Rhondda Cynon Taf (Cynon Valley) Local Plan (Including Waste Policies) 1991-2006 (Adopted January 2004)
- Rhondda Cynon Taf Community Plan 2004-2014

12.26 The main policy themes emerging from these documents and relating to the landscape and views are:

- The Brecon Beacons National Park is a landscape valued at an international, national, regional and local scale and is designated because of its special qualities. These include sensory and visual aspects, as well as geological, nature conservation and cultural heritage factors. Development should not compromise the integrity of these features, nor the opportunity for enjoyment of them by residents, workers or visitors to the Park.
- Parts of the Cynon Valley including Hirwaun Common to the south of the site are designated as a Local Landscape Area, by virtue of their special landscape features, geology, natural and cultural heritage and should be protected from adverse effects from development, including effects on the use of the landscape for leisure purposes.

- The special features worthy of retention in both the designated and non-designated landscapes and built-up areas contribute to a high quality of life in the locality and in particular in the National Park, and protection and enhancement of these features are an important factor in contributing to the aims of sustainable development.
- Particular consideration should be given to the potential effects of development on landscape character. Views from the protected landscapes are of significance in any proposals for development, whether these are to be located within or outside the boundaries of these landscapes.
- Policies recognise that landscapes are subject to change. Through sensitive, contextual design that responds to and reinforces locally distinct patterns and forms of development, it is possible to moderate the effects of development on landscape and views. This would include careful consideration of aspects such as siting, appearance, form, scale and massing, relationships between buildings and spaces, existing and proposed natural features, boundary treatments, and relationships to surrounding areas. Innovative and contemporary design can contribute to these aims.

Designations

12.27 The site lies in part within the Brecon Beacons National Park, and the boundary is shown on Figure 12.2 Designations. Designated in 1957, the statutory duties of the Park Authority are set out below:

- Protect the natural beauty of the Park
- Help visitors enjoy and understand it
- Foster well-being of local people.

12.28 The National Park is also designated as a Category V landscape by the International Union for the Conservation of Nature and Natural Resources (IUCN). Category V is defined as:

'An area of land and/ or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.'

12.29 The remainder of the site falls within the administrative boundary of Rhondda Cynon Taf (Cynon Valley) Borough Council. The site is allocated for the development of industrial uses in the local plan documents for both planning authorities. Further detail is set out in Appendix 12.5, and other chapters of the Environmental Statement.

12.30 Land to the north of the site within the Brecon Beacons National Park, is also located in the 'Fforest Fawr' (Great Forest) Geopark. A Geopark is an area where the geological heritage is considered to be of European significance and will have a sustainable development strategy with a strong management structure. It comprises a swathe of upland country that includes mountains, moorlands, woods, meadows, waterbodies and settlements. Covering around 300square miles of land in the western half of the park, it stretches as far south to the edge of Merthyr Tydfil, east of the site. The Fforest Fawr Geopark is a

partnership between the Park Authority, British Geological Survey and Cardiff University.

12.31 A large area of land to the south of the site is designated as a Local Landscape Area in recognition of its landscape and cultural heritage features including former mining activities. RCT Local Plan policy seeks to protect the special qualities of this area and ability for people to enjoy these qualities. Further detail on the policy is given in Appendix 12.5.

12.32 RCT Borough Council has confirmed in a telephone conversation that there are no trees subject to tree preservation orders (TPO) on the site or in immediately surrounding areas including on the Industrial Estate. There are several TPO trees in Hirwaun and there are TPO woodland areas at Pontbren Llwyd and south of the A465 near Pontneddfechan. These are shown on Figure 12.2 Landscape Related Designations.

12.33 There are a number of sites within the study area that have protection at international and national level due to their nature conservation, biodiversity or geological value. These are shown on Figure 12.2. The nearest designated area is Blaen Cynon peat bog located approximately 150m to the east of the site adjacent to the existing industrial units, which is designated a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC). Several other SSSIs and SACs are located at least 1km from the edge of the site. Further designated areas include a National Nature Reserve located around 2km north of the site, and Country Park around 3km to the southeast. The study area contains a number of National Monuments of Wales. There a limited number of listed buildings located in areas to the northeast of the site and within Hirwaun. Details regarding the nature conservation and cultural heritage features of the site are set out in the relevant chapters within this Statement.

12.34 Existing planning policy for the Brecon Beacons National Park and the Draft Management Plan make reference to a 'Section 3 Conservation Map' showing areas of mountain, moor, heath and woodland that are particularly important to conserve. A copy of this map was requested from Brecon Beacons National Park Authority but was not made available at the time of writing.

Site Location and Setting

12.35 Figure 12.1 Site Location and Context shows the location of the site together with major landscape features, roads and settlements within the study area. A view of the site from the southern edge of Penderyn Reservoir is shown in Photographic Viewpoint 1, Figure 12.8. The locations of individual properties around the study area are shown on Figure 12.6 Zone of Visual Influence and Viewpoint Areas.

12.36 The site is situated on the existing Hirwaun Industrial Estate just west of the small settlement of Hirwaun. The site consists of previously developed land, formerly used as an Ordnance factory. It is now grassed over and crossed by a network of herringbone drains that show as gravel 'lines' across the site. The site is bound to the south by Fifth Avenue and to the east by Ninth Avenue and sits below the level of these roads. There are large industrial units are located along Fifth Avenue and Ninth Avenue. A public footpath runs along the north edge of the site, which is screened by a belt of woodland and is contained to

the north by the steep embankment that retains Penderyn Reservoir. A stream runs along the north side of the footpath and then turns to cross the north-western corner of the site. The stream would be diverted around the edge of the site as part of the scheme proposals. To the west of the site there are small fields edged with hedge, tree and shrub vegetation that separate the site from the farmhouse and out-buildings at Tai-cwplau.

Access and local roads

12.37 The site is accessed from the A465, which runs parallel to Fifth Avenue to the south and bisects the Industrial Estate. The principal means of access from the A465 to the Industrial Estate is via the roundabout at the junction of the A465, A4059 and A4061 located just west of Hirwaun. The A4061 travels south from the junction towards Hirwaun Common and the Rhondda valleys to the south, while the A4059 travels north towards Penderyn and Pantecefnffordd and beyond into the Brecon Beacons National Park.

Topography

12.38 The site is located in a valley that is oriented approximately north-west to south east. The site lies at around 200m AOD. To the south and north of the site, the land rises dramatically toward major ridgelines at Hirwaun Common (around 500m AOD, 3-4km south of the site) and the lower hills of the Brecon Beacons National Park (around 300m-350m AOD), 2-3km northwest and northeast of the site. The landscape within the valley and on its side slopes has many subtle variations in topography, with minor hills and man-made landforms creating minor ridgelines. The major and minor ridgelines are shown on Figure 12.5, together with the principal areas of vegetation around the study area.

Vegetation

12.39 The site itself is grassed, with patches of rushes, occasional scrub and small groups of planted trees. A belt of mixed native planting is growing along the western boundary of the site. This would be removed and replaced with new planting as part of the scheme proposals. The Hirwaun Industrial Estate is enclosed by mature vegetation, including dense areas of mature conifers. Within the study area, there are large areas of deciduous woodland, particularly to the north and northeast of Penderyn Reservoir and within the river valley that leads from the Brecon Beacons towards Pontneddfechan to the west. In addition, within the study area there are extensive coniferous plantation forests, particularly on the upper slopes of the valley to the north and south. Most of the countryside areas are grassed, with pasture land generally located on the lower valley slopes and rough grassland with occasional scrub on higher ground and more exposed areas, parts of which are also grazed.

Watercourses

12.40 The main watercourses that flow through the study area are indicated on Figure 12.3, but these are not a prominent feature in views of the landscape around the site. Similarly, networks of ditches and small streams around the fields are a minor or negligible part of the view. In contrast, large waterbodies such as the Penderyn Reservoir are easily detected in the landscape, due to reflection of the surface, and act to a degree as orienteering landmarks in the landscape.

Colour

12.41 There is a variety of colour in the landscape, arising to a large extent from the wide variety of vegetation types, which themselves are a reflection of variations in for example, topography, geology, microclimate and human management. Overall, the colours include a range of dull yellows, greens and browns from light to dark tones. Bright colours are infrequent and where these occur, are visually prominent, such as the mown grassed edges of Penderyn Reservoir. In winter, areas of grass turn to a wheat colour, deciduous woodland appears brown, and areas of bracken appear brown or reddish brown.

Public rights of way and open access land

12.42 In May 2005 the Countryside and Rights of Way Act (CROW) came into force, clearly identifying open access land in Wales, where the Act created new rights for people to walk on areas of open country, registered common land and public forests.

12.43 As part of the CROW Act, the Countryside Council for Wales worked with landowners, tenants and other interested parties to produce accurate maps of all open access land, and these are now available to view on their website. The public rights of way, including footpaths, bridleways, national trails, and national cycle routes, as well as areas of open access land in the study area are shown on Figure 12.5. There are no public rights of way or open access land located on the site itself. One public footpath runs along the northern edge of the site, beyond the site boundary. There are large areas of open access land on the upper valley slopes of the National Park and around Hirwaun Common to the south of the site.

Landscape character assessment

12.44 Review of the RCT local plan highlighted the document 'Landscape Strategy for Rhondda Cynon Taf'. The Final Draft of Volume 1, 'Vision and Strategy' was produced in January 2008, and describes the key issues and features of Rhondda Cynon Taff and sets out 'visions' for the future. Extracts from volume 1, describing character areas for parts of the study area around Hirwaun and to the north and west of the town have been received from Rhondda Cynon Taf Borough Council. It is understood from telephone discussions with the Council that the work has largely been superseded by the CCW Landmap process; however the document provides useful descriptive references of local landscape character. Comments within the document include:

- *'Ensure proposed development is sympathetically located and designed in relation to the surrounding landscape.*
- *New industrial and commercial buildings should be in scale with the landscape and the colour of building materials is in keeping with the surrounding landscape. Any bright and reflective colours will be particularly intrusive.*
- *Selective views from major roads should be encouraged such as major employment sites set in an attractive and prosperous landscape or views of distant hills.*

- *Exposed industrial areas integrated into the surrounding landscape through tree planting.'*

12.45 An appraisal of the landscape character of the study area was undertaken as part of the assessment of effects. This determined a number of broad character areas which are illustrated on Figure 12.3 and described below. An assessment of the landscape quality, value and sensitivity has been made for the areas, in accordance with the evaluation criteria set out in Appendix 12.2. Outlying areas around Pontneddfechan, to the north of Hirwaun, the Dare Valley Country Park and the area around Craig Hendre-fawr to the southwest were not visited as it was determined that any landscape and visual impacts for these areas would not be significant due to the distance from the site. However, where these areas could be seen from surrounding areas a general description is given. These areas have not been assessed for the purposes of this report. Within the character areas there is local variation, and this is reflected in the visual and sensory aspect areas defined by CCW Landmap. Extracts of the key elements of the aspect areas that are shown on Figure 12.4 is also set out in Table 12.7 below.

'Urbanized Valley' Landscape Character Area

12.46 The valley within which the site is located is predominantly urbanized, containing the main concentrations of transport infrastructure, large scale employment areas, settlements and routes of overhead power lines. The mixed planting in these areas includes roadside planting on steep embankments, small wooded areas and large areas of conifer screen planting. Hirwaun is the main settlement within this area, and is set below the level of the roads that constrain it. It is mainly residential with a small commercial centre. Hirwaun RFC rugby club grounds are located south of the town alongside the A465, and together with an adjacent equipped children's playground, are mostly enclosed by planting at the boundaries and alongside the road. Hirwaun Industrial Estate is the dominant feature of this urbanized valley landscape and is prominent in views from surrounding areas including designated landscapes, particularly where buildings have been constructed with very light coloured roofs.

Landscape quality: **Low/ Medium**
Landscape value: **Low/ Very Low**
Landscape sensitivity: **Low**

12.47 There is a distinct edge to this urbanized valley character area, beyond which the landscape becomes distinctly rural in character, with broad open landscapes, wooded areas, pasture land, minor settlements and narrow winding roads. Subsidiary valleys cross the main valley side slopes and are frequently well vegetated with deciduous woodland, while the open slopes of the hills both to the north and south include extensive areas of plantation forest.

'Lower valley slopes with urban and industrial influences' Landscape Character Area

12.48 To the south of the urbanized valley on the lower valley slopes, the rural character is interrupted by visually prominent industrial areas including workings of the Tower Colliery.

There are other areas of this landscape where the colour, texture and shape of landform indicate former mining activities. Field sizes on the southern lower valley slopes are generally larger than areas on the northern lower valley slopes and are bound by hedges, with limited areas of woodland. The main settlement is the village of Rhigos to the west. Along the local roads around Rhigos there are occasional individual properties, and a small concentration of dwellings at Cefn Rhigos to the northwest. Rhigos is easily distinguished in views of the landscape from wider areas, including from designated areas. The country park to the southeast is a managed landscape.

Landscape quality:	Low/ Medium
Landscape value:	Medium
Landscape sensitivity:	Low/ Medium

'Wooded countryside with scattered settlement' Landscape Character Area

12.49 To the north of the urbanized valley, the landscape of the lower valley slopes is distinctly more wooded, with an irregular field pattern of mainly small to medium sized fields. The woodland provides a considerable degree of visual screening to the small settlements and individual properties located within this area. The main concentrations of residential properties are at Penderyn and Pontbren Llwyd, with other settlement comprising small groups of dwellings or individual properties, including some farmhouses.

Landscape quality:	Medium/ High
Landscape value:	High
Landscape sensitivity:	High

'Open countryside' Landscape Character Area

12.50 The open countryside landscape areas are distinct from the lower valley slopes and wooded countryside in the lack of urbanization. Over much of the area this is a consequence of the steep and rugged slopes, and/ or planning controls in designated landscapes. Those areas that are more open in nature, but are located on lower ground are also included in this character area. The colours of the open countryside landscape areas are distinctly less strong and bright, and there is a strong rural character and in places a sense of 'wilderness', even where these are located close to areas with urban elements. The changing patterns of weather are particularly notable in these areas, for example through mists seen passing over the summits of hills, views of large 'heavy' skies, or the sense of exposure when walking through these landscapes. The higher slopes within the open countryside areas afford extensive views across many kilometres of the landscape, and offer an appreciation of the varied natural and cultural heritage of this part of Wales.

Landscape quality:	High
Landscape value:	High/ Exceptional
Landscape sensitivity:	High

'Plantation and mixed forest' Landscape Character Area

12.51 The plantation and mixed forest areas comprise extensive blocks of trees grown for commercial purposes. Plantations describe exclusively coniferous areas, while mixed forest may include a proportion of deciduous trees. These areas appear very dark, almost black in the landscape, particularly when compared with the surrounding open grasslands, and have sharp, square edges, unlike the woodland areas, that are not necessarily congruous with the contours of the slopes on which they are located. Nonetheless, the forests are a regular feature of the wider landscape and some local value may be placed on their loss, in terms of loss of a characteristic feature.

Landscape quality: Medium
Landscape value: Medium
Landscape sensitivity: Medium

Extracts from CCW Landmap visual and sensory aspect areas

12.52 The CCW visual and sensory aspect areas within the study area are listed in Table 12.7, and include the summary description and overall evaluation. The general boundaries of these areas are shown on Figure 12.4. Copies of the full Landmap data capture forms are included in Appendix 12.7.

Table 12.7: Extracts from CCW Landmap visual and sensory aspect areas captured data

CCW Landmap Visual and Sensory Aspect Area and Summary Description	*Overall Evaluation (with reasons)*	*Management Recommendation/ Guidelines*
Bridgend/ Caerphilly/ Rhondda Cynon Taff		
Cynon VS 735 – Cadair Fawr Dramatic landscape of rough grazed grassland with rock outcrops and some marshy areas lying between approximately 300m and 485mAOD. Wind noise is a dominant aesthetic factor which evokes particular experience of exposure and wildness. Spectacular upland views dominated by large expanse of sky/ clouds. Strong visual link with Brecon Beacons	**High** Attractive largely unspoilt upland area with strong sop and good views.	**Grazing Management** Medium Term: Prevent overgrazing
Cynon VS 833 – Penderyn Upper valley sides with strong upland feel- both from the strong visual link that exists and the rough grazing with some woodland/conifer elements. Slight urban	**Moderate** Valley sides with pattern of field boundaries/woodland, but detractive elements e.g. urban edge, pylons traffic noise, of	**Prevent Overgrazing** Immediate: soften urban edge Medium Term: restrict pylons & reduce impact

CCW Landmap Visual and Sensory Aspect Area and Summary Description	Overall Evaluation (with reasons)	Management Recommendation/ Guidelines
feel on lower slopes but dominant character is that of an upland area. Visual detractors include pylons and the sharply defined urban edge. Noise and movement from the A465. Scattered farmsteads	local importance.	of A465 e.g. planting
Cynon VS 522 – Aberdare Urban development in floor of relatively wide valley. Range of built form creates visual complexity e.g. houses/industrial estate/spoil heaps. Some views out to neighbouring upland areas provide a partial antidote to the unattractive built environment and contribute to its sense of place within the wider upland setting. Background traffic noise from A4059.	**Low** Without any positive visual and sensory qualities, this urban area with remnants of past mining industry has little or no importance. The views out to the adjacent upland areas are the only limited visual quality, and these are usually compromised by an element of built form.	**n/a** Medium Term: careful development control to limit housing/urban sprawl
Cynon VS 368 – Open Cast area of opencast mining	**Low** No qualities of distinction apart from a relative amount of rarity.	**n/a**
Cynon VS 430 – Hirwaun Common Dramatic landscape of rough grazed grassland with rock outcrops and some marshy areas lying between approximately 200m and 515mAOD. Wind noise is a dominant aesthetic factor which evokes particular experience of exposure and wildness. Attractive upland views within and attractive rolling terrain to north. A475 is a visual detractor.	**High** Attractive largely unspoilt upland area with strong sense of place and good views.	**Grazing Management** Long Term: prevent over grazing
Cynon VS 580 – St Gwynno Upland landscape dominated by coniferous forest with small areas of rough grazing/open land interspersed. Strongly defined undulating topography with ridges and valleys creates a multi-scaled landscape with a variety of spaces. Limited views out to upland areas. Some car/refuse dumping minor eyesore/visual detractor.	**Moderate** Fairly typical upland plantation with moderate sop and limited views, mainly from higher open areas.	**Introduce broadleaf woodland mix** Immediate: Broadleaf planting along edge/stream course Medium Term: Maintain open spaces
Cynon VS 890 – Craing Nantmelyn Lower slopes to the east of Hirwaun Common. Generally grazing land with	**Moderate** No single defining feature of regional importance to justify	**Land management (grazing, bracken control)**

CCW Landmap Visual and Sensory Aspect Area and Summary Description	Overall Evaluation (with reasons)	Management Recommendation/ Guidelines
bracken and small scattered clumps of woodland. Open character and more upland feel is tempered by urban edge presence to north (Penywaun). Views similarly polarised into upland to south west and urban to north east. Some more distant upland views to north past Penywaun however.	more than local importance. Scenic quality and integrity both reduced by the presence of urban areas.	Medium Term: limit urban spread up valley sides, reduce well defined edge
Brecknockshire		
BRCKN VS 876 – Nedd Fechan and Mellte Valleys The pastoral upland valleys of the Mellte and Nedd Fechan run south from the upland massif of Fforest Fawr cutting through the limestone upland. Between them is a low ridge which has rock outcrops and common land in places. This area is more open with larger fields and little woody vegetation. The landcover is dominated by pasture with riparian deciduous woodland, particularly on steep slopes, and grown out hedgerows, all of which contribute to an enclosed, sheltered landscape. Some of the woodlands are grazed, eliminating understorey and allowing clear views. Rectilinear blocks of coniferous forest lie on the upper slopes below Fan Llia and Fan Nedd. Occasional conifers associated with dwellings reinforce the upland character. Settlement is mainly scattered farmsteads. Ystradfellte and Pontneddfechan are the only settlements, nestling in the valley floor of the Mellte and Nedd Fechan respectively. The latter has crept up the hill with suburban housing which is out of character. The main interest in the area is focussed on the rivers with their associated waterfalls and limestone caves. The river courses are rocky and have strong riparian vegetation. Visitors focus on these areas for walking and caving	**Outstanding** The valleys have a high scenic quality through their unspoilt upland pastoral mosaic character. The main interest is in the river courses with their superb landscape of rocky beds, waterfalls and caves in a woodland setting. The area is known as Waterfall Country and has a strong sense of place. It is well visited for the beauty of the countryside as setting for the waterfalls which indicates consensus on value. The area is generally of consistent character.	**Conserve river corridor, deciduous woodland and hedgerows** Medium Term: manage river corridor to minimise impact of visitors on river, rocks and vegetation & conserve/manage woodland cover avoiding grazing of woodland floor & conserve/manage hedgerows, laying where appropriate Immediate: restrict growth of settlements

CCW Landmap Visual and Sensory Aspect Area and Summary Description	Overall Evaluation (with reasons)	Management Recommendation/ Guidelines
BRCKN VS 911 – Gwaun Hepste A significant area of coniferous forestry, some relatively immature and some already felled on a ridge between Mellte and Hepste Valleys. A small part of the coniferous forest lies west of the Mellte. The plantations are dominated by spruce but have some other species such as larch and are somewhat monotonous, visually. They form an abrupt edge against the adjoining pasture. The cleared areas are unsightly. The deciduous woodland of the Mellte Valley is very attractive. The river with waterfalls and rocky course is very attractive and is used by cavers and others for recreation. There are paths through this area and the coniferous woodland.	**Moderate (Mellte Valley is outstanding)** The forestry plantation is consistently managed and has consistent character with integrity. It is dominated by a single species which leads to monotony visually. The Mellte Valley is covered with deciduous woodland focussing on the impressive water falls and rocky channel. This area is of outstanding/high value.	**Diversify tree species in coniferous plantations especially in publicly accessible areas** Medium Term: selectively fell conifers over time and diversify especially on edge & manage deciduous woodland to encourage regeneration/diversity
BRCKN VS 597 – Coed-y-Rhaiadr An extensive area of coniferous plantation dominated by spruce with some larch. The area covers previously enclosed land and there is a central area of rough pasture which is still retained with two dwellings. The area acts as simple backcloth to Nedd Valley. Within the lower part of the Nedd Valley there is deciduous woodland with waterfalls on the river. There is public access and this is a popular visitor attraction serviced by car parks to the south and north.	**Moderate** The forestry plantation is consistently managed and has a consistent character with integrity. It is dominated by a single species which leads to some monotony visually. The Nedd Valley lower area is covered with deciduous woodland focussing on the river with impressive waterfalls and rocky channel. This area is of outstanding quality in all categories.	**Diversify tree species creating more interesting edges in particular** Medium Term: selectively fell conifers overtime and diversify species especially on edge & manage deciduous woodland to encourage regeneration and Diversity & manage recreational routes to encourage access without damage to river/woodland.
Neath, Port Talbot		
NPT VS 430 – Gelliceibrun/ Pont Walby Both sides of Neath valley east of Glynnedd, deeply cut with minor valleys. The areas are heavily wooded with enclosed areas of pasture, boundaries of	**Moderate** Heavily wooded pastoral landscape with an intimate scenic quality. Although there has been some disturbance in	**Maintain deciduous tree cover** Medium Term: reinstate hedges, lay and replant gaps &

CCW Landmap Visual and Sensory Aspect Area and Summary Description	Overall Evaluation (with reasons)	Management Recommendation/ Guidelines
which are predominantly grown out hedges. The deciduous cover gives a more sheltered, settled feel than much of the surrounding area. The woodland hides evidence of workings to the south west. There are scattered settlements throughout the area and only minor roads and footpaths. Deciduous woodland contrasts with surrounding land cover - moorland/ coniferous plantations. This area appears run down with areas of encroachment of bracken and scrub.	areas, deciduous cover helps maintain a constant character throughout the area. To the east, in the Nedd Fechan valley, a series of waterfalls attract visitors, confirming the scenic quality of the area.	maintain grazing regime & control bracken
NPT VS 962 – Mynydd Nant y bar/ Mynydd Blaenafan Large area of undulating plateau running across the high ground between the Afan valley and Neath valley to the east of county borough. Rising from approx 50m AOD in Neath valley to 600m AOD. Numerous small valleys provide added topographical interest to this landscape which the conifers emphasise and add drama to. The area is almost entirely covered with coniferous plantation, mainly spruce, with larch which leads to a monotonous cover on the plateau tops. There are some areas of open ground and exposed rock, primarily at summits or steeper ground. There are no roads or settlements in this area although the Coed Morgannwy Way which almost dissects the area and provides access along a long distance trail. In many areas the abrupt forest edge sits uncomfortably with the surrounding open landscape. Cleared areas of forest are unsightly.	**Moderate** Area of forestry is consistently managed and contains numerous landscape features, exposed rock and open upland, which add to the aesthetic quality of this area. The edges and skyline against the Afan and Neath valley complement the valleys' characters.	**Vary composition of woodland to increase visual variety – larch/deciduous** Medium Term: enhance landscape features within forestry by selective thinning and felling & maintain open heath and exposed rock.

Visual Assessment

12.53 From each visual receptor location within the viewpoint areas, the visual assessment gathered data on the context of the existing view, whether there are any views towards the site, and whether it would be likely that the receptor would have a view of the proposed development. Within these areas, some of the receptor viewpoints indicate that the proposals would not be visible from certain areas.

12.54 A summary of the existing views from each of the five viewpoint areas shown on Figure 12.6 is set out below. Appendix 12.8 sets out details of each of the visual receptors assessed within each viewpoint area including their distance from the site and sensitivity, and where relevant refers to the relevant Photographic Viewpoints. The visual receptors that are roads or places are located on Figure 12.1 Site Location and Context. Footpaths, areas of CROW open access land and significant areas of vegetation are shown on Figure 12.5, while specific properties are located on Figure 12.6. The information has been used to undertake the impact assessment in section 12.5.

Existing views around the study area – Viewpoint Area 01 Site Environs

12.55 The area includes the local and major roads to the south and west of the site, residential and commercial properties located along them, and one public footpath that passes along the northern edge of the site. These areas are located in the lowest parts of the valley, where the character is strongly influenced by the high proportion of urban and industrial elements in the views and traffic noise. The area is well vegetated including plantation conifers on the Industrial Estate that screen the buildings, as well deciduous vegetation along roads and within the small undeveloped urban fringe areas. The low topography, road bunds, vegetation and large buildings create a high degree of visual containment and limit the number of available views towards the site.

Existing views around the study area – Viewpoint Area 02 Brecon Beacons National Park

12.56 This viewpoint area encompasses a large area of land to the east north and west of the site. It includes the lower wooded slopes and grazing land of the Brecon Beacon hills that contain local lanes, several public rights of way, very small settlements and isolated properties and farms. Penderyn Reservoir is located just north of the site. To the northeast, the open exposed landscapes are used for rough grazing and are crossed by a bridleway and areas of CROW open access land. The topography of this area has many local variations and combined with the extents of woodland cover; create a high degree of visual screening of the site. However, within these areas, there are locations where there is a view, often through vegetation, of the Hirwaun Industrial Estate and from this the location of the site can be inferred. From higher ground where the landscape is open, there are points where there is a clear view towards the Industrial Estate and the site. These views also include the wider valley landscape and slopes to the south.

Existing views around the study area – Viewpoint Area 03 Rhigos and Cefn Rhigos

12.57 The area is located to the southwest of the site, and has a sense of separation from it, in part due to the change in landscape character from urbanized valley to urban fringes/ semi rural character on the lower valley slopes, but also arising from the changes in the available views of the wider landscape. The urbanized valley is generally less prominent or is not part of many of the panoramic views of the landscape from these areas. The main settlement is at Rhigos, while there are smaller collections of dwellings and individual properties and farms located on the minor roads to the west and northwest. The local area is well connected with a network of footpaths and bridleways.

Existing views around the study area – Viewpoint Area 04 Hirwaun Common

12.58 There is one major transport route, the A4061, and several access tracks that serve the industrial sites and plantation forests located in this area. There are few public rights of way, however most of Hirwaun Common and the forests and woodlands on it are designated CROW open access areas. The landscape is largely open and the extensive landscape views encompass the full extent of the urbanized valley, including Hirwaun Industrial Estate and Penderyn Reservoir. While there are generally no views of the site itself, due to the screening effect of existing vegetation on the Industrial Estate, the location of the site can be determined in these views from other features, in particular the reservoir which is located behind it. Overall the views are more extensive from higher ground, but also more distant, so that the urbanized valley, while prominent, is one of a number of elements in the view.

Existing views around the study area – Viewpoint Area 05 Hirwaun

12.59 The visual receptors include users of major transport routes, a small town, commercial properties and a recreation ground. Similar to Rhigos, the Hirwaun settlement and visual receptors around it have a sense of separation from the site and its immediate environs, even though the landscape here is more markedly urban in character than at Rhigos. This is due to the visual containment that arises from the local topography, man-made bunds and mounds, and planted vegetation. Glimpsed views of the Tower Colliery mine south of Hirwaun are the main indicator of the proximity of this viewpoint area to the Industrial Estate.

The Proposed Development and Landscape Mitigation

12.60 A description of the development proposals is set out in Chapter 3 of the ES. This section describes the main features of the development to set the context to the landscape mitigation proposals. Reference has been made to the latest revisions of the following drawings by PRC Architects:

- Existing Site Survey, Dwg. No. PL002
- Proposed Site Plan, Dwg. No. PL 003
- Existing Site Sections, Dwg. No. PL010
- Proposed Site Section, Dwg. No. PL011

- Floor plans, elevations and sections for the Gatehouse, Visitors Centre, Fuel Preparation Area, Engine House, Pyrolisis, Biomax and High Energy User Dwg. Nos. PL020, PL031, PL041, PL051, PL061 and PL081.

12.61 The site is approximately 7ha in area, of which around 5ha would comprise built development, including roads and other hard-surfaced areas. The combined recycling, commercial and energy generation functions of the site are collectively termed a 'park'. There are four main zones of operation comprising:

- Fuel Preparation Area - located in the south-eastern part of the park
- Anaerobic Digestion (AD) and Pyrolisis - located to the west of the park
- 'Biomax' Separator - located in the north-eastern part of the park
- Plasma Conversion - located in the south-western part of the park

12.62 In addition, there would be an on-site 'Engine House' electricity generation plant located in the centre of the park, and a 'High Energy Use Unit' third party development located along its northern edge. A Visitors Centre including accommodation for administration and education functions would be located in the southeast corner of the site. The development also includes several ancillary structures, as well as parking for cars and lorries. There would be two distinct phases of development.

12.63 The park has been designed to provide an efficient use of the site, allowing links where required between related processes. The Fuel Preparation Area, Biomax Separator and High Energy Use Unit comprise the three largest buildings on the site and would be approximately 11-14m in height to the ridgeline. Located around the edges of the park, these buildings would enclose a central area that accommodates the AD tanks, Pyrolisis building and associated structures as well as the Engine House. These elements would be around 15m, 11.5m and 8.5m respectively, to the highest point, with the AD tanks set 2.5m below normal ground level. The larger buildings would provide a degree of visual screening to these internal functions, particularly when viewed from Fifth Avenue and Ninth Avenue.

12.64 The Plasma Conversion comprises an area of structures, containers and associated pipework and ducting located immediately west of the Fuel Preparation Area. This would be set back from Fifth Avenue, and surrounded on two sides by green walls that extend across part of the AD area. A detailed design would be carried out for the green walls and could comprise a combination of living panels and trellis structures on which climbers could grow. The height of the upper section of the green wall could be varying to avoid creating a uniform structure.

12.65 The proposed buildings are fenestrated using a palette of complimentary colours and materials of contrasting textures pre-selected by PRC architects. These are used to create an architectural rhythm and create visual interest to larger buildings. The shared palette of materials and colours is intended to create the sense of a family of buildings across the site.

12.66 To increase legibility and visual at interest the entrances of the larger buildings the PRC design provides accents with full height curtain walling and projecting glazed canopies. Anti-glare roof lights have been introduced to the roofscape in order to provide visual relief and reduce the mass of the roofscape.

12.67 The visitors centre is located in a prominent position at the junction of Fifth and Ninth Avenue providing a point of visual interest. A living green sedum roof is proposed to this gateway building contributing to the park's contemporary design and green credentials.

12.68 The main area of car parking is located just north of the visitors centre. The pedestrian and vehicular access route around these areas are surfaced in block paving of contrasting colours, which is further enhanced with formal landscaping which would provide an attractive setting for workers and visitors to the park. Adjacent to the car park is a waiting and inspection zone for lorries entering the site. The area would be set below the level of Ninth Avenue, and this combined with bunding, railings and landscape planting alongside it, would screen much of the view of the vehicles and structures as seen from the road.

12.69 The additional structures around the site include four flare stacks around 17.5m in height. The two flare stacks located by the AD structures would be set on ground 2.5m below normal ground level. A further stack around 2.5m in diameter and containing three flues would be located in the centre of the site. The final height of this stack would be dependent on selection of the preferred dispersion model, however the maximum height is not expected to exceed 40m. The stack would include an inspection platform around 1m wide and positioned not higher than the ridge of the adjacent buildings. The proposed development would also include two water treatment plants, further car parking areas and a weighbridge area with adjacent 'Gate House' (small security and welfare building).

12.70 The proposed development would be set below the level of Fifth Avenue and Ninth Avenue and there would be gentle gradients from the entrance points into the site. The hard surfaced areas would be predominantly made up of brushed concrete, with 'blacktop' surfaces within the parking circulation areas. Block paving would be used within parking bays. Further areas of tree and shrub planting, both at the park boundaries and within it, are intended to create additional areas of visual screening, a foil to security fencing within the site and a 'green' landscape setting. Signage would be kept to the minimum required to aid orientation to and within the development.

12.71 In terms of materials, cedar boarding has been selected by PRC to clad the main elevations to the buildings. The colours for cladding panels to the buildings, roofing and various structures around the park have been pre-selected by PRC from Corus Colours 'Colorcoat HPS200 Ultra'. The chosen Corus colours are 'Heather' (RAL:040 70 05), 'Seal' (RAL: 040 50 05), and 'Fox' (RAL: 040 50 20) for pre-finished steel cladding. These colours have a textured matt finish. They range respectively from a light grey with a pink hue, a dark grey with a pinkish tone and an earthy red/ brown. 'Seal' is proposed for roofs and doors, while panel cladding to the buildings would be in the colours 'Fox' and 'Heather'.

The palette of materials is intended to blend effectively with colours occurring in the surrounding landscapes as well as other buildings.

12.72 The proposed development is intended to operate for 24 hours, seven days a week, and some lighting will be required at all times to allow safe working and access. While the design of the lighting and operation of the site, including movements of vehicles on and off the site is subject to further detailed design and agreement, the general requirements and measures that could be undertaken to minimise any effects of light pollution are summarised below:

- Some areas such as roadways may need to be lit at all times. This is likely to be lighting mounted on columns around 6m in height, and directed towards the ground. The lighting could be controlled via switches contained in buildings on the site, such as the gatehouse.
- To facilitate movement between buildings at night, lighting could be controlled using light switches.
- Other areas requiring to be lit may require floodlighting mounted on columns around 6m in height. The angle of the fittings would be directed towards the ground.
- Based on the preliminary lighting design, light levels at the site boundary are anticipated to be around 10lux, which is equivalent to a barely sufficient level to walk in. The proposed landscape planting at the edges of the site would reduce this level even further.
- Lighting would be designed in accordance with BREEAM recommendations to achieve a lower level of brightness and minimise or avoid any reflection of light from ground surfaces.

12.73 The whole of the park would be contained by a substantial landscape buffer comprising both existing and proposed planting, together with bunding and water features. The intention would be to create a swathe of predominantly native tree and shrub planting around the site that enhances existing vegetated areas. Along the northern and western edges of the park, the existing belt of woodland growing alongside the public footpath and diverted stream would be retained and enhanced with a new landscape buffer around 20-30m in width to the north, and around 10-20m wide to the west.

12.74 The southern edge to the park alongside Fifth Avenue would include a landscaped area around 20-25m wide and accommodating a series of swales and ponds that would provide a sustainable urban drainage system (SUDS) and reduce the site's contribution to stormwater discharge. Where appropriate, and in accordance with the water attenuation and drainage requirements, these waterbodies would be enhanced by varying the slope profiles to provide areas for a variety of native aquatic and marginal planting, with the aim of enhancing both their visual aesthetic and nature conservation value. Surrounding these ponds would be a series of bunds and level areas, planted with a mixed palette of tree and shrub species. A variety of sizes of plants would be accommodated, to create a diverse structure of vegetation, with larger trees creating an instant visual screening, and smaller plants that would provide similar benefit in years to come. The grassed setting to the

waterbodies and planting could include native species with potential to enhance the nature conservation value of this area.

12.75 The detailed tree and shrub planting proposals for the site would be based on those species observed to be growing successfully on and around the site, as well as the list of tree species native to the Brecon Beacons National Park as set out in the Appendix 3 to Approved Unitary Development Plan. A copy of the UDP list is included in Appendix 12.6. Existing vegetation, including landscape planting along Ninth Avenue includes Ash, Willow, Birch, Alder and Oak, as well as Dogwood, Guelder Rose, Hazel, Blackthorn and Field Rose. Native species would predominate in new planting at the site edges, adjacent to existing vegetation in the landscape, and where available, local provenance species would be incorporated. Within the site, a greater proportion of non-native species would be incorporated, making use of hardy plants that are suited to the conditions of the site and scale of spaces, and that would not compromise vehicular circulation around the park.

12.76 Existing developed areas of the Hirwaun Industrial Estate include large areas of coniferous screen planting. The use of any conifers within and around the proposed park would be at most, minimal, the intention being that the design and layout of the buildings and proposed areas of planting would provide effective moderation of any effects on landscape character or views, including both within the site environs and the wider landscape, without the need for a blanket planted screen.

12.77 Detailed landscape proposals would be prepared for the park, and a management plan would be provided and implemented. The plan would set out the landscape and ecological design objectives, routine maintenance operations and long term management requirements. The aim would be to ensure that the various planted features around the park are successfully established, and provide an enduring and robust landscape setting to the scheme into the future.

POTENTIAL EFFECTS

Potential effects on landscape

12.78 The potential effects on landscape have been assessed for those areas within each of the five viewpoint areas shown on Figure 12.6. The assessment does not include the outlying parts of the study area as these are not considered significant in terms of potential landscape effects arising from the development, largely due to their distance from the site. These include the Dare Valley Country Park, areas around Craig Hendre-fawr to the southwest, landscapes north of Hirwaun and east of the A4059, and the landscapes around Pontneddfechan to the west. For similar reasons, the corresponding CCW Landmap visual and sensory areas have not been included in the impact assessment. These are:

Cynon

- CYNON VS735 – Cadair Fawr
- BRCKN VS597 – Coed-y-Rhaiadr

Brecknockshire

- BRCKN VS876 – Nedd Fechan and Mellte Valleys
- BRCKN VS597 – Coed-y-Rhaiadr
- BRCKN VS911 – Gwaun Hepste

Neath, Port Talbot

- NPT VS430 – Gelliceibryn/ Pont Walby
- NPT VS962 – Mynydd Nant y bar/ Mynydd Blaenafan

12.79 Appendix 12.9 sets out the predicted impacts for the landscape character and visual and sensory aspect areas during construction and at Year 1. Year 1 is taken as the year when the entire development is complete, including all phases of work. Year 15 is the year taken to assess residual effects and further detail is set out in section 12.6.

12.80 The assessment of effects during construction assumes there would be no mitigation of landscape and visual effects and therefore represents a 'worst case scenario'. The table assumes that the effects on landscape character would arise from the addition of elements or features at variance with those normally visible in the landscape. Examples are large cranes, storage areas or a greater number of large vehicles using the surrounding roads.

12.81 The assessment of operational effects has taken into account the year 1 photomontage views shown in Figures 12.18 to 12.22. While the colours of the development shown in the photomontages is not necessarily an exact representation of the likely final appearance of the development, they are intended to demonstrate that from the key landscapes to the north and south of the site, the development could be effectively integrated into its immediate landscape setting, reducing the significance of the perception of it from surrounding landscapes, or the ability of people to enjoy those landscapes. The reader is referred to material supplied by PRC architects to support the planning submission, including any samples of materials proposed for the development.

12.82 The proposed development would be contained within the extents of both the Industrial Estate and urbanized valley and as such would not have direct impacts on the landscape character of the surrounding areas. The landscapes adjoining the site are developed and include a variety of industrial activities and moving traffic. Where developments have been carefully and sensitively designed, for example with an appearance or finish that is typical of the environs, and with an appropriate degree of visual screening, then these have been integrated in the landscape setting and are less significant when considering effects on landscape character of the surrounding areas. Developments or features that are more visually intrusive when perceived from adjoining landscapes are often those that are at variance with the landscape in which they are sited, for example through their scale, form, height or visual appearance, siting on exposed slopes, or lack of appropriate visual screening.

12.83 Appendix 12.9 demonstrates that effects on landscape character arising from the perception of the development from the outlying areas would be greater from areas of higher ground and more open and sensitive landscapes, where there would be a view of a greater extent of the development than from lower lying areas due to the elevation. However, the highest points from which the site may be seen are within the areas of the zone of visual influence that are most distant from the site. From these areas, perception of the landscape encompasses not only the various elements of the Industrial Estate and surrounding urban uses, but also nearby settlements and extensive open and wooded landscapes. The development itself would be a small part of this view, and would benefit from the visual containment provided by existing planting around the Industrial Estate and within the immediate site environs.

12.84 The proposed development would include buildings and structures that are of a similar scale, height, form and massing to existing buildings on the Hirwaun Industrial Estate and would be designed to a high standard with quality materials and a comprehensive landscape setting. It would be located within a small part of the National Park that already has significant urban influences. While it would result in the loss of an open area of grassed land with landscape structure planting, it is considered that it would not have any significant effect on the much more extensive areas of the National Park that have characteristics more typical of the visual and sensory aspect areas described by CCW Landmap.

12.85 The lighting required to allow the functioning of the site is likely to be perceived from outlying areas, in particular from areas that look down onto the development, and for much of the time would be likely to be seen in context of other areas of lighting within the urbanized valley, such as around settlements, highways or areas of commercial development. Lighting would be designed to contain light within the site itself and minimise or avoid any light pollution.

12.86 The stack proposed at the centre of the site would be a maximum of 40m in height. Although the stack itself would be noticeably taller than the other buildings and structures within the development, particularly when viewed from areas close to the site, it would be consistent in scale with high-voltage electricity pylons that pass nearby to the site, which themselves are around 49m in height. The stack would not break the horizon when viewed from the higher ground of the National Park to the north or from the elevated publicly accessible areas of Hirwaun Common to the south, and would not obscure the available views of the wider landscape setting from these areas.

Potential impacts on views

12.87 A summary of the potential impacts from each of the five viewpoint areas shown on Figure 12.6 is set out below, while Appendix 12.10 sets out the impacts for each of the visual receptors during construction, and at Year 1 of operation. Year 1 is taken as the year when the entire development is complete including all phases of work. Year 15 is the year taken to assess residual effects, and further detail is set out in section 12.6. Five viewpoints were selected for the production of photomontage views, based on the visual assessment described in section 12.3, and are shown in Figures 12.18 to 12.22. The illustrations show

the existing view, anticipated view at Year 1 and anticipated view at Year 15. The photomontage views have been used in the assessment of the potential impacts on views, visual amenity and landscape character.

12.88 The assessment of effects during construction assumes there would be no mitigation of landscape and visual effects and therefore represents a 'worst case scenario'. However, it is recognised that construction activities would be subject to a number of conditions such as restriction of working hours and measures to reduce dust in the atmosphere. It is assumed that visual receptors would generally consider a construction site to be of low visual amenity. The assessment shows that the effects would be greater from those areas that are elevated above the site. The effects on views during construction would arise from activities taking place on site, including the presence of plant, site compounds, storage areas and excavations. In addition, there may be temporary disruptions to the layout of surrounding roads and use of any footpaths near to the site. Construction traffic including delivery vehicles would also be present on surrounding roads, although due to the likely large scale of these, it is unlikely that these would use the local or minor roads in the area.

12.89 As described for the impacts on landscape character, lighting required to allow the 24hour functioning of the site is likely to be perceived by visual receptors around the site, in particular from areas that would look down onto the development. It is noted however, that from visual receptor locations such as public rights of way and open access areas, this is likely to be insignificant at times of darkness, when it is unlikely these areas would be used. Where there may be glimpsed views of the development by road users, and these are from elevated locations, then lighting on the site may be visible. However, this would be seen in context of other lighting, such as around settlements, highways or areas of commercial development. As described, measures would be taken to minimise contain light within the site itself as far as possible. The buildings themselves would provide some screening of lighting in views from areas surrounding the site.

Potential Visual Effects – Viewpoint Area 01 Site Environs

12.90 The construction activities and proposed development would benefit from the high level of visual containment that already exists due to the large areas of planting within this lower part of the valley. The most significant effect on views would be those from Fifth Avenue and Ninth Avenue, where much of the view towards the lower slopes of the National Park are likely to be obscured by the development, altering the context of the view. Elsewhere, while much of the main part of the development is likely to be screened from views, the upper parts of the proposed 40m stack may be visible from some areas where much of the remainder of the development may not be, such as from properties to the west of the site, and glimpses from roads to the south and east.

Potential Visual Effects – Viewpoint Area 02 Brecon Beacons National Park

12.91 For the visual receptors located on the wooded slopes around the site, existing vegetation in the landscape is likely to provide a significant degree of visual screening from

both the construction activities and the development itself. Where there are already glimpsed views towards the Industrial Estate from the wooded slope areas, these views are therefore likely to encompass the new development. There are limited areas within the open landscapes on the higher slopes that already have a clear view towards the Industrial Estate, and would have a view of the development. The colours selected by the architects for the development are intended to mitigate the change in the view, by integrating the development visually within its context. The development would also be one of a number of elements in the view, including both urban elements and broad open landscapes. In the available views of the development, the proposed 40m stack would be seen to be taller than adjacent buildings and structures on the Industrial Estate, however, from more elevated areas, this would be seen in context of other development and structures located on higher ground. These are either taller than the proposed stack, in the case of high voltage pylons, or would appear 'above' the stack in the view.

Potential Visual Effects – Viewpoint Area 03 Rhigos and Cefn Rhigos

12.92 The effects during construction are likely to include some views of larger structures on the site, such as cranes. The separation of these areas from the site and already limited views towards the Industrial Estate are likely to temper the effects of the new development. There may be some views of the upper parts of the development including the proposed 40m stack, seen behind the roofs of existing buildings and planting around the Estate and nearby roads. These views would also include other urban elements, such as pylons crossing the valley, as well as panoramic and distant views of the hills both to the north and the south.

Potential Visual Effects – Viewpoint Area 04 Hirwaun Common

12.93 The majority of the visual receptors have some views towards the Industrial Estate and buildings within it, and are likely therefore to have a view of part of the development. From the lower slopes, these views are likely to encompass only the upper parts of the development, including taller structures and the higher parts of roofs, with lower parts of the development screened by existing buildings, road bunds and mature vegetation. The colours chosen by PRC architects for these are intended to integrate the development within its landscape setting. Views from higher ground would encompass a greater proportion of the development, and combined with the greater sensitivity of the receptors located on public footpaths or in open access areas, the significance of the effects would be greater. The proposed 40m stack would be seen to be taller than other parts of the development, however, similar to views from other areas, this would be in context of nearby electricity pylons and other industrial functions both on the Industrial Estate and within the wider landscape.

Potential Visual Effects – 05 Hirwaun

12.94 The receptors benefit from the existing screening effects on the site of topography, road embankments and well as vegetation. However, in the winter months, the loss of leaves from deciduous vegetation may reveal glimpsed views towards the upper parts of the development, including the upper part of the proposed 40m stack from some areas, for example from Hirwaun RFC and the grounds of Mount Pleasant Public House.

RESIDUAL EFFECTS

12.95 The residual landscape and visual effects have been assessed at Year 15. The residual landscape impacts are shown in Appendix 12.9, and the residual visual impacts are shown on in Appendix 12.10. The photomontage views in Figures 12.18 to 12.22 also show the potential impact at five locations – Mynydd Beili-glas carpark/ viewing point, public footpath by the A4061, Penderyn Reservoir (southern and northern edges) and the bridleway in the National Park north of the site.

12.96 With the high quality approach to the buildings, structures, finishes and external spaces around the development, combined with the site layout that responds to the urban form of the Industrial Estate, the residual landscape and visual effects could be reduced.

12.97 The principal change to the development on which the assessment of the residual effects is based, would be that the proposed structural planting around and within the site would be reaching semi-maturity and would provide an attractive landscape setting to the site. The planting would provide a degree of visual screening of the buildings, structures, ancillary spaces and parking areas, as well as the activities within these areas. Planting would help to break up the mass of the development particularly when viewed from the more sensitive locations on the higher slopes and open access land. Use of a large proportion of native trees and shrubs in the planted buffers around the development would relate in landscape character and visual terms, to the lower wooded slopes that surround the site to the north, west and northeast.

12.98 The planting would also be beneficial in breaking up any views of lighting on the development in hours of darkness, when perceived from areas of ground elevated above the development site. The planting would also have the effect of reducing the lux levels at the periphery of the site, and combined with the screening effect of buildings on the site, would benefit visual receptors in the vicinity.

Residual Landscape Effects

12.99 Appendix 12.9 shows that the effect of the maturing landscape setting to the development is to reduce the extent of the development that would be seen, and to integrate it in its immediate landscape setting. The proposed planting around the site may also benefit the landscape character of the Industrial Estate as a whole, by adding a new structure of planting that will improve the setting of both the new development and existing nearby buildings, for years to come.

Residual Visual Effects – Viewpoint Area 01 Site Environs

12.100 The visual containment of the development created by vegetation within this area, would be increased as the mitigation planting around the site matures, gaining height and closing the canopy of planted wooded areas. While this would not screen the upper parts of the proposed 40m stack, the finishes proposed by PRC architects are intended to reduce the visual prominence of this structure when viewed from surrounding areas. In addition, vegetation in the landscape and the glimpsed or brief nature of some of these views are likely to reduce their significance.

Residual Visual Effects – Viewpoint Area 02 Brecon Beacons National Park

12.101 From areas within the National Park, particularly where the view would be from open land elevated above the development, the effect of maturing planting within and enveloping the site would not necessarily be to visually screen it, but rather create a well vegetated setting that is consistent with the character of the wooded valley slopes, and also breaks up the form and massing of the buildings within the site. The proposed 40m stack may be glimpsed in several views from the Park, however, the wooded areas within the surrounding landscapes are likely to provide a significant visual foil to it, including in winter views. From higher open ground, maturing planting would not screen the upper part of the stack, however it would be seen in the context of other structures of similar height, or buildings on ground elevated above the development. The development would be clearly distinguished in the view from the southern banks of Penderyn Reservoir, however, planting around the site would break up the form of the development and views of the wider valley landscape would not be obscured. Fishermen at this private recreational site are likely to have their back to this view, when standing on the southern edge of the reservoir. From the northern edge of the reservoir, the waterbody and surrounding embankments, together with vegetation to the south of it would provide a significant degree of screening of most of the proposed development.

Residual Visual Effects – Viewpoint Area 03 Rhigos and Cefn Rhigos

12.102 The vegetation planted around and within the proposed development would be maturing and would provide an increasingly effective visual foil to it, and assist in its integration into the landscape. The vegetation would not screen the upper part of the proposed 40m stack, and this is likely to be visible from some areas, such as footpath west of Rhigos and properties at the north-eastern edge of Rhigos. However, these views would also include a number of pylons, the height of which is around 49m above ground level, and parts of other large industrial buildings, so that the development would not be significantly at variance with its setting. In addition, views from these areas tend to be distant and encompass extensive views of the wider landscape, and the development would be a small part of this view.

Residual Visual Effects – Viewpoint Area 04 Hirwaun Common

12.103 By year 15, the landscape planting proposed around and within the development would provide a substantial vegetated setting to the buildings and structures, increasing the degree to which it is integrated in the landscape and reducing the visibility of the development as a whole. As in year 1, the proposed 40m stack would be taller than the other parts of the development and much of the vegetation surrounding it, however, it would be one of a number of urban elements in the view including pylons, warehouses and industrial works. The pylon would not obscure wider views towards the Brecon Beacons National Park.

Residual Visual Effects – Viewpoint Area 05 Hirwaun

12.104 There would be little change in the residual effects from year 1, since the maturing landscape planting around the site would have limited additional effect on the existing high degree of visual containment to the development. Where there would potentially be glimpsed views of the upper part of the 40m stack in year 1, these are also likely to be available in year 15.

CONCLUSIONS

12.105 The application site is proposed for the development of a recycling, commercial and energy generation 'park'. The site is allocated for industrial uses in the local plans of the two administrative authorities that govern the area.

12.106 The landscapes surrounding the site have a significant natural and cultural heritage that is reflected in the number of historic sites and areas protected for nature conservation value. Part of the site is situated with the Brecon Beacons National Park. The Park itself is valued from international through to local level for its qualities such as scenic beauty, geological resource, landscape character and tranquillity.

12.107 Open land and forested landscapes to the south of the site around Hirwaun Common are designated as a Local Landscape Area with the aim of protecting landscape quality and views, and the ability to enjoy the landscape.

12.108 There is a broad range of national, regional and local guidance and policy that seeks to protect the special features of the designated and undesignated landscapes and their visual and recreational amenity, by minimising any adverse effects from development, and requiring quality design that relates to its context. The overriding objectives are to ensure sustainable development and a high quality of life for the residents, workers and visitors to the area.

12.109 As part of this EIA, Savills undertook a landscape, townscape and visual assessment based on the Guidelines for Landscape and Visual Impact Assessment 2nd edition (Landscape Institute & Institute of Environmental Management and Assessment, 2002.) and

incorporating visual and sensory aspect data prepared by the Countryside Council for Wales Landmap process.

12.110 The site comprises previously developed land, and while it consists of open land, it is located within an area of transitional character, considerably influenced by the industrial uses around it. It is not typical of the pastures, wooded countryside or open grasslands of the areas of the National Park to the north. In views from the wider landscapes, these industrial uses are not necessarily a significant detraction from the enjoyment of these areas, particularly where measures have been taken to integrate industries or other urban elements within the landscape setting. In addition, the steep slopes above the 'urbanized valley' where the development is proposed to be located, afford extensive panoramic views of dramatic hillsides, and the valley itself is a relatively small part of the overall scene when viewed from many areas.

12.111 Existing vegetation around the site, in particular the wooded slopes to the north, west and northwest, and planting around the Industrial Estate and roads within the urbanized valley, combined with the varied topography of the area, creates a high level of physical and visual separation of the site from many of the surrounding landscape areas.

12.112 As shown in Appendix 12.10, there are few high sensitivity visual receptors that would be affected by the proposals. The limited areas to the north of the site from which the development is likely to be clearly visible include Penderyn Reservoir, the un-named lane to the northwest and a section of public bridleway and area of open access land to the north of the lane. These are located at distances of up to 1.5km. Views from these areas include other parts of the Industrial Estate, mining activities around Hirwaun Common to the south and extensive views of the surrounding hills and valley sides. Elsewhere, the location of the site can be interpreted in a limited number of views from areas to the west and northeast of the site, due to the presence of the roofs of existing buildings on the Industrial Estate, or the reservoir in the view. Some of these views are glimpses through existing vegetation in the landscape.

12.113 From the south, there is a clear view of Penderyn Reservoir which lies just north of the site, from the open access land, and the Local Landscape Area, and from the public parking place and viewing point at Mynydd Beili-glas (located at approximately 500m AOD, 3-4km south of the site). The development would be partly screened by existing mature deciduous and coniferous vegetation located within the Hirwaun Industrial Estate and along the A465. Further north, a less elevated view of the reservoir is available from the public footpath that crosses land below Hirwaun Common. At this lower level, mature vegetation in the valley landscape would provide a greater screening effect to the development. The majority of views from the south are panoramic, encompassing extensive areas of the southern slopes and valleys of the Brecon Beacons, as well as the urbanized valley to the south of this, and the development would be one of a number of elements in these panoramic views.

12.114 The proposed development has been designed to a high standard by PRC architects and will be contained within wide planted buffers at the periphery. The majority of the proposed buildings and structures on the site would be similar in scale, height and massing to existing buildings on the Hirwaun Industrial Estate, including those located on Ninth Avenue. The choice of colours for the buildings and structures within the proposed park is aimed at integrating the development within the surrounding landscapes and minimising visual intrusion, particularly when viewed from outlying areas. The various areas of bunding, buffer vegetation, ponds and internal planting to the park would provide an effective visual foil to the buildings, structures and vehicles located around it, breaking up the mass of the development, creating an attractive aesthetic, and integrating the park with both the immediate and wider landscape setting. These features are likely to also have the additional benefit of providing extended wildlife habitats and movement corridors, contributing to local biodiversity objectives.

12.115 The four flare stacks proposed on the site would be similar in height or only slightly taller (around 3m) than adjacent buildings on the site, and are likely to be perceived as part of the overall development. The upper part of the stack proposed to be located at the centre of the site, which would be up to 40m from local ground level, would be visible above the tallest buildings and structures on the site. The photomontage views demonstrate that this view is most notable from the elevated banks of Penderyn Reservoir that would look over the 'rooftops' of the development. However, several high voltage pylons (around 49m in height) are also visible from this location and appear to be similar in scale to the proposed stack. In views from most areas surrounding the site including from the elevated open landscapes, while the stack would be visible above the other buildings and structures on the site, it is unlikely to break the horizon in most views, and would not result in any significant obstruction of views, most notably the panoramic views. In distant views, the stack would appear as one of several structures located within the urbanized valley. Due to the scale of the stack, it would not be possible to screen views of the upper part of it with planting, however PRC architects' proposed palette of colours and finishes for the structures is intended to minimise visual prominence and effectively integrate the development into the surrounding landscapes.

12.116 Development of the site will not lead to the loss of agricultural land, public rights of way, open access areas or trees subject to tree preservation orders. There is some existing landscape planting along the eastern edge of the site that would be removed to facilitate the development but this would be replaced with new landscape bunding and planting with a high proportion of native species to provide a visual screen and containment to the development.

12.117 The proposals comply with the national, regional and local guidance and planning policy, and are not considered to have significant harmful effects on the natural beauty of the National Park or the recreational and visual amenity of its residents or visitors. The landscape proposals could have a positive effect on the landscape character and setting of the site, by extending the character of the adjacent lower wooded slopes of the National Park.

Chapter Thirteen
ECOLOGY

INTRODUCTION

13.1 This chapter of the ES assesses the potential effects that may arise within the study area as a result of implementing the proposed development. The assessment presents a summary of the current conditions within the study area, describes the changes predicted as a result of the proposals and, where appropriate, identifies mitigation measures to address any significant negative effects that are identified. This chapter of the ES assesses the likely significant effects of the Proposed Development in terms of Ecology and incorporates a summary of the ecological survey reports which are included in Appendix 13.1.

13.2 The chapter describes the assessment methodology; the baseline conditions currently existing at the Application Site and surroundings; the predication of potential impacts; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed. This chapter has been prepared by Middlemarch Environmental Ltd.

METHODOLOGY

13.3 The ecological assessment included:

- A Desk Study and an Extended Phase 1 Habitat Survey combined with an assessment of the potential for legally protected species and species included in the UK BAP (badgers, bats, breeding birds, great crested newt, marsh fritillary, reptiles, otters and water voles) to occur within and adjacent to the Application Site;
- Results of further surveys for legally protected species and habitats and species included in the UK BAP;
- Data gathering of existing information and evaluation of any previous ecological survey work;
- Evaluation of the Application Site in terms of its nature conservation value;
- An assessment of the effects of construction and operation of the Proposed Development on the Application Site's existing ecological features;
- Requirement for mitigation measures in respect of potential adverse effects; and;
- Identification of residual effects taking into account the proposed mitigation measures.

13.4 Information was requested with respect to details of statutory and non-statutory designated sites of importance for nature conservation occurring within 2km of the Application Site. Information was also requested about any known occurrences of the legally protected species listed below and species included in the UK BAP and Local Biodiversity Action Plans ('Our Natural World' – a Biodiversity Action Plan for the Brecon Beacons

National Park and 'Action for Nature' - the Local Biodiversity Action Plan for Rhondda Cynon Taff) occurring within 2km of the Application Site (or 10km for bat species), such as: badgers; bats; birds; great crested newts; water vole; otter; reptiles; and; species and habitats included in the UK BAP.

13.5 The following organisations were consulted:

- Countryside Council for Wales web site for Protected Sites and Landscapes map;
- Biodiversity Information Service for Powys and Brecon Beacons National Park;
- South East Wales Biodiversity Records Centre; and,
- National Biodiversity Network (NBN) Gateway website.

13.6 The locations of statutory and non-statutory designated sites of nature conservation in relation to the Application Site are shown on Figure 13.1.

13.7 During development of this ES consultations were carried out with the following organisations with respect to ecology:

- Countryside Council for Wales; and
- Environment Agency Wales.

13.8 A walkover survey of the Application Site was undertaken in June 2008 and broadly followed the 'Extended Phase 1 Habitat Survey' methodology as set out in Guidelines for Baseline Ecological Assessment (Ref. 13.1). This method of survey provides information on habitats present within the Application Site and assesses the potential for legally protected species to occur in and adjacent to the Application Site.

13.9 Plant names follow New Flora of the British Isles (Ref 13.2) and are quoted as common names within the text of the ecology chapter. The reader is referred to the relevant report in Appendix 13.1 for Latin names.

13.10 Figure 13.3 shows colour-coded habitat maps with records of protected and notable species recorded at the Application Site during the surveys. Full survey reports are included in Appendix 13.1.

13.11 With respect to legally protected species, the following features were recorded:

- Locations of any mature trees that could offer suitable roosting sites for bats;
- Locations of any mature trees that could offer suitable roosting sites for barn owls;
- Signs of badger activity including setts, tracks, snuffle holes and latrines on the Application Site;
- Habitats for nesting birds;
- Habitat suitable for great crested newt;
- Habitat suitable for water vole;
- Habitat suitable for otter;
- Habitat suitable for reptiles;
- Habitats and species included in the UK BAP; and;
- Location of any weeds, which are subject to statutory controls e.g. Japanese knotweed and giant hogweed.

13.12 The Extended Phase 1 Habitat Survey identified the need for further surveys in respect of a range of animals to be undertaken in order to satisfactorily evaluate the nature conservation importance of the Application Site. A list of the surveys undertaken is provided below. Full details of the survey methodologies, results and conclusions from each survey are presented in Appendix 13.1. A summary of the findings of each survey is provided together with an evaluation of the survey results in the 'Baseline Conditions' section of this chapter. Where likely significant effects are identified, these are discussed in detail in the 'Potential Impacts' section of the chapter and where appropriate, recommendations for mitigation are provided in the 'Potential Mitigation and Enhancement' section.

13.13 Further surveys undertaken as part of the ecological assessment were:

- Badger survey;
- Bat activity survey;
- Breeding bird survey;
- Great crested newt assessment;
- Marsh fritillary survey;
- Otter survey;
- Reptile survey; and,
- Water vole survey.

13.14 The ecological surveys have not tried to produce a comprehensive list of plants and animals for the Application Site as any ecological surveys will be limited by factors which affect their presence. These factors include: weather; time of year; migration patterns; and, behaviour. However, it is considered that the results of the surveys, together with the information from the data gathering exercise, have enabled an assessment of the nature conservation interest of the Application Site to be made in sufficient detail for the potential effects of the Proposed Development on features of importance for nature conservation to be adequately defined. All surveys were completed at the appropriate times of year and in accordance with best practise. Further details of all survey methodologies, timings and result are provided in Appendix 13.1.

13.15 As a result of the field surveys and ecological data gathered for the Application Site and adjacent habitats, the ecological features were evaluated in terms of their nature conservation value using the criteria set out in The Institute of Ecology and Environmental Management (IEEM) 'Guidelines for Ecological Impact in the United Kingdom' (Ref. 13.3).

13.16 With respect to the assignment of a value for habitats and species within the Application Site, the guidelines state that tabulated boundaries between different values become difficult to define with precision due to the range of factors influencing the definition of value e.g. habitat quality, geographic location, size of populations etc. Thus the guidelines suggest an approach involving professional judgement based on available guidance and information and expert advice.

13.17 The value of an ecological resource has been determined within a defined geographical context. The following frame of reference has been used: International; UK; National (e.g. Wales); Regional (e.g. South-Wales); County (e.g. Powys); District (e.g. Rhondda Cynon Taff); Local; and, within Zone of Influence (e.g. project site or immediate

area). Using this geographical context the value of habitats or species can be assessed using the criteria outlined in Table 13.1.

13.18 Once the value of an ecological resource has been determined the significance of the effect on the resource can be assessed. The IEEM guidelines define a significant impact in ecological terms as

> *'…an impact (adverse or positive) on the integrity of a defined site or ecosystem(s) and / or the conservation status of habitats or species within a given geographical area, including cumulative impacts.'*

Table 13.1: Guidance on Determining the Nature Conservation Value of Features (after IEEM Guidelines for Ecological Impact Assessment, 2006)

Value	Scale	Criteria
Very high	International	High importance and rarity. International scale and limited potential for substitution. E.g. Special Areas of Conservation, Special Protection Areas, Ramsar Sites.
High	UK / National	High importance and rarity, national scale, or regional scale with limited potential for substitution. E.g. Sites of Special Scientific Interest, National Nature Reserves.
Medium	Regional / County	High or medium importance and rarity, local or regional scale and (limited) potential for substitution. E.g. Local Nature Reserves, County Wildlife Sites.
Lower	District / Local	Low or medium importance and rarity, local scale. E.g. old hedges, woodlands and ponds.
Negligible	Within Zone of Influence	Very low importance and rarity, local scale. E.g. areas of built development, active mineral extraction or intensive agricultural land.

13.19 Following collation of the ecological baseline information, the likely effects of the Proposed Development were assessed, based on the existing knowledge of the design and against the criteria provided in Table 13.2.

13.20 The assessment of the potential effects of the Proposed Development takes into account both on-site and off-site effects, such as those that may occur on adjacent areas of ecological value. Effects can be permanent or temporary and can include direct loss of wildlife habitats, fragmentation and isolations of habitats, disturbance to species, changes to key features and changes to the local hydrology and/or water quality.

13.21 The significance of an adverse effect (or a beneficial result) is the product of the magnitude of the effect and the value or sensitivity of the ecological feature affected (see Table 13.1). High levels are significance are generally ascribed to large effects on features of high nature conservation value. Low levels of significance are ascribed to small effects on features of high nature conservation value or large effects on features of lower nature conservation value as shown in Table 13.2.

13.22 The effects can be either beneficial, where there is an advantageous or positive effect on the environmental resource or receptor, or adverse, where there is a detrimental or negative effect on the environmental resource or receptor. Using the terms outlined above and in Table 13.2 the criteria presented in Table 13.3 has been used to assess the significance of adverse and beneficial effects on ecological resources or receptors.

Table 13.2: Significance Matrix

		Magnitude of Effect		
		HIGH	MEDIUM	LOW
Value of Receptor	Very High to High (International/UK/England)	Major	Major / Moderate	Moderate
	Medium (County/Regional)	Major / Moderate	Moderate	Moderate / Minor
	Low (Local/District)	Moderate	Moderate / Minor	Minor
	Zone of Influence (Site or Immediate Area)	Minor / Negligible	Negligible	Negligible

Table 13.3: Likely Significance Effects Criteria

Effect	*Criteria*
Major adverse	Loss of, permanent damage to or adverse impact on integrity of any part of a site of international or national importance; Loss of a substantial part or key feature of a site of county importance; Loss of favourable conservation status (FCS) of a legally protected species; Loss of or damage to a population of nationally rare or scarce species.
Moderate adverse	Temporary disturbance to a site of international or national importance, but no permanent damage; Loss of or permanent damage to any part of a site of county importance; Loss of a key feature of local importance; A substantial reduction in the numbers of legally protected species such that there is no loss of FCS but the population is significantly more vulnerable; Reduction in the amount of habitat available for a nationally rare or scarce species, or species that are notable at a regional or county level.
Minor adverse	Temporary disturbance to a site of county value, but no permanent damage; Loss of, or permanent damage to, a feature with some ecological value in a local context but that has no nature conservation designation; A minor impact on legally protected species but no significant habitat loss or reduction in FCS; A minor impact on populations of nationally rare or scarce species or species that are notable at a regional or county level.
Negligible	No effects on sites of international, national or county importance; Temporary disturbance or damage to a small part of a feature of local importance; Loss of or damage to land of negligible nature conservation value; No reduction in the population of legally protected, nationally rare, nationally scarce or notable (regional/county level) species on the site or its immediate vicinity.
Minor beneficial	A small but clear and measurable gain in general wildlife interest, e.g. small-scale new habitats of wildlife value created where none existed before or where the new habitats exceeds in area the habitats lost.
Moderate beneficial	Larger scale new habitats (e.g. net gains over 1 ha in area) created leading to significant measurable gains in relation to the objectives of biodiversity action plans.
Major beneficial	Major gains in new habitats (net gains of at least 10 ha) of high significance for biodiversity being those habitats, or habitats supporting viable species populations, of national or international importance cited in Annexes I and II of the Habitats Directive or Annex I of the Birds Directive.

13.23 The Application Site is located on Fifth Avenue in Hirwaun Industrial Estate (central National Grid Reference SN 938 068). The site is situated at the northern edge of the industrial estate, with industrial buildings located to the south and east. Penderyn Reservoir forms the northern site boundary, with early-mature sessile oak lining the boundary and over-shading much of the track. A pumping station and an area of pasture with scattered trees forms the western site boundary. Fifth Avenue forms the southern site boundary and Ninth Avenue forms the majority of the eastern site boundary, with the remainder marked by a water treatment works.

13.24 The site is dominated by an area of flat, made ground, with incorporated drainage channels. It is understood that the area was previously built upon (within the last 100 years). This central area of the site is dominated by marshy grassland, however occasional gorse and planted scattered trees are present towards the edges of this habitat. This area was grazed by horses and thus subjected to a high level of poaching. Fenced off areas were present along the eastern and western site boundaries, with protected areas of young broad-leaved plantation woodland and scattered trees in marshy grassland.

13.25 A grassy track runs along the northern site boundary, bound between lines of trees (northern side of track) and broad-leaved woodland (southern side of track). A small stream runs along the western edge of the site, with a second shallower brook flowing into this stream forming a triangular area of willow carr, scattered trees and marshy grassland separate from the main area of the site (the third side was formed by a dry ditch which separated this area from the grassy track).

13.26 Details of statutory sites of nature conservation value within 2km of the edge of the Application Site are summarised in Table 13.4 and shown on Figure 13.1. Desk study information has been collated from:

- Countryside Council for Wales Web site for Protected Sites and Landscapes map;
- Biodiversity Information Service for Powys and Brecon Beacons National Park;
- South East Wales Biodiversity Records Centre;
- National Biodiversity Network (NBN) Gateway website.

Table 13.4: Summary of Statutory Sites of Nature Conservation Value Within 2km of Application Site

Site Name*	Distance from Application Site**	Comments
Blaen Cynon SAC	100 m east	This site is considered to be one of the best areas in the United Kingdom for marsh fritillary. This site comprises five geographically separate areas which are also designated as SSSIs.
Cors Bryn-y-Gaer SSSI	100 m east	Part of Blaen Cynon SAC, this site comprises two geographically separate areas.
Woodlands Park and Pontpren SSSI	700 m north-east	Part of Blaen Cynon SAC, this site comprises three geographically separate areas.
Coedydd Nedd a Mellte SAC	1100 m west	This site is considered to be one of the old sessile oak woods with Ilex and Blechnum in the British Isles. It also contains a significant presence of Tilio-Acerion forests of slopes, screes and ravines.
Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI	1100 m west	Parts of the SSSI (which comprises two geographically separate areas) are included within Coedydd Nedd a Mellte SAC.

* SAC: Special Area of Conservation
SSSI: Site of Species Scientific Interest
** Distance from Application Site is measured approximately from the edge of the Application Site to the edge of the Site of Nature Conservation Value

13.27 With respect to non-statutory sites of nature conservation value, the desk study identified seven designated as Ancient Woodland, of which six of these are designated as Ancient Semi-Natural Woodland and one is defined as Ancient Replanted Woodland. The nearest of these was located approximately 350 m west of the perimeter of the Application Site. No further details regarding these woodlands have been provided.

13.28 The desk study identified a number of protected species within a 2km radius of the edge of the Application Site. In addition, records for Annex II bat species were provided within a 10km radius. These are summarised in Table 13.5. Some of these species are also listed within the Local BAP and/or as priority species within the UK BAP (Ref 13.4). Only species recorded within the last 15 years are included within Table 13.5.

13.29 In addition, a number of species of conservation concern including red data book species were recorded, these are summarised below:

- 4 liverwort species: Red data book species;
- 4 moss species: Red data book species;
- 6 lichen species: Red data book species;
- 1 vascular plant: Red data book species;
- 1 beetle (Coleoptera) species: Red data book species;
- 2 bird species (redstart and woodcock): Local BAP, Welsh Amber Bird species.

13.30 The absence of records should not be taken as confirmation that a species is absent from the search area.

Table 13.5: Protected and Notable Species Records within 2km of the Application Site

Species	Record and Date	Level of Protection
Mammals		
Lesser horseshoe bat	1 record from 11 km east*	International: ECH Annexes II & IV, Bonn Convention Annex II, Berne Convention Annex II National: WCA Schedule 5 & 6, S42, UK BAP County: Local BAP
Pine marten	2 records from 700 m north	International: ECH Annexes V, Berne Convention Annex National: III WCA Schedule 5, S42, UK BAP County: Local BAP
Birds		
Pied flycatcher	1 record from 2500 m north	International: Bonn Convention Annex II National: S42 County: Local BAP
Wood warbler	1 record from 2500 m north	International: Bonn Convention Annex II National: S42, RSPB Amber Data List
Song thrush	1 record from 700 m east	National: S42, RSPB Amber Data List, Welsh Amber Birds, UK BAP County: Local BAP
Lapwing	1 record from 1100 m north	International: Bonn Convention Annex II, ECB, National: S42, RSPB Amber Data List, Welsh Red Bird, UK BAP County: Local BAP
Herpetofauna		
Common toad	1 record from 700 m east	International: Berne Convention Annex III National: WCA Schedule 5 (S9(5)), S42, UK BAP County: Local BAP
Viviparous lizard	1 record from 700 m east	National: WCA Schedule 5, S42, UK BAP County: Local BAP
Common frog	1 record from 700 m east	International: Berne Convention Annex III National: WCA Schedule 5 (S9(5)) County: Local BAP
Invertebrates		
Marsh fritillary	37 records from 500 m north or 500 m east	International: Berne Convention Annex II, ECH Annex II National: WCA Schedule 5, S42, UK BAP County: Local BAP
Small pearl-bordered fritillary	1 record from 700 m east	National: S42, UK BAP County: Local BAP
Small heath	1 record from 700 m east	National: S42, UK BAP
Plants		
Bluebell	2 records from 700 m north-east	National: WCA Schedule 8

WCA: Wildlife and Countryside Act 1981
ECH: European Communities Council Directive on the Conservation of Habitats and Fauna
ECB: European Communities Council Directive on the Conservation of Wild Birds
S42: NERC Act 2006 Section 42 Species (Priority Species in Wales)
Local BAP: Our Natural World – a biodiversity action plan for the Brecon Beacons National Park and Action for Nature: The Local Biodiversity Action Plan for Rhondda Cynon Taff
UKBAP: UK Biodiversity Action Plan
RSPB Red Data List: Globally threatened species with rapid decline in breeding population in last 25 years.
RSPB Amber Data List: Species with unfavourable conservation status in Europe, historical population decline and moderate population decline in last 25 years.

*Record outside of search area but it is considered likely that the species will be utilising habitat within search area.

13.31 In addition to ecological data collected by Middlemarch Environmental Ltd, a 'Baseline Ecology' report was produced by ERM in 2007. The ecological summary included in this ES chapter has taken into account the results of this survey. A copy of this report is included in Appendix 13.1.

Phase 1 Habitat Survey – Habitats Occurring Within the Application Site

13.32 Figure 13.2 shows an Extended Phase 1 Habitat Survey Map of the Application Site. The full text of the Extended Phase 1 Habitat Survey undertaken in May 2008 is provided in Appendix 13.1. A summary of the habitat descriptions from the survey is provided below.

13.33 The following habitats were noted at the time of the survey (listed in alphabetical order). The habitats are described in more detail below.

- Bare ground;
- Broad-leaved plantation woodland;
- Broad-leaved semi-natural woodland;
- Dense scrub;
- Dry ditch;
- Fence;
- Hardstanding;
- Introduced shrub;
- Marshy grassland;
- Running water;
- Scattered broad-leaved trees;
- Scattered scrub; and,
- Semi-improved neutral grassland.

13.34 Bare ground - A small area, comprising of large gravel, formed a soakaway into which all the drains on site entered. This area was predominantly clear of vegetation.

13.35 Broad-leaved plantation woodland - Two areas of plantation woodland were recorded within the Application Site. Both areas comprised young trees and scrub planting, with tussocky semi-improved grassland forming the ground flora. All trees were in good condition with no cracks, crevices or hollows noted. These areas were surrounded by fencing which was in good to moderate condition. Tree species included alder, ash, dogwood, blackthorn, gorse, guelder rose, hawthorn, oak and rose. Ground flora included common grass, ruderal and forb species.

13.36 Broad-leaved semi-natural woodland - Along the northern edge of the site was an area of willow woodland, with occasional birch. The trees were all young to semi-mature and the area appears to have been planted. Occasional gorse formed the understorey within this area whilst the ground flora comprised semi-improved neutral grassland (see below). In addition, an area of willow carr was present within the north-western corner of the site, dominated by early mature willows. Marshy grassland formed the ground flora of this habitat

(see below). The ground within this area had been subject to high levels of poaching by horses, leaving areas of bare soil some of which were damp or full of water.

13.37 Dense scrub - A small area of dense gorse scrub was noted in the north-eastern corner of the site.

13.38 Dry ditch - A shallow, dry ditch was present along the northern edge of the area of willow carr in the north-western corner of the site. A second shallow dry ditch was noted in the south-eastern corner of the site. Both ditches were vegetated by semi-improved neutral grassland (see below) suggesting that the ditch does not regularly hold water.

13.39 Fences - Post and wire fencing generally topped by barbed wire, formed the majority of the site perimeter and also separated a number of internal areas within the site. In addition, concrete posts, remnants of a defunct fence line, were noted along parts of the western and northern site boundaries. The fencing supported minimal vegetation, however occasional lichens including *Cladonia* sp. were noted growing on the fence posts.

13.40 Hardstanding - Two small areas of hardstanding were present along the southern and eastern edges of the site, and provided provisional vehicular access points onto the site from the Fifth Avenue and Ninth Avenue respectively. The area off Ninth Avenue was a continuation of the road and was therefore regularly used as a parking area and turning point and the tarmac was predominantly clear of vegetation. The area of hardstanding off Fifth Avenue was blocked by large boulders to prevent vehicular access to the site and consequently this area was subject to less disturbance. Approximately 15% of the surface was covered by a mixture of moss species with occasional grass and composite species.

13.41 Introduced shrub - A small area of fenced shrub was present along the eastern boundary of the site. This was dominated by sea-buckthorn, with Pyracantha and dogwood also noted. In addition, a large butterfly bush was noted just to the north of the area of fenced introduced shrub area.

13.42 Marshy grassland - Marshy grassland dominated the Application Site varying in species composition depending on grazing pressure, topography and proximity to the stream. The central area of the site comprised topographically flat, made-ground with concrete drainage channels, and was subject to horse grazing and poaching. The habitat was dominated by patches of hard and soft rush which comprised between 50 and 80% of the vegetation cover. Grasses, sedges and other species were also noted within this area (see Appendix 13.1 for further details) most notably great burnet (a locally important species in Powys and Brecon Beacons) and black knapweed (a Local BAP species). Some small areas of ephemeral standing water were noted within this area.

13.43 Running water - Two small shallow streams ran through the site, the main one flowing from north to south with the other extending from the north-western corner into the main stream. Both streams were predominantly clear of marginal, emergent and floating vegetation. Small patches of bur-reed, marsh-marigold, water horsetail and water mint were noted within the streams. Sections of the main stream were shaded by overhanging scrub vegetation.

13.44 Scattered broad-leaved trees - The majority of the trees on the site were planted, varying between 1 and 4 m high, with many still attached to tree stakes. A number of young scattered trees were also noted along the bank of the main stream. Species included alder, ash, rowan, whitebeam and goat willow. None of the trees on site were suitable for use by bats for roosting.

13.45 Scattered scrub - Areas of scattered scrub were present around the edges of the site (mainly the southern boundary and in the north-eastern corner). Gorse was the most frequent species present, with occasional hawthorn, rose and bramble.

13.46 Semi-improved neutral grassland - The unmown road verges along Ninth Avenue and Fifth Avenue comprised semi-improved neutral grassland. The sward was dominated by grass species with comprised approximately 75% of the cover. Black knapweed (a Local BAP species), tufted vetch, common vetch, and common bird's-foot-trefoil were amongst the more common forb species within this sward. A larger area of semi-improved grassland was noted at the south-eastern corner of the site. Scattered common spotted and southern marsh orchids (c. 25 plants) were present within this area and a single patch of five devil's bit scabious plants were noted on the eastern edge of this area

Protected and Notable Species Surveys

13.47 Surveys for protected and notable species were completed to identify the presence / absence of such species using the Application Site. The protected species included within the survey criteria include:

- Badger;
- Bat species;
- Breeding birds;
- Great crested newt;
- Marsh fritillary;
- Otter;
- Reptile species; and
- Water vole.

13.48 Badgers - Badger surveys consisting of a visual inspection of the site and 30m around the site boundary where access was possible, for signs of badger presence, including setts, latrines, foraging signs and tracks were completed in May 2008. The field survey, which comprised an extensive search of all suitable habitat types within the Application Site identified no signs that the site is currently being used by badgers. As the majority of the site consists of damp and marshy ground this would make it unsuitable for badgers to utilise for building setts. The drier areas in the north-eastern corner of the site may provide suitable areas for badgers to build setts, however these could be thoroughly searched and no setts or evidence of badger activity was noted within this area of the site.

13.49 Bats - A daytime (pre-dusk) walkover survey of the Application Site for bats was conducted. A visual assessment was undertaken of the site for activity and signs of possible bat presence and all likely roosting areas were visually assessed. In addition, a series of targeted nocturnal surveys were conducted (continuing until 1.5 hours after sunset) to determine whether bats are using those areas of the site deemed to exhibit greatest potential. The nocturnal survey was conducted using electronic bat detectors with computer

analysis of bat detector recordings completed. The surveys were undertaken in May, July and August 2008. The initial bat surveys identified that there were no features on site which could be utilised by bats as a roost. Some of the habitats on site provided suitable foraging habitat (scattered trees, broadleaved woodland, dense scrub and running water). With respect to lighting at night, the northern and western boundaries of the site were predominantly unlit, however the southern and eastern boundaries of the site were lit by regularly spaced street lights (approximately 20m intervals) and bright lights were located within the water treatment works at the north-eastern corner of the site. Two separate nocturnal surveys were undertaken, each concentrating on different corners of the site. A single common pipistrelle was detected commuting along the western boundary of the site on only one of the two nocturnal surveys. The limited commuting activity recorded indicates that the Application Site does not contain important commuting features for the local bat populations. Common and soprano pipistrelles were recorded foraging along the edges of the Application Site during the survey period, with the western boundary being most frequently utilised. The timing of the bat activity recorded on site suggests that the bats noted were not roosting in close proximity to the Application Site.

13.50 Breeding birds - The methodology used for the breeding bird survey follows the Common Bird Census (CBC) as utilised by the Royal Society for the Protection of Birds (RSPB) and the British Trust for Ornithology (BTO) (Ref 13.5) and involved walking the entire survey site and passing within 50m of every point. All bird data was recorded onto maps and a final species list is compiled. Particular note was made of any Schedule 1 Species, National and Local BAP Priority Species and those listed as being of Conservation Concern (Red and Amber Listed). The surveys were completed in May and June 2008. Of the 19 species of bird noted using the site during the survey visits, 8 species were recorded to be breeding on the site. The surveys show that the site is of value for a range of National and Local Biodiversity Action Plan Priority Species and RSPB Red and Amber Listed Species of Conservation Concern including:

- Three National BAP Species – skylark and song thrush;
- Two local BAP Species – skylark and song thrush;
- Three RSPB Red Listed Species – skylark, song thrush and starling;
- Eight RSPB Amber Listed Species – green woodpecker, lesser black backed gull, swallow, tree pipit and willow warbler.

13.51 The most valuable features/habitats recorded on site for breeding birds are the areas of marshy grassland within the centre of the site. This area supported one pair of skylark and two pairs of meadow pipit. The presence of skylark is of significance in a local, county and national context. The woodland and scattered trees which form the site's boundary features are also deemed to be valuable for species such as willow warbler, song thrush, blackbird, robin and wren. The presence of song thrush is of significance in a local, county and national context. Concentrations of breeding birds were consistently noted along these boundary features.

13.52 Great Crested Newts - A habitat assessment of the land surrounding the development area (up to 500m from the Application Site) for suitable breeding and terrestrial habitat was undertaken. In order to assess the habitat suitability for amphibians in the development area, including great crested newts, the following criteria were considered: the presence of suitable breeding habitats in the vicinity of the site; the presence of suitable

terrestrial habitats within the development site; and, the presence of habitat corridors allowing newts to commute into the site.

13.53 The land within the Application Site was considered to provide optimal foraging habitat for great crested newts but the site has no areas of permanent standing water, and ephemeral pools of water within the site were less than 0.1m deep, with no areas of open water suitable for great crested newts to undertake breeding displays. The larger stream on site was considered to be sub-optimal for use by great crested newts as it has a significant flow, limited egg laying habitat and numerous small fish were present. The smaller stream had a slower flow and no fish were noted and more marginal and emergent vegetation provided suitable egg laying habitat. The water was however highly turbid which seriously impaired visibility and makes it sub-optimal for use by displaying great crested newts. The marshy grassland and semi-improved grassland habitats which dominate the site provide suitable foraging habitats for great crested newts, and the areas of scrub and woodland may provide suitable foraging habitat and areas of refugia.

13.54 A single water body, Penderyn Reservoir, was identified within a 500m radius of the Application Site. The reservoir is located approximately 50m north of the site with suitable terrestrial habitat connecting the survey area and the reservoir. In addition, the habitat to the north, west and north-east of the site was considered to provide optimal foraging habitat with good connectivity for this species.

13.55 Penderyn Reservoir was approximately 10ha in size, far exceeding the preferred size range for ponds (50-250 m^2) which support great crested newt breeding activities (Ref 13.X). The water body contained no aquatic vegetation and therefore lacked suitable egg laying habitat and the water clarity was low which would make it sub-optimal for great crested newt mating displays. The presence of trout within the reservoir further decreases the suitability of this water body. A Habitat Suitability Index (HSI) Assessment of the reservoir was completed which identified that the HSI Score was 0.39 which represented poor suitability for use by great crested newts.

13.56 A total of eight ponds were located within a 1km radius of the development site, the closest of which was located approximately 600m west. Due to the distance of these ponds from the Application Site these ponds were not included within the great crested newt assessment. Whilst great crested newts are known to travel up to 1km from their breeding ponds during the terrestrial phase of their life cycle, they generally only travel between 250 to 500m when the surrounding foraging habitat is optimal. Only one of the ponds, located 800m to the north-east of the site, was connected to the site by continuous suitable terrestrial habitat. The rest of the ponds were separated from the site by at least one road. Whilst these roads are not main roads and therefore are not considered to form impermeable barriers to newts, the lack of habitat connectivity together with the distance would decrease the likelihood of any great crested newts within these ponds utilising the development site.

13.57 Marsh fritillary - Surveys for this species were undertaken in three stages to determine the presence of marsh fritillary within the Application Site. The first stage involved an initial habitat and food plant survey of the site and the surrounding area to provide an assessment of the breeding potential within the site itself and whether there is any potential for dispersal into surrounding habitats. The marsh fritillary is associated with two main habitat

types: damp neutral or acidic grasslands (Rhos pastures); and, dry chalk and limestone grasslands. The main larval foodplant is devil's-bit scabious, with field scabious and small scabious occasionally used. The second stage involved using the Butterfly Monitoring Scheme methodology, to complete a series of counts along a fixed route across the site during given weather conditions. Adults seen within 5m of each side of the transect route were be recorded. The final stage of the survey depended on the quantity of food plant across the site, and included survey using quadrats or by examination of the individual plants for the larval form and eggs of the marsh fritillary. No marsh fritillaries (adults, larvae or eggs) were recorded during the surveys. The site provided sub-optimal habitat for marsh fritillary, with only a single small patch of devil's bit scabious (the larval food plant) noted. In addition, the sward height of the grassland was too high as the species prefer intermediate to shorter sward lengths.

13.58 Eleven species of butterfly were recorded during the survey, including three species of conservation concern listed on the UK Biodiversity Action Plan: small heath; small pearl bordered fritillary; and, wood white, which have undergone population decreases of 52%, 70% and 64% respectively over the last 20 to 30 years (Ref 13.6). This indicates that the site provides an important habitat for these species.

13.59 Otter - The field survey for otter consisted of an initial walkover survey assessing the site for habitat suitability, complemented by a detailed search for otter signs within 500m of the site, paying particular attention to all watercourses and water features. The streams and marshy grassland on site provided otters with suitable foraging habitat. The dense scrub at the southern end of the Application Site (outside of the site boundary) may provide a suitable resting area for otters, but the banks within the site were relatively open and provided little opportunities for otters to hide. No evidence of otter usage was noted during the survey. Otters do not always leave evidence of their presence, especially if the population density within an area is low (Ref 13.7) however the lack of evidence suggests that this length of watercourse within the site is not regularly utilised by this species.

13.60 Reptiles - Reptile surveys were completed in May and June 2008. Survey transects were identified on site to ensure that habitats within the Application Site with the potential to support reptiles were sampled. Any important reptile features such as vegetation piles, sunny aspects, log piles; abundant food supply (invertebrates etc) were also noted. Temporary reptile refugia (0.50 x 0.50 m roofing felt tiles) were established along the transect lines. These refugia were checked during 5 inspection visits undertaken in suitable weather conditions. The site provided suitable resources for reptiles which included: woodland and scrub areas providing commuting, foraging and hibernation sites; grassland habitats providing foraging and commuting sites; hardstanding providing basking areas for reptiles; and, running water providing foraging habitat for grass snake. During the survey visits a single juvenile slow worm was recorded at a single point on the western edge of the marshy grassland habitat. No other reptiles were identified during the survey visits.

13.61 Water Voles - The survey methodology involved an assessment of water features running through and around the Application Site (500m upstream and downstream where possible) to determine the presence/absence of, and suitability for water voles. An assessment will be made of the suitability of the habitat, and, where appropriate, a search made for possible burrows and signs of water vole activity such as: droppings; latrine sites;

feeding stations and 'lawns'; footprints and tracks or 'runs'; and, burrows. Water voles are closely associated with fresh water habitats, generally slow-flowing, less than 3m wide and approximately 1 m deep, including rivers, ditches, lakes and canals. They favour steep banks, which need to be suitable for burrowing and well vegetated. Their diet is almost exclusively vegetarian, including grasses, reeds and other herbaceous vegetation. The streams within the Application Site were considered to provide sub-optimal water vole habitat owing to the frequently shaded nature of the channel provided by adjacent scrub and woodland. The streams only contained occasional patches of marginal and emergent vegetation and therefore provide limited food resources for water voles. In addition, the banks were generally either sparsely vegetated where they were shaded by scrub and trees, or were bare where they were eroding away and thus providing sub-optimal cover for water voles. No evidence of water vole presence i.e. burrows, latrines, grazed vegetation was detected along the surveyed watercourses within, and adjacent to, the Application Site.

13.62 Other notable species recorded using the site (but not necessarily breeding) included:

- Common frog, common toad and smooth newt - all Local BAP species;
- Starling - UK BAP species;
- Green woodpecker, swallow and meadow pipit - RSPB Amber Data List species;
- Cinnabar moth caterpillar and wood white butterfly - UK BAP species;
- Four spotted chaser and large red damselfly - Locally Important Species in Powys and Brecon Beacons.

13.63 The results of the field and desk studies were compared against national and appropriate local Biodiversity Action Plans (BAPs). Table 13.6 shows the habitats and species that have been recorded within the Application Site (or are appropriate to the Application Site) and are listed on the Section 74 list of habitats and species of principal importance for the conservation of biological diversity in England. (i.e. National BAP target species and habitats) and/or the local Biodiversity Action Plans: 'Action for Nature: The Local Biodiversity Action Plan for Rhondda Cynon Taff' and 'Our Natural World - the Local Biodiversity Action Plan for the Brecon Beacons National Park' (currently under review).

Table 13.6: Summary of Biodiversity Action Plan Habitats and Species Recorded at the Application Site

Species	UK BAP*	Rhondda Cynon Taff BAP	Brecon Beacons BAP
Habitats	Neutral grassland **(b)**	-	Neutral grassland
	Rivers and streams **(b)**	Rivers and streams	Rivers and streams
	Broadleaved, mixed and yew woodland **(b)**	-	Woodland
Species	Skylark	Skylark	Skylark
	Song thrush	Song thrush	Song thrush
	Slow worm	-	Slow worm
	Common toad	Amphibians	Common toad
	Small pearl-bordered fritillary	Small pearl-bordered fritillary	Small pearl-bordered fritillary
	Small heath	-	Small heath
	Wood white	-	-
	Bats (various species)	All bats	Bats
	-	Black knapweed	-
	*(b) Broad habitat, (p) Priority habitat		

POTENTIAL IMPACTS

Nature Conservation Evaluation

13.64 Habitat features described within the Baseline Conditions section were evaluated against the Nature Conservation Evaluation criteria provided in Table 13.1. The evaluation of each habitat feature also took into account the presence (or potential presence) of any populations of protected species, species listed as priority species on the UK BAP and species considered to be scarce or threatened at a national level as this can, depending on the level of use by a particular species, elevate its conservation value.

Statutory Sites of Nature Conservation Importance

13.65 Two Special Areas of Conservation (SAC) sites were noted within 2km of the Application Site: Blaen Cynon; and Coedydd Nedd a Mellte. These sites support internationally rare species and habitats and are considered to be of international importance for nature conservation.

13.66 Three Sites of Special Scientific Interest (SSSIs) were noted within 2km of the Application Site: Cors Bryn-y-Gaer SSSI and Woodlands Park and Pontpren SSSI (which are part of Blaen Cynon SAC) and Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI (which is part of Coedydd Nedd a Mellte SAC). These sites support nationally rare species and habitats and are considered to be of national importance for nature conservation.

Non-Statutory Sites of Nature Conservation Importance

13.67 Seven sites listed as Ancient Woodland were noted within 2km of the Application Site. These sites are considered to be of county importance for nature conservation as they represent areas of habitat that are threatened and declining at a national level.

Habitats

13.68 The marshy grassland and running water habitats within the Application Site are listed on the Local BAPs as habitats of conservation importance. The area and quality of these habitats on the site are relatively limited given the extent and habitat quality of similar habitats within the immediate surrounding area. The marshy grassland however supports a low population of slow worm, and skylark were noted breeding within the grassland. Thus these habitats are considered to have a County importance for nature conservation.

13.69 The remaining habitats noted on site (bare ground, broad-leaved plantation woodland, broad-leaved scattered woodland, dense scrub, dry ditch, fences, hardstanding, introduced shrub, scattered broad-leaved trees, scattered scrub and semi-improved neutral grassland) are all considered to have a negligible importance for nature conservation.

Evaluation of Significance of Impacts

13.70 The activities likely to have an effect on habitats and species can be split into construction effects and operational effects. In this instance construction effects have been assumed to include all works associated with site clearance, land forming/contouring, construction of infrastructure (including services, drainage, roads, car parks etc) and buildings, and landscaping works. Operational effects can be considered as those as a result of on-going anthropogenic use (e.g. lighting, litter generation, habitat damage), vehicle movements, management and maintenance of the infrastructure, buildings and landscaping areas. The activities most likely to have an impact on habitats and species include site clearance, land forming/contouring, all construction works and on-going anthropogenic use of the buildings and infrastructure within the developed site.

Construction

Effects on Statutory Sites of Nature Conservation Importance

13.71 Blaen Cynon SAC (including Cors Bryn-y-Gaer SSSI and Woodlands Park and Pontpren SSSI) - This site is located approximately 100m east of the Application Site and comprises bogs, marshes, fens, heath, scrub, grassland and broad-leaved woodland. The site contains the following Annex I habitats: Northern Atlantic wet heaths (4%), Molinia meadows on calcareous, peaty or clayey-silt laden soils (1.9%), alkaline fens (0.3%) and alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (3.7%). Annex II species listed on the citation include marsh fritillary. Some of the Annex I habitats listed as qualifying features of the SAC are also represented on site but it is not considered that they are contiguous with the habitats on the Application Site due to the lack of habitat connection between the two sites (where habitats exist to the east of the Application Site comprise mainly or closely-mown amenity grassland). Marsh fritillary surveys of the Application Site did not identify any individuals of the species (at any stage in their life cycle) and concluded that the Application Site provided sub-optimal habitat for the species (only one small patch of Devil's bit scabious, the marsh fritillary larval food plant, was noted). Adult marsh fritillary rarely fly

more than 50-100m thus reducing the likelihood of the adults utilising the Application Site which is 100m away at its closest point. Thus it can be concluded that the loss of habitat within the Application Site will not result in a negligible impact on the integrity of the SAC.

13.72 Coedydd Nedd a Mellte SAC (including Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI) - This site is located approximately 1.1km west of the Application Site and is a very large and diverse example of old sessile oak wood. The woods extend along a series of deeply incised valleys and ravines, and contain complex mosaics of sessile oak woodland, ash woodland (some of which is referable to Annex I type Tilio-Acerion forests of slopes, screes and ravines), and transitions to lowland woodland types. The whole site is biologically rich, with many woodland plant communities represented and rich bryophyte and lichen assemblages. Notable higher plant species include wood fescue and the ferns *Dryopteris aemula*, *Hymenophyllum tunbrigense* and *Asplenium viride*. This site is separated from the Application Site by roads and extensive areas of habitat and does not appear to have any habitat connection to the Application Site. The effect of the proposed development on this site can therefore be considered to be negligible with respect to the integrity of the SAC.

Effects on Non-Statutory Sites of Nature Conservation Importance

13.73 Ancient Woodland - The areas of ancient woodland noted within 2km of the Application Site are separated from the application site by Penderyn Reservoir, extensive non-woodland habitats and roads and do not appear to have any habitat connection with the Application Site.

Effects on Habitats

13.74 The proposed development will result in the loss of approximately 0.05ha of bare ground, hard standing and fence habitats. These habitats are of limited ecological value and the effect of the loss of these habitats as a result of the proposed development can therefore be considered to be of negligible significance.

13.75 The proposed development will result in the loss of approximately 0.71ha of broad-leaved plantation, broad-leaved woodland and scattered broad-leaved trees. This area is being utilised by species such as willow warbler, blackbird, robin and wren for breeding. Without mitigation the effect of the proposed development on these habitats can therefore be considered to be a minor adverse effect at a local level.

13.76 With respect to the loss of approximately 0.02ha of dense and scattered scrub and introduced shrubs, these habitats are of limited ecological value and are not specifically providing habitat for protected or notable species. Without mitigation the effect of the proposed development on these habitats can therefore be considered to be of negligible significance.

13.77 The proposed development will result in the loss of approximately 180m of dry ditch. This habitat is of limited ecological value and is not specifically providing habitat for protected or notable species. Without mitigation the effect of the proposed development on this habitat can therefore be considered to be of negligible significance.

13.78 The proposed development will result in the loss of approximately 0.48ha of semi-improved neutral grassland. This habitat is listed on the Local BAP for the Brecon Beacons National Park. Without mitigation the effect of the proposed development on this habitat can therefore be considered to be a minor adverse effect at a local level.

13.79 With respect to the marshy grassland located within the centre of the site, the proposed development will result in the loss of 7.25ha of locally important habitat. This grassland is utilised by amphibians (frogs, toads and smooth newts) and a small population of slow worm for foraging, by a single pair of skylark for breeding and by notable invertebrates for foraging. Without mitigation, the loss of the habitat as a result of the construction activities can therefore be considered to be a minor adverse effect at the County level.

13.80 The proposed development will result in the diversion of a length of running water in the north-western corner of the site. The proposals will not result in the loss of any running water habitat although there will be temporary disturbance to the watercourse while the diversion works take place. Thus this can be considered to be a negligible effect at a site level.

Effects on Species

13.81 Badgers – No badger activity was recorded during the badger surveys. It is therefore anticipated that, without mitigation, the effect of the proposed development on these species will be negligible.

13.82 Bats – No bat roosts were recorded within the Application Site and therefore it can be considered that there will be a negligible impact on roosting bats from the proposed development. Bats were noted foraging along the northern and western boundaries of the site over the broad-leaved woodland areas. Without mitigation it can be considered that there would be a temporary reversible minor adverse impact on foraging bat species.

13.83 Breeding birds – With respect to breeding birds using the Application Site species listed as priority species under the NERC Act 2006 Section 42, UK BAP and Local BAP and as RSPB Red and Amber List, were noted breeding on the site. The most notable of these is skylark and song thrush which both held one breeding territory on the site. Skylark were recorded using the marshy grassland in the centre of the site whilst the song thrush were noted using the semi-improved grassland and scattered scrub along the southern boundary. The majority of the marshy grassland habitat will be lost as a result of the proposed development thus removing the opportunity of this area to be used by breeding skylark. However, given the extent of the similar habitats within the immediate vicinity of the Application Site it is likely that the pair of skylark will find alternative nesting sites within the local area. With respect to the habitats being used by the song thrush, these will be lost from this location as a result of the development. Thus without mitigation it can be considered that there will be a permanent, reversible, minor adverse impact at a county level on breeding bird species using the site.

13.84 Great crested newts – Although the habitats within the Application Site provide suitable foraging habitat, the great crested newt assessment concluded that the waterbodies within 500m of the Application Site are not suitable to support great crested newts and that those waterbodies greater than 500m from the site have minimal habitat connection with the site. Thus it can be concluded that the site is unlikely to support terrestrial phase great crested newts and therefore without mitigation the proposed development can be considered to have a negligible effect on this species.

13.85 Marsh fritillary – The habitats within the site provided sub-optimal habitat for marsh fritillary and no marsh fritillary's were noted during the survey. Thus it can be concluded that the site is unlikely to support marsh fritillary and therefore without mitigation the proposed development can be considered to have a negligible effect on this species.

13.86 Other Butterflies – During the marsh fritillary survey, eleven species of butterfly were recorded using the site. These included small heath, small pearl bordered fritillary and wood white which are all listed as being species of conservation concern of the UK BAP. The small heath butterflies were using the marshy grassland and semi-improved neutral grassland habitats, whereas the wood white and small pearly bordered fritillary were both using the grassland and scattered scrub areas around the edges of the site. There will be loss of habitats being used by these species and therefore without mitigation there can be considered to be permanent irreversible minor adverse effect at a County level.

13.87 Otter – The otter survey did not identify any signs of otter use within the Application Site or within the immediate vicinity. Therefore without mitigation the proposed development can be considered to have a negligible effect on this species.

13.88 Reptiles – A single slow worm was recorded on the Application Site during the survey works. Slow worms will be utilising the marshy grassland and scattered scrub and habitats for foraging and may hibernate within suitable features on the site if these are available. Given the small number of slow worm recorded on site and the suitability of habitat within the immediate vicinity of the site for these species, without mitigation the proposed development can be considered to have a permanent irreversible minor adverse effect on these species at a local level.

13.89 Water vole – The water vole survey did not identify any signs of water vole use within the Application Site or within the immediate vicinity. Therefore without mitigation the proposed development can be considered to have a negligible effect on this species.

Completed Development

Effects on Statutory Sites of Nature Conservation Importance

13.90 Blaen Cynon SAC (including Cors Bryn-y-Gaer SSSI and Woodlands Park and Pontpren SSSI) – With respect to potential effects on the SAC from the completed development the site is separated from the SAC by the sewage works and industrial development and does not appear to have any habitat connection to the site. The main potential effect could be from air pollution created as a result of the operation of the development. Air dispersion modelling has been completed (for full details see Chapter 9:

Air Quality) which shows that the background figure of air pollutants for NO_x and SO_2 far outweighs any process contribution from the proposed development. Thus it can be concluded that there would be no significant effect on the integrity of the SAC from operation of the proposed development.

13.91 The proposed development will likely result in an increase in traffic utilising the A465 road which exists south of the SAC. However, given the likely access route to the site and the distance from the roads to the SAC it is not anticipated that there will be any significant effect on the integrity of the SAC from this.

13.92 The completed development can therefore be considered to have a negligible effect on the SAC.

13.93 Coedydd Nedd a Mellte SAC (including Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI) – With respect to potential effects on the SAC from the completed development the site is separated from the SAC by roads and extensive habitat but does not appear to have any habitat connection to the site given the types of habitats present within the SAC and the development site. The air dispersion modelling did not extend to include this SAC (it fell outside of the grid which was considered), however, the results of the modelling show that there should be no higher concentrations of NO_x and SO_2 outside of the grid. Thus it can be concluded that there would be no significant effect on the integrity of the SAC from operation of the proposed development. Thus the completed development can be considered to have a negligible effect.

Effects on Non-Statutory Sites of Nature Conservation Importance

13.94 Ancient Woodland – With respect to potential effects on the ancient woodland sites from the completed development the site is separated from the SAC by roads and extensive non-woodland habitat and does not appear to have any habitat connection to the site given the types of habitats present within the SAC and the development site. The air dispersion modelling did not extend to include the ancient woodland sites specifically, however, the results of the modelling show that there should be no higher concentrations of NO_x and SO_2 outside of the grid. Thus it can be concluded that there would be no significant effect on the integrity of the ancient woodland sites from operation of the proposed development. Thus the completed development can be considered to have a negligible effect.

Effects on Habitats

13.95 Increases in traffic flow and therefore exhaust-fume pollution may result in the deterioration of habitat quality of the landscaping areas which surround the operational areas of the site. Increased nutrients, such as those produced by exhaust-fumes, will result in the loss of species characteristic of nutrient-poor habitat through being out competed by more robust species, and may cause pollution to the existing ditches and waterbodies. The effects of pollution on such habitats is currently an unknown factor. Without mitigation this can be considered to be permanent, reversible minor adverse effect at a site level.

13.96 Increased human activity and associated issues, e.g. pollution, litter and invasion of non-native species, is considered to be temporary, reversible minor adverse effect at a site level.

13.97 A change of land-use resulting from the proposed development will result in a permanent change in the local ecosystem structure and is considered to be permanent, reversible minor adverse effect at a site level.

13.98 The creation of landscaped habitats within the Application Site is considered to a permanent, irreversible minor beneficial effect at a local level.

Effects on Species

13.99 Depending on the operational requirements of the Developed Site there is the potential for disturbance to bird species which may use the landscape areas for foraging and nesting. This can be considered to be a temporary, irreversible minor adverse effect at a local level.

13.100 Depending on the operational requirements of the Developed Site there is the potential for disturbance to foraging bat species which may still use the landscape area for foraging and, in the future, once trees are suitable matured, roosting. This can be considered to be a permanent, irreversible minor adverse effect at a local level.

13.101 The additional traffic within the Developed Site may result in risks to fauna which exist within the landscape are from crossing access roads within the Application Site. This can be considered to be a permanent, irreversible minor adverse effect at a local level.

MITIGATION

Construction

Statutory Sites of Nature Conservation Importance

13.102 Blaen Cynon SAC (including Cors Bryn-y-Gaer SSSI and Woodlands Park and Pontpren SSSI) – The effect of the proposed development works on this site can be considered to be negligible and therefore mitigation measures are not required.

13.103 Coedydd Nedd a Mellte SAC (including Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI) – The effect of the proposed development works on this site can be considered to be negligible and therefore mitigation measures are not required.

Non-Statutory Sites of Nature Conservation Importance

13.104 Ancient Woodland – The effect of the proposed development works on these sites can be considered to be negligible and therefore mitigation measures are not required.

13.105 With respect to the loss of marshy and semi-improved neutral grassland habitat from beneath the development footprint, within the proposed landscape area to the south of the proposed operational area approximately 0.30ha of grassland habitats will be created surrounding the ponds. It is anticipated that this area will accommodate native species with the potential to enhance the biodiversity value of the area.

13.106 No specific mitigation in respect of the loss of bare ground, hardstanding and fences is required.

13.107 With respect to the loss of broad-leaved woodland, broad-leaved plantation and scattered trees and scrub, the existing habitats areas along the northern and western boundaries (totalling approximately 0.90ha) will be retained and enhanced and in addition, the landscaping areas will provide approximately 0.70ha of woodland and scrub planting, with predominately (but not exclusively) native species used.

13.108 Within the landscape area 0.17ha of open water and associated reedbed/marginal aquatic vegetation will be created within the southern landscape area. These features will not only act as SUDS as part of the drainage scheme for the site but will also provide habitat for use by aquatic and terrestrial invertebrate species, amphibian species, wildfowl and bird species (once the reedbed areas are established). The inclusion of areas of trees and scrub within this environ will provide a mosaic of habitats which would be suitable for use by a range of species.

13.109 The inclusion of a sedum green roof on the visitor centre will provide additional habitats within the site environ. Sedum green roofs have been shown to provide habitat for a range of invertebrate species (Ref 13.8).

13.110 The landscape areas within the Application Site will be designed to enhance the existing and adjacent habitats. Appropriate ecotones (a natural gradation from intensely managed amenity habitat to more natural habitat) from the development to the remaining and adjacent habitats should be implemented. Appropriate native species (or cultivars in the more amenity areas) and species of local provenance should be used.

13.111 To minimise the effects of soil compaction and indirect damage to existing habitats to be retained and hedgerow root systems, the following should take place:

- Ecologically sensitive areas (especially retained habitats within the landscape area) are to be fenced off and no storage/works to take place within the fences; and,
- Where fencing off is not feasible then geotextile material will be used, particularly in areas that will be landscaped.

13.112 Effects resulting from dust and chemical spill will be minimised. Fires will not be permitted on the Application Site and the work force will be made aware of the risks of accidental fires. Appropriate precautions will be instigated.

13.113 Management and enhancement of habitats within the landscape areas will be carried out in accordance with a Management Plan which will be agreed with the relevant authorities prior to implementation. This management plan will ensure the long-term viability of the habitats within the landscape areas and will provide specific measures with respect to the maintenance of identified fauna populations within the site.

Species

13.114 No mitigation is available for habitat loss which will result in the reduction of habitat available for use by skylark. Disturbance to these and other nesting birds can be minimised through avoidance of carrying out vegetation clearance during the nesting bird season, generally accepted to be March – September inclusive. Where this is not feasible the habitats will be checked by a suitably qualified ecologist prior to habitat destruction. If nesting birds are identified then no works will take place that will cause disturbance until the birds have naturally left the nest. Noise disturbance is to be minimised, as discussed in Chapter 10: Noise and Vibration.

13.115 With respect to the butterfly species recorded using the site, the areas of grassland and scrub habitat available for use will be reduced but areas of replacement grassland and scrub habitats will be created within the landscape area.

13.116 Mitigation plans will be developed to minimise the effect on the following species: slow worm. All mitigation plans will be approved by the Countryside Council for Wales prior to implementation. It is anticipated that the mitigation plan will include provision for completion of a trapping and translocation programme to ensure that there is no death or damage to individual slow worms during the construction phase.

13.117 Population levels of slow worm within the receptor area will be monitored on an agreed basis to assess the effect of the proposed development on the species. Species monitoring results will be utilised to feed-back into the Management Plan for the habitats within the landscape area to ensure appropriate management of the habitats in accordance with species requirements.

13.118 To minimise road kill, the majority of vehicle movements will be restricted to be being between 08:00 and 18:00. Thus vehicle movements outside of these hours will be minimal and predominantly associated with operation of the site rather than deliveries.

13.119 To minimise disturbance to nocturnal and roosting wildlife, no night working will be undertaken during the construction phase.

Completed Development

Statutory Sites of Nature Conservation Importance

13.120 Blaen Cynon SAC (including Cors Bryn-y-Gaer SSSI and Woodlands Park and Pontpren SSSI) – The effect of the completed development works on this site can be considered to be negligible and therefore mitigation measures are not required.

13.121 Coedydd Nedd a Mellte SAC (including Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI) – The effect of the completed development works on this site can be considered to be negligible and therefore mitigation measures are not required.

Non-Statutory Sites of Nature Conservation Importance

13.122 Ancient Woodland – The effect of the completed development works on these sites can be considered to be negligible and therefore mitigation measures are not required.

Habitats

13.123 No mitigation is available to minimise the effects of increased traffic flow and therefore exhaust-fume pollution on the habitat quality of the existing adjacent habitats and created habitats within the landscape areas. However, it is likely that stricter national emission control standards would result in reduced levels of exhaust fume pollution from each individual vehicle thus reducing the potential impact of increased traffic flow.

13.124 There is no available mitigation against the effects of increased human activity (particularly around the Visitor Centre) and associated issues. However these can be minimised through education and interpretation of areas being retained or enhanced for wildlife.

Species

13.125 The proposed development will have a landscape buffer strip along these boundaries which will potentially provide foraging opportunities for bats to be retained along these routes. The lighting strategy has been designed to minimize light spill to the northern and western edges of the Application Site. Along the northern boundary there are no lights to be installed at the back of the proposed building thus resulting in the dark commuting corridor being maintained. Along the western boundary the lighting will be associated with the road and therefore focussed to illuminate the road rather than the adjacent landscaping zone.

13.126 The following generic recommendations are made with regard to the development of the site:

- Develop a Mitigation Plan with respect to the presence of slow worm within the Application Site.
- Develop a Construction Ecological Management Plan, once full details and timescales for the development and construction works are known, to minimise risk to the ecology of the site during development.
- Hedge works should be carried out from only one side of the hedge in any one year to retain foraging and nesting sites for birds and other species on the other side.

- The recommendations of BS5837 (2005) and NJUG 10 (as appropriate to operations) should be followed when working close to trees.
- All herbicides should be used in accordance with the manufacturers instructions.
- Avoid vegetation work between March to September inclusive to obviate conflict with the Wildlife and Countryside Act 1981 (WCA) regarding disturbance to nesting birds.
- Environment Agency Pollution Prevention Guidelines, notably PPG1, 5 and 6 should be adhered to throughout works on site.
- Update of protected species surveys if there is a chance the development scheme will be delayed.

13.127 The following generic points in relation to habitat creation and enhancement should be considered:

- Wild/Natural Areas (outer buffer zones around the periphery of the site) - 100% native and local provenance species should be utilised (except in special circumstances).

- Informal Areas (inner buffer zone around the development) - 75% native tree and shrub stock should be used. Non-native stock to be used as landscape features and visual focal points. Of the non-native species used 50% are to be wildlife friendly. A minimum of 60% of the grass seeding is to comprise an appropriate wildflower/grass mix.

- Formal Areas – these areas should comprise 10% native trees and shrubs, 40% ornamental species (wildlife friendly), and, 50% other ornamental species.

- The following points should also be considered:
    - Seed/plant stock to be of local provenance and from a similar ecotone i.e. they should reflect the local site conditions and existing species in each habitat.
    - Wildlife friendly, native cultivars should be favoured wherever possible.
    - Smaller tree/shrub stock to be used whenever feasible.
    - Planting products are to be bio-degradable if possible.
    - Peat-free composts are to be specified.

13.128 Where feasible, the balancing ponds are designed to be wildlife friendly. The inclusion of appropriately designed ponds would support the local BAP in providing habitat for a range of amphibians.

13.129 An appropriate number and type of bird and bat boxes should be erected on the existing / proposed trees and buildings where possible.

13.130 All elements of the mitigation should be monitored throughout the development period and post-development with a view to assessing the efficiency of the proposed strategy and to inform future mitigation strategies/development master planning. The following provides a guideline for monitoring periods:

- Nesting/breeding success of birds — three years post-development.
- Use of site by reptile species — three years post-development.
- Use of site by butterflies — three years post-development.
- Monitoring of bat/bird boxes — three years post-development.

- Tree/hedgerow planting five years post-development.
- Grassland/aquatic vegetation planting five year post-development.
- Health of retained trees/hedgerows five years post-development.

EVALUATION OF RESIDUAL IMPACTS

Construction

Effects on Statutory Sites of Nature Conservation Importance

13.131 Blaen Cynon SAC (including Cors Bryn-y-Gaer SSSI and Woodlands Park and Pontpren SSSI) – The residual effect of the proposed development works on this site can be considered to be negligible.

13.132 Coedydd Nedd a Mellte SAC (including Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI) – The residual effect of the proposed development works on this site can be considered to be negligible.

Effects on Non-Statutory Sites of Nature Conservation Importance

13.133 Ancient Woodland – The residual effect of the proposed development works on these sites can be considered to be negligible.

Effects on Habitats

13.134 The proposed development works within the Application Site will result in the loss of significant areas of marshy grassland. Given the level of mitigation that is available for this loss of habitat the residual effects can be considered to be permanent, irreversible minor adverse effects at a County level.

13.135 The proposed development works within the Application Site will result in the loss of small areas of semi-improved neutral grassland. Given the level of mitigation that is available for this loss of habitat the residual effects can be considered to be temporary, irreversible negligible effects at a local level.

13.136 The proposed development works within the Application Site will result in the loss of areas of broad-leaved plantation, broad-leaved woodland, scattered trees, and scrub habitats. Given the level of mitigation that is available for this loss of habitat the residual effects can be considered to be temporary, irreversible negligible effects at a local level.

13.137 The proposed development works within the Application Site will result in the loss of areas of bare ground, hardstanding and fences. Given the minimal ecological value of these features the residual effects can be considered to be permanent, irreversible negligible effects at a site level.

13.138 The proposed development works within the Application Site will result in the diversion of a section of running water. Given the current minimal ecological value of this

features and the proposed mitigation, the residual effects can be considered to be permanent, irreversible negligible effects at a site level.

13.139 Effects resulting from soil compaction, in addition to those outlined in Chapter 11: Ground Conditions, Drainage and Flood Risk, include alteration of soil structure which may affect the species composition within retained habitats, landscape quality and future reinstatement and planting capabilities in landscape areas. With the mitigation measures detailed above implemented the residual effects of the proposed works can be considered to be a permanent, reversible and negligible effect at the site level.

13.140 Indirect damage to tree root systems during adjacent works is possible. However, with the mitigation measures detailed above implemented the residual effects of the proposed works can be considered to be a permanent, irreversible and negligible effect at the site level.

13.141 A change of land use during the construction phase will result in a temporary change in the local ecosystem structure. No mitigation is available with respect to this effect and therefore this is considered to be a temporary, irreversible minor adverse effect at the local level.

Effects on Species

13.142 The proposed development of the site will result in effects on butterfly species currently using the site. With the mitigation measures detailed above implemented the residual effects of the proposed development on these species can be considered to be permanent, irreversible minor adverse effects at a County level.

13.143 The proposed development of the site will result in effects on breeding bird species including skylark and meadow pipit currently using the marshy grassland within the site. With the mitigation measures detailed above implemented the residual effects of the proposed development on these species can be considered to be permanent, irreversible minor adverse effect at a County level. Clearance of ground in preparation for construction works may result in loss of habitat and disturbance to nesting birds, in particular skylark, if this occurs during the breeding season. With the mitigation measures detailed above implemented the residual effects of the proposed works on this species can be considered to be permanent, irreversible and of negligible significance at a site level.

13.144 The proposed development of the site will result in effects on breeding bird species including song thrush, willow warbler, tree creeper, robin, blackbird and wren currently using the woodland and scrub habitats within the site. With the mitigation measures detailed above implemented the residual effects of the proposed development on these species can be considered to be temporary, reversible negligible effect at a local level.

13.145 The proposed development of the site will result in effects on foraging bat species currently using the woodland and scrub habitats along the northern and western boundaries of the site. With the mitigation measures detailed above implemented the residual effects of the proposed development on these species can be considered to be temporary, reversible negligible effect at a local level.

13.146 The proposed development of the site will result in effects on a small population of slow worm currently using the marshy grassland within the site. With the mitigation measures detailed above implemented the residual effects of the proposed development on these species can be considered to be temporary, irreversible negligible effect at a local level.

13.147 With the mitigation measures outlined above implemented the following residual effects can be considered to be temporary, reversible and negligible effects: dust generation resulting in reduced photosynthetic capacity and palpability of vegetation and therefore a loss of plants and/or invertebrates; accidental fire causing damage to vegetation and habitats; chemical spill resulting in phytotoxicity; increased traffic may result in loss of individuals of protected and/or other species; and disturbance to nocturnal or roosting wildlife.

Completed Development

Effects on Statutory Sites of Nature Conservation Importance

13.148 Blaen Cynon SAC (including Cors Bryn-y-Gaer SSSI and Woodlands Park and Pontpren SSSI) – The residual effect of the completed development works on this site can be considered to be negligible.

13.149 Coedydd Nedd a Mellte SAC (including Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI) – The residual effect of the completed development works on this site can be considered to be negligible.

Effects on Non-Statutory Sites of Nature Conservation Importance

13.150 Ancient Woodland – The residual effect of the completed development works on these sites can be considered to be negligible.

Effects on Habitats

13.151 With the mitigation proposed implemented, it can be considered that the residual effects associated with the following would be permanent, irreversible negligible to minor adverse effects at a site to local level: increases in traffic flow and therefore exhaust-fume pollution resulting in the deterioration of habitat quality of the retained and created habitats within the landscape area; increased nutrients, such as those produced by exhaust-fumes, resulting in the loss of species characteristic of nutrient-poor habitat through being out competed by more robust species; pollution to the existing watercourses.

13.152 With the mitigation proposed implemented, it can be considered that the residual effects associated with increased human activity and associated issues (e.g. pollution, litter and invasion of non-native species) would be permanent, reversible negligible effects at the site level.

13.153 A change of land-use resulting from the completed development will result in a permanent change in the local ecosystem structure. As no mitigation is available for this, it is

considered that the residual effects will be permanent, irreversible minor adverse effects at the local level.

13.154 The residual effect of the creation of landscaped habitats within the Application Site is considered to a permanent, irreversible minor beneficial effect at a local level.

Effects on Species

13.155 Depending on the operational requirements of the developed site there is the potential for disturbance to bird species which may continue to use the landscape areas. With the mitigation measures detailed above implemented the residual effects can be considered to be permanent, irreversible negligible effects at the local level.

13.156 Depending on the operational requirements of the developed site there is the potential for minor disturbance to foraging bat species which are likely to still use the habitats within the landscape areas for foraging. With the mitigation measures detailed above implemented the residual effects can be considered to be permanent, reversible negligible effects at the local level.

13.157 The additional traffic within the developed site may result in risks to fauna which exist within the landscape areas from crossing access roads within the Application Site. With the mitigation measures detailed above implemented the residual effects can be considered to be permanent, irreversible negligible effects at a local level.

SUMMARY

13.158 The Application Site is situated 100m west of Blaen Cynon SAC (which encompasses Cors Bryn-y-Gaer SSSI and Woodlands Park and Pontpren SSSI). In addition, Coedydd Nedd a Mellte SAC (which encompasses Coedydd Nedd a Mellte SSSI and Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI is located within 1.1km west of the Application Site.

13.159 There are seven ancient woodlands within 2km of the Application Site. There are no non-statutory designated conservation sites within 2km of the Application Site.

13.160 Thirteen different habitats were recorded on the Application Site. Of these three are listed as broad habitats on the UK BAP and the Local BAPs: neutral grassland; rivers and streams; and woodland.

13.161 Protected species records from within a 2km radius of the site include nationally scarce invertebrates, various bird species, toad, frog and common lizard, bats, pine martin and bluebell. Species surveys completed within the application site identified that the site supported populations of UK and Local BAP listed butterflies, reptiles (slow worm) and breeding birds, and provided foraging areas for bats.

13.162 With appropriate mitigation, the ecological effects resulting from the Proposed Development will primarily be negligible to minor adverse effects at a site to County level.

The inclusion of habitats within the Landscape Zone will result in predominately minor beneficial effects at a local level.

13.163 Table 13.7 contains a summary of the ecological likely significant effects of the Proposed Development. Appendix 13.2 provides a review of relevant planning policies relating to ecology.

13.164 No details of cumulative schemes were provided and therefore an assessment of the cumulative effects of developments within the area has not been completed as part of this chapter.

Table 13.7: Summary Impacts Table

Proposed Activity	*Characterisation of unmitigated impact on the feature*	*Significance without mitigation and confidence level*	*Mitigation and enhancement*	*Residual significance and confidence level*
				CONSTRUCTION IMPACTS
				Effects on Statutory Sites of Nature Conservation Importance
Blaen Cynon SAC	None	Probable negligible impact at international level	Not required.	Probable negligible impact at international level
Cors Bryn-y-Gaer SSSI	None	Probable negligible impact at international level	Not required	Probable negligible impact at international level
Coedydd Nedd a Mellte SAC & SSSI	None	Probable negligible impact at international level	Not required	Probable negligible impact at international level
Woodlands Park and Pontpren SSSI	None	Probable negligible impact at national level	Not required	Probable negligible impact at national level
Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI	None	Probable negligible impact at national level	Not required	Probable negligible impact at national level
				Effects on Non-Statutory Sites of Nature Conservation Importance
Ancient Woodland Sites	None	Probable negligible impact at county level	Not required	Probable negligible impact at county level
				Effects on Habitats
Loss of bare ground, hardstanding and fence habitats	None - habitats not being used by any species.	Probable negligible impact at site level	Not required	Probable negligible impact at site level

Loss of broad-leaved semi-natural woodland, broad-leaved plantation woodland and scattered broad-leaved trees	Loss of habitat being used by common invertebrates, and common birds for foraging and nesting and by bats for foraging.	Certain permanent irreversible minor adverse impacts at local level	Retention of existing habitat along northern and western boundaries and creation of broad-leaved woodland/ habitats within landscape zone	Probable negligible impact at local level
Loss of dense and scattered scrub and introduced shrub habitats	Loss of habitat being used by invertebrates, mammals and birds for foraging and nesting	Certain permanent irreversible negligible impact at site level	Creation of scrub habitats within landscape zone	Probable negligible impact at site level
Loss of marshy grassland habitats	Loss of moderate area of Local BAP habitat which supports butterfly and bird species listed on the UK and Local BAPs	Certain permanent irreversible impact at local level	Creation of grassland habitats within the landscape zone	Probable minor adverse impact at the County level
Loss of semi-improved neutral grassland	Loss of small area of Local BAP habitat	Certain permanent irreversible minor adverse impact at local level	Creation of grassland habitats within the landscape zone	Probable negligible impact at the local level
Loss of dry ditch habitats	None - habitats not being used by any species.	Probable negligible impact at site level	Not required	Probable negligible impact at site level
Temporary disturbance to running water habitats	Potential pollution of watercourses as a result of diversion works.	Probable negligible impact at site level	Protection of watercourses during diversion works to ensure no pollution enters watercourse.	Probable negligible impact at site level
Various habitats	Effects of soil compaction on habitats	Probable temporary reversible impacts within site	Delineation of works areas and areas where plant, equipment and storage is not allowed. Use of geotextile over soils within temporary works/storage areas if within the areas of landscaping.	Probable negligible impact at site level
Various habitats	Effects on habitats from dust generation	Probable temporary	Minimisation of dust through control of works during construction phase	Probable negligible impact at site level

Various habitats	Effects on habitats from increased risk of fire	Probable temporary reversible impacts within site.	No fires to be allowed on site. Construction workers to be made aware of risks and informed of controls.	Probable negligible impact at site level
Various habitats	Effects on habitats from chemical spill	Probable temporary impacts at site level	Use of chemicals on site to be heavily controlled. Construction workers to be made aware of risks and informed of controls.	Probable negligible impact at site level
Local ecosystem	Change in local ecosystem structure from development	Probable temporary reversible impacts at local level	None available	Probable minor adverse impact at local level
				Effects on Species
Loss of habitat for terrestrial invertebrates	Loss of habitat being utilised by a range of butterfly species including small heath, small pear-bordered fritillary and wood white which are listed on Local BAP	Certain permanent irreversible minor adverse impact at County level	Creation of grassland and scrub habitats within landscape area and management of area for use by butterflies	Probable minor adverse impact at County level
Loss of habitat for breeding birds - skylark	Loss of marshy grassland habitat used by breeding skylark	Certain permanent irreversible minor adverse impact at County level	No mitigation available.	Probable minor adverse impact at County level.
Loss of habitat for breeding birds – song thrush	Loss of neutral grassland and scattered scrub habitat used by breeding song thrush	Certain permanent irreversible minor adverse impact at County level	Creation of woodland, woodland edge and scrub habitats within landscape area	Probable negligible impact at County level
Loss of habitat for breeding birds - other species using habitats on site	Loss of grassland, woodland and scrub habitats being used by breeding birds.	Certain permanent irreversible impact at local level	Creation of woodland, woodland edge and scrub habitats within landscape area	Near-certain negligible impact at local level

Disturbance to birds on-site during breeding	Potential to affect breeding success in local area	Probable temporary irreversible impact at local level	Ensure vegetation clearance works are carried out (a) outside of the breeding season or (b) after ecologist has confirmed no birds are breeding within / immediately adjacent to vegetation.	Near-certain negligible impact at site level
Disturbance to birds off-site during breeding	Potential to affect bird territories and breeding success in local area	Probable temporary irreversible impact at local level	Minimise noise during construction.	Probable negligible impact at local level
Loss of roosting bat habitat	None	Near-certain negligible impact at County level	None required	Near-certain negligible impact at County level
Loss of foraging bat habitat	Potential to affect bat foraging routes due to vegetation clearance.	Probable temporary reversible minor adverse impact at local level	Creation of suitable habitats within landscape zone along northern and western site boundaries to ensure foraging routes for bats are maintained.	Probable negligible impact at local level
Loss of habitat for slow worm	Loss of habitats being used by small population of UK BAP species, slow worm.	Probable permanent irreversible minor adverse impact at local level	Development and implementation of a mitigation strategy to ensure no loss of favourable conservation status of species from development.	Near-certain negligible impact at local level.
Various fauna	Disturbance to various fauna from increased noise	Probable temporary reversible impacts at local level	Control of noise levels during construction in accordance with details provided in Chapter 10: Noise and Vibration.	Probable negligible impacts at local level
Various fauna	Loss of individuals from increased traffic	Probable temporary irreversible impacts at local level	Construction working areas, storage areas and haulage routes to be clearly defined and marked out. Construction workers to be informed of restricted areas.	Probable negligible impacts at local level

Local ecosystem	Change in local ecosystem structure from development	Probable temporary reversible negligible impacts at local level	None available.	Probable negligible impacts at local level
				COMPLETED DEVELOPMENT
				Effects on Statutory Sites of Nature Conservation Importance
Blaen Cynon SAC	Potential impacts from emissions from increased traffic movements along A465	Probable negligible impact at international level	None available.	Probable negligible impact at international level
Cors Bryn-y-Gaer SSSI	None	Probable negligible impact at international level	Not required	Probable negligible impact at international level
Coedydd Nedd a Mellte SAC & SSSI	None	Probable negligible impact at international level	Not required	Probable negligible impact at international level
Woodlands Park and Pontpren SSSI	None	Probable negligible impact at national level	Not required	Probable negligible impact at national level
Dyffrynoedd Nedd a Mellte a Moel Penderyn SSSI	None	Probable negligible impact at national level	Not required	Probable negligible impact at national level
				Effects on Non-Statutory Sites of Nature Conservation Importance
Ancient Woodland Sites	None	Probable negligible impact at county level	Not required	Probable negligible impact at county level
				Effects on Habitats
Adjacent habitats and habitats in landscaping areas	Deterioration of habitats as a result of increased traffic flow and exhaust fumes	n/a	None available.	Probable minor adverse impact at site level
Adjacent habitats and habitats in landscaping areas	Deterioration of habitats from increased human activity e.g. litter, pollution, disturbance	Probable temporary reversible impact within site	Control of public access to identified areas within the areas of landscaping.	Probable negligible impact at site level

Local ecosystem	Change in local ecosystem structure as result of development	Probable temporary irreversible negligible impacts at local level	None available. Local ecosystem will alter eventually.	Probable minor adverse impact at local level
Landscaping area	Creation of habitats within the areas of landscaping	n/a	Inclusion of additional habitats within the areas of landscaping such as: grassland, open water, marginal vegetation, woodland and scrub.	Probable permanent reversible minor beneficial impact at local level
				Effects on Species
Bird species	Disturbance to bird species using the areas of landscaping for feeding / nesting	Probable temporary irreversible minor adverse impacts at the site level	Minimise disturbance in ecologically sensitive areas. Control of public access.	Probable negligible impact at local level
Bat species	Disturbance to foraging bat species using the areas of landscaping for foraging	Probable temporary irreversible minor adverse impacts at the site level	Minimise lighting and disturbance in ecologically sensitive areas.	Probable negligible impact at local level
Various species	*Death / injury to individuals from increased traffic and / or road design*	*Probable permanent irreversible minor adverse impacts at the local level*	*Minimise risk from traffic through control of movements and design of road system. Minimal use of roads at night.*	Probable negligible impact at site level

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Chapter Fourteen
ARCHAEOLOGY AND CULTURAL HERITAGE

INTRODUCTION

14.1 This Chapter details the results of a desk based study to assess the archaeological potential of the site proposed for the Enviroparks development. The site comprises previously developed land and has undergone substantial re-grading work in the past. As such it is considered unlikely that any undisturbed below ground archaeological deposits will be present, however an initial baseline investigation has been undertaken and determines whether or not there is a requirement for further works.

METHODOLOGY USED

14.2 The Chapter aims to assess the potential impact of the proposed development on any known or potential archaeological and cultural heritage resources within the vicinity. As such, the Chapter will:

- Identify and define the extent of known archaeological and cultural heritage resources within the study area;
- Establish, from existing evidence, the likely archaeological potential of the study area;
- Provide a preliminary assessment of the importance of the known archaeological and cultural heritage features;
- Assess the overall impact of the proposed development on any known or potential archaeological or cultural features; and
- As necessary, the Chapter will make recommendations on the need for (and scope of) further evaluation and mitigation.

BASELINE ANALYSIS

The Site

14.3 The proposed site for the Enviroparks operation is currently undeveloped. That said, the site is brownfield land and was historically an ordnance factory, between approximately 1940 and 1945. The site is understood to have been an engineering works, producing .303 cartridges and other metal based components. The site is located on a developed industrial estate, and the area has a significant industrial past, especially the iron and coal workings, the result of the areas rich mineral wealth. It is considered unlikely that significant, undisturbed finds of archaeological or cultural interest will be made.

14.4 As a site which is currently not in use, the proposed construction of the Enviroparks facility will cause significant disruption to the site landscape. The following activities associated with the construction of the proposed development could impact on known or potential archaeological or cultural features:

- Topsoil stripping;
- Excavation work for footings / piling;
- Pre-construction drainage works and fencing;
- Movement of heavy machinery; and
- Provision of services, drainage and cabling.

14.5 Cultural heritage consists of built features, historic landscapes and archaeology - the material remains of past ways of life - as well as less tangible aspects such as language, literature, music, religion, customs, crafts, art, folklore, place names and traditional ways of life. Areas of cultural heritage may include World Heritage Sites, historic parks or gardens, historic landscapes, nationally important archaeological remains, which are designated as Scheduled Ancient Monuments, other important archaeological remains, areas of archaeological evaluation, listed buildings and other buildings of architectural or historic importance.

Legislation

Statutory Legislation

14.6 The following table summarises the statutory legislation relating to the historic environment and relevant to this section.

Table 14.1: Statutory Protection for Archaeological and Heritage Sites

Legislation	*Key Issues*
Ancient Monuments and Archaeological Areas Act (1979)	It is a criminal offence to carry out any works on or near to a Scheduled Ancient Monument without Scheduled Monument Consent.
Planning (Listed Buildings and Conservation Areas) Act (1990)	No works can be carried out in relation to a listed building without listed building consent. Designation of an area as a 'conservation area' introduces general controls over demolition and development within that area.
Treasure Act (1996)	The 1996 Act defines 'Treasure' as any object that is at least 10% gold or silver, associated coins or groups of coins which are over 300 years old, objects formerly classed as 'treasure trove' (i.e. deliberately deposited items with a high content of gold or silver) and any objects found in association with the above. Any find of 'Treasure' must be reported to the local Coroner.

Burial Act (1857)	Under Section 25 of the 1857 Act, it is a criminal offence to remove human remains from any place of burial without a Home Office licence.
Hedgerow Regulations (1997)	It is against the law to remove most countryside hedgerows without permission. A local authority can prohibit the removal of an 'important' hedgerow. The 1997 Regulations define the criteria for determining whether a hedgerow is important; these include historical and archaeological criteria.
Protection of Military Remains Act (1986)	The Act outlines the criteria for designating a military crash site. Certain activities are prohibited at protected sites, without the authority of the Ministry.

Non-Statutory Protection

14.7 The following table summarises the non-statutory protection relating to the historic environment and relevant to this chapter.

Table 14.2: Non-statutory Protection For Archaeological And Heritage Sites

Legislation	*Key Issues*
Planning Policy Wales	Defines the land use planning policies of the Welsh Assembly Government. It is supplemented by a series of Technical Advice Notes, although none are currently available for archeological or cultural heritage issues specifically.
Register of Parks and Gardens of Special Historic Interest in Wales	The Register identifies important historic parks and gardens, which should then be considered by the local planning authority in planning decisions.
National Monuments Record	The Record identifies important sites and monuments which should then be considered by the local planning authority in planning decisions.

14.8 Details included in the Planning Policy Wales document[(1)], highlight the key planning principles and policy objectives in Welsh planning. The policy objectives which could impact on or which are appropriate to the archaeological and cultural heritage concerns include:

- Promoting resource-efficient settlement patterns that minimise land-take and urban sprawl, especially through preference for the re-use of suitable previously developed land and buildings, wherever possible avoiding development on greenfield sites. The development is to be situated on a brownfield site.

- Help to ensure the conservation of the historic environment and cultural heritage, acknowledging and fostering local diversity. The brownfield site proposed for

development has an industrial heritage. The site was cleared in the 1960s and no industrial artefacts are thought to be present.

14.9 The proposed development is sited over the boundary of the Rhondda Cynon Taf County Borough Council and the Brecon Beacons National Park Authority. The Brecon Beacons area is a National Park, containing Sites of Special Scientific Interest and Special Areas of Conservation. The statutory purposes of National Parks are to conserve and enhance their natural beauty, wildlife and cultural heritage and to promote opportunities for public understanding and enjoyment of their special qualities. National Park Authorities have been set up to pursue these purposes, and public bodies and other relevant authorities have a statutory duty to have regard of this, whether activities lie within or outside the designated areas.

14.10 The proposal includes the development of an industrial site, the land has previously been developed. The potential impact on the landscape and visual qualities of the local area are considered in the landscape and visual assessment (Chapter 12). The building design has been produced to a very high standard and will use high quality building materials, which will assist in minimising the potential impact on the natural beauty of the local area, particularly when considering the area to the north of the site, which lies within the National Park.

14.11 The retention of natural and maturing features such as the tree line to the north of the site, coupled with additional landscaping and planting will afford some protection when looking south across the site from the reservoir. The conscientious design of the site will soften the view from the north when compared to the older existing units around the Hirwaun Industrial Estate, and enables Enviroparks to contribute to the cultural heritage of the future, where good design is fully incorporated with the needs of the development application.

14.12 The Rhondda Cynon Taf Local Development Plan Preferred Strategy from January 2007[(2)] includes Strategic Policy SP 10 relating to the built heritage of the area:

'The rich heritage and identity of Rhondda Cynon Taf will be preserved and enhanced by the protection and enhancement of the historic environment. Development proposals will only be permitted where it can be demonstrated that they will not cause unacceptable harm to the following:-

a) Listed Buildings and their setting;
b) Conservation Areas and their setting;
c) Local distinctiveness of settlements;
d) Townscape character;
e) Setting of settlements; and
g) Historic and cultural features of acknowledged importance.

The Council will seek to implement enhancement schemes for Conservation Areas to improve the character, quality and appearance of these areas.'

14.13 The Brecon Beacons National Park Authority Unitary Development Plan[(3)] includes a statement of aims, which include the requirement to conserve and enhance the natural beauty, wildlife and cultural heritage of the Park. This is included in the following policies:

Part 1 Policy 3: Cultural Heritage

Development will only be permitted where there is no unacceptable impact on the Park's cultural heritage. Wherever appropriate, development proposals will be required to demonstrate that provision has been made for the protection, enhancement and positive management of cultural heritage.

Policy G3: Development in the National Park

All proposals for development or change of use of land or buildings in the National Park must comply with the following criteria, where they are relevant to the proposal:

i) the proposed development does not have an unacceptable impact on, nor detract from or prevent the enjoyment of, the special qualities, natural beauty, wildlife and cultural heritage of the National Park;

Policy Q10: Nationally Important Archaeological Remains

Development proposals which would have an unacceptable impact on the remains or the settings of an archaeological site of national importance, whether scheduled or not, will not be permitted.

Policy Q11: Sites of Archaeological Importance

Development proposals which would have a significant adverse effect on historic landscapes, sites and features of archaeological interest or of local cultural importance and their settings will only be permitted where:

i) archaeological remains can be protected in situ by appropriate design and siting; or

ii) in the opinion of the NPA, the benefits of the proposals outweigh any adverse effects.

Policy Q12: Archaeological Evaluation

Where important archaeological remains are known to exist or may exist within an area for archaeological evaluation, the NPA will require the archaeological implications of development proposals to be evaluated before planning applications are determined. Planning permission will not be granted where the NPA deems such evaluation to be inadequate.

14.14 Additionally, clear and unequivocal guidance on design will assist applicants and the National Park Authority in achieving high quality developments in the National Park. For the purpose of this guidance, design is taken to mean the relationships between all elements of the built and natural environment including:

- the relationship of buildings to their urban or rural landscape context, to the environment, to biodiversity and to cultural heritage.

Archaeological and Cultural Heritage Features

14.15 Information has been obtained from both Cadw (the Welsh Assembly Government's historic environment division) and the Glamorgan Gwent Archaeological Trust (GGAT), as to the likely presence of archaeological artefacts or cultural heritage features at the site which would require consideration.

14.16 Cadw responded that, based on the mapping supplied, which highlighted the proposed site and identified its general location within the industrial estate, no designated historic assets fall within the area of interest. Cadw noted that they only hold records on designated sites such as Scheduled Ancient Monuments; Listed Buildings; Registered Parks and Gardens; World Heritage Sites and Historic Landscapes, and advised that the regional Archaeological Trust (GGAT) be approached to provide information on non-designated archaeological/historical sites in and around the Hirwaun area.

14.17 GGAT were contacted and confirmed that the Historic Environment Record showed a number prehistoric cairns in the wider area, although no known sites within the proposed development area. The proposed development site was confirmed as the site of the former Royal Ordnance Factory built in the 1940's, although this had been effectively removed from the site over subsequent years, leaving little trace, and the installation of the herringbone drainage system would effectively leave little likelihood for the survival of any other archaeological or historical features.

14.18 GGAT concluded therefore, that should proposals for the development of this site be submitted they would be unlikely to recommend that there is a requirement for any archaeological condition be attached to any consent granted nor would there be a need for an archaeological input into an ES/EIA.

14.19 The Cynon Culture website (www.cynonculture.co.uk) provides some detail of the history of Hirwaun, famous during the 18th and 19th century for its ironworks. Hirwaun dates prior to that however, with Hirwaun Common existing before the invasion of the Normans.

The Battle of Hirwaun 1086

14.20 In 1086, Rhys ap Tewdwr the allegedly last King of South Wales, had a grievance with Iestyn ap Gwrgant who was Lord of Glamorgan. The dispute was over the ownership of counties of South Wales. Lestyn's nephew Einion ap Callwyn had friends in the court of King William II, and by summoning the help of an army from the King, significantly outnumbered the army of Rhys ap Tewdwr.

14.21 The battle started at Aberdare, ending up on Hirwaun Common and involving a tremendous loss of life. Rhys ab Tewdwr's army was driven to the upper reaches of Rhigos/ Penderyn, where there are still vestiges of this great conflict in such places as Cwm Cadlan and Bodwigiad. In the Cadlan Valley there are numerous mounds or carneddau and several of these are reputed to be memorials of the men who fell in the battle e.g. Carn y Frydwr (Battle Cairn) & Maes y Gwaed (Field of Blood). On the Rhigos side, and originally passing through the proposed development site, there is a brook called 'Nant-yr-Ochain' which tradition tells, is associated with the groans of men mortally wounded in battle. The brook was diverted at some point in the early 1970s when the railway was removed and the A465 and Fifth Avenue were developed. The battle went against Rhys, who was compelled to flee.

Detailed Listings

14.22 The Historic Wales Website (http://jura.rcahms.gov.uk/NMW/start.jsp) presents historic environment information held by the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW), the National Museum of Wales and Cadw. The portal allows the simultaneous searching of hundreds of thousands of records relating to archaeological monuments, historic buildings and artefacts held by different organisations across Wales. A search was undertaken of the area in the vicinity of the proposed development, and the results are presented in Appendix 1. The nearest recorded finds / listings are within the Hirwaun Industrial Estate, however they are not located on or in the immediate vicinity of the site and thus the proposed development will have no impact on them.

Historical Sites

14.23 The nearest historical attraction sites of interest have been viewed on the Cadw website (www.cadw.wales.gov.uk). However as none were within 20 km of the proposed development, there will be no significant impact on these sites.

Conservation Areas

14.24 Conservation areas were created by the Civic Amenities Act of 1967 and are *'areas of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance'*. Rhondda Cynon Taf has sixteen conservations areas and the Brecon Beacons National Park has five. The conservation areas of the two authorities are detailed below, however there are no conservation areas in the vicinity of the proposed development, the nearest being in Aberdare, approximately 6 km away.

Rhondda Cynon Taf Conservation Areas:

- Aberdare Town Centre
- Blaenrhondda
- Broadway, Treforest
- Castle Square, Treforest
- Glan-y-Llyn, Taffs Well
- Grnagwen, Pontypridd
- Llanharan
- Llanharry
- Llantrisant
- Llanwonno
- Miskin
- Old Park Terrace, Treforest
- Pontyprodd Town Centre, Pontyprodd
- Taff, Pontyprodd
- Talygan House and Grounds
- Troedrhiwtrwyn

Brecon Beacons Conservation Areas:

- Brecon
- Crickhowell
- Llangattock
- Crickhowell and Llangattock
- Talgarth

14.25 The proposed development will not impact on any of the conservation areas listed.

PREDICTION OF POTENTIAL IMPACTS

14.26 Potential impacts from the proposed development on archaeological or cultural heritage features or Designated sites can be assessed against the following significance matrix:

Table 14.3 Significance Matrix for Impacts on the Archaeology and Cultural Heritage of the Proposed Development Area

Significance	*Description of Impact*
High	Severe and non-recoverable damage or destruction of the site or feature
Medium	Potential changes to the site or feature may result in an appreciable reduction in our ability to understand the resource or its historical context.
Low	A slight change may occur to the site or feature and may result in a small reduction in our ability to understand the resource or its historical context.
Negligible	Features are present in the local area, however the potential impact from the development will lead to no material change or damage.
Undetermined	The presence or otherwise of a feature and the likely impact of the development has not been confirmed. Further investigation is required.

14.27 The lack of any likely archaeological or historical features on or around the site, and the distance of the proposed development from any significant features of interest, indicate that the potential impact of the proposed development on the cultural heritage of the Hirwaun or Brecon Beacons area will be **negligible**. It is considered that no listed buildings, Scheduled Ancient Monuments, historic parks and gardens, registered battlefields or Conservation Areas would be directly affected by the proposed scheme.

MITIGATION

14.28 The results of the desk-based study suggest that no specific mitigation measures are required in order to protect the cultural heritage of the area from the effects of the proposed development, although care will be taken during construction works and any finds of potential archaeological or cultural interest will be reported to CADW / GGAT. On the identification of such a find, work in the area will cease until advice is obtained from the relevant body.

EVALUATION OF RESIDUAL EFFECTS

14.29 There are no residual impacts for consideration.

REFERENCES

1. Planning Policy Wales. March 2002. Welsh Assembly Government. ISBN 0 7504 2854 6.

2. Rhondda Cynon Taf Local Development Plan. Preferred Strategy; January 2007

3. Brecon Beacons National Park Authority. Authority Approved Unitary Development Plan; March 2007

Chapter Fifteen
CONCLUSION

INTRODUCTION

15.1 This ES has explained the process by which EHL formulated its proposals for an Enviroparks development, identified a site at Hirwaun Industrial Estate and subsequently refined its proposals in the light of detailed environmental studies of the site and its surroundings, guided by consultations with the local community, local authorities and statutory agencies including the Environment Agency Wales.

15.2 This final chapter of the ES provides a summary of the mitigation measures that have been identified and an outline of the residual impacts that might remain after taking these into account. A summary of mitigation measures can help the formulation of planning conditions and legal agreements to ensure that the measures described in the ES are implemented, if it is decided that planning permission should be granted.

MITIGATION

15.3 Regulation 21(1) of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 sets out the following requirement:

'Where an EIA application is determined by a local planning authority, the authority shall –

…(1)(c) make available for public inspection at the place where the appropriate register (or relevant section of that register) is kept a statement containing –

i). the content of the decision and any conditions attached thereto;

ii). the main reasons and considerations on which the decision is based; and

iii). a description, where necessary, of the main measures to avoid, reduce and, if possible, offset the major adverse effects of the development.'

15.4 Mitigation included can be categorised as either *inherent* or *additional*. Inherent mitigation is a fundamental part of the scheme design, and is generally included in the application plans. If planning permission is granted for the scheme, it will be subject to planning conditions that ensure development takes place in accordance with these plans. Additional mitigation tends to be more detailed and not always capable of being shown in the scheme description plans. Individual planning conditions and legal agreement clauses can therefore be formulated to ensure implementation.

Inherent mitigation

15.5 The main inherent mitigation conveyed within thematic chapters of this Environmental Statement are summarised below.

Community effects (chapter 7)

15.6 The following inherent mitigation is proposed in the scheme:

- Creation of up to 200 permanent local jobs;
- Support of up to 530 temporary construction workers;
- Secondary benefits to the local economy resulting from increased local expenditure;
- Educational, social and sustainability benefits.

Transport and access (chapter 8)

15.7 The following inherent mitigation is proposed in the scheme:

- Reduction in waste-related traffic movements due to co-location of processes;
- Diversion of a considerable amount of waste-related traffic away from relatively minor roads such as those serving the Bryn Pica landfill site, to which most local waste is currently transported;
- Convenience and accessibility of the site in transport terms for both operational and staff (commuting) journeys.

Air quality (chapter 9)

15.8 The following inherent mitigation is proposed in the scheme:

- Negative pressure ventilation in potentially odorous areas, discharging via the engine air intake or through carbon and / or biofilters.
- All operations that might have an impact on odour generation will be undertaken internally;
- No external feedstock storage;
- An adequate stack height to promote effective dispersion.

Noise and vibration (chapter 10)

15.9 The principal inherent mitigation measures are as follows:

- Enclosure of operations within buildings; minimisation of internal noise generated; attenuation measures.

Ground conditions, drainage and flood risk (chapter 11)

15.10 The key inherent mitigation measures proposed are as follows:

- Effluent treatment and removal during operation;
- Measures to protect landscaped areas and natural features from potential run-off.

Landscape and visual effects (chapter 12)

15.11 The following inherent mitigation is proposed in order to achieve an acceptable development that responds to its setting and enhances the appearance of the Hirwaun Industrial Estate:

- Siting, layout, scale and massing of the development;
- Use of colours and materials in proposed buildings and structures;
- Landscape and planting works on the periphery of the site and within the proposed development.

Ecology (chapter 13)

15.12 The following inherent mitigation is proposed:

- Provision and retention of habitats (grassland and reedbed to south, woodland to north and west) these habitats being designed to enhance the existing;
- Use of a green roof on the visitor centre and administration building;
- Measures to protect species – collection and translocation programme.

Archaeology and cultural heritage (chapter 14)

15.13 The location and nature of the proposals are such that no detriment to cultural heritage and archaeology has been identified.

Additional mitigation

15.14 The main additional mitigation measures identified within the assessment are set out in Table 15.1 overleaf.

Table 15.1: Key additional mitigation measures proposed

Mitigation measure	*Environmental issues*	*Implementing agent(s)*	*Legal instrument*	*Compliance target(s)*	*Implementation timescale*
Construction and Environmental Management Plan (CEMP)	Transport, noise, air quality, community effects, ecology, water quality	Developer, building contractors	Planning condition	Minimal number of complaints, avoidance of statutory nuisance, no adverse health effects, compliance with waste legislation	Before and during construction
Health and Safety Plan	Community effects	Developer, building contractors	Health and safety legislation	To prevent adverse health effects	During construction and operation
Use of a Site Management Plan to control site operations	Transport, noise, air quality, community effects, ecology, water quality.	Developer, Operator	Planning condition	Minimal number of complaints, avoidance of statutory nuisance, no adverse health effects, compliance with waste legislation	During construction
Development of specific vocational training initiatives, Local labour agreements, and Local purchasing initiatives	*Community effects*	*Developer, Operator, local planning authority*	*Not legally enforced*	*Maximisation of social and economic benefits to the Hirwaun and RCT area resulting from the scheme*	During construction and operation

Mitigation measure	*Environmental issues*	*Implementing agent(s)*	*Legal instrument*	*Compliance target(s)*	*Implementation timescale*
Transport Plan to encourage alternative methods of travel	Transport	Developer, Operator, local planning authority	Planning condition	Maximise use of modes of transport other than the private car for employees	During operation
Implementation of a certified environmental management system.	Transport, noise, air quality, community effects, ecology, water quality	Developer, Operator	Planning condition	Minimisation of detrimental environmental impact on the surrounding area	During operation
Odour Management Plan	Air quality	Developer, Operator	Planning condition	Minimisation of odour impact on the surrounding area	During operation
Mitigation Plan with respect to the presence of slow worm within the application site.	Ecology	Developer, building contractors	Planning condition	to ensure that there is no death or harm to individual slow worms during the construction phase	Before and during construction
Develop a Construction Ecological Management Plan	Ecology	Developer, building contractors	Planning condition	To minimise risk to ecology during development.	During construction (once full details and timescales for works are known)

RESIDUAL EFFECTS

15.15 The predicted residual effects of the scheme, following the implementation of mitigation measures to address potential environmental effects are summarised in Table 15.2 below.

Table 15.2: Residual effects of EHL's proposals

Thematic chapter	*Residual effects*	*Significance (by construction/operation stage where applicable)*
Chapter 7 - Community Effects	Employment Education Health	Operational: Major beneficial Moderate beneficial Minor beneficial
Chapter 8 - Transport and Access	Effect upon road network	Operational: Minimal negative
	Driver and pedestrian delay	Operational: Negligible
	Road safety	Operational: Minimal negative
Chapter 9 - Air Quality	Dust emissions	Construction: Low negative Operation: Negligible
	Odour	Construction: Negligible Operation: Medium short-term negative
	Emission to air from process engines	Operational: Medium negative
	Emissions from the traffic movements created	Operational: Negligible
Chapter 10 - Noise and Vibration	Construction Noise and Vehicle Movements	Minor to moderate negative
	Road traffic noise in operation	Neutral
	Operational noise (daytime and night-time)	Neutral
Chapter 11 - Ground Conditions, Drainage and Flood Risk	Flood risk to site	Operational: Medium positive
	Waste effluent	Operational: Low positive to low negative
	Water quality and flood risk in the wider area	Operational: Low negative
Chapter 12 - Landscape and Visual Effects	Landscape impact (see appendix 12.9 for full breakdown by location)	• Temporary (during construction): Significance ranges from minor through to major dependent upon location. • Year 1: Significance ranges from negligible/none through to moderate dependent upon location. • Year 15: Significance ranges from minor beneficial, through negligible/none, to minor dependent upon location.
	Visual impact (see appendix 12.10 for full breakdown by location)	• Temporary (during construction): Significance ranges from none/negligible through to major. • Year 1: Significance ranges from no change through to major dependent

		upon location. • Year 15: Significance ranges from no change through to moderate dependent upon location
Chapter 13 - Ecology	Effects on statutory sites of nature conservation interest	• Construction: Negligible • Operational: Negligible
	Habitats	• Construction: Various dependent upon habitat, minor adverse at worst. • Operational: Various dependent upon habitat, minor adverse at worst.
	Species	• Construction: Various dependent upon species, minor adverse at worst. • Operational: Negligible.
Chapter 14 - Archaeology and Cultural Heritage	None	n/a

OVERALL CONCLUSION

15.16 The overall conclusion of this environmental statement is that there would be few significant adverse environmental effects resulting from implementation of this scheme that cannot be mitigated. On balance, the long term effect of the proposed Enviroparks development at the Hirwaun Industrial Estate is therefore considered to be **positive**, when these residual effects are balanced against the environmental benefits of the scheme, including its contributions to enhanced waste management and resource recovery and the consequential reduction in reliance on landfill, the generation of energy from a renewable source and the substantial investment that the proposals would represent in the local economy, with employment and expenditure benefits. As well as being important to the local environment in their own right, the comprehensive containment and control of resource recovery processes proposed in the Enviroparks development is inherent in EHL's aspiration for the development to be a showcase and an exemplar for future projects elsewhere.