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environmental management for business

Administration Officer
Office of Climate, Licensing and Resource Use,
Environmental Protection Agency,
Headquarters P.O. Box 3000,
Johnstown Castle Estate,
Co. Wexford.

23rd May 2014

RE: Application for Waste Licence (Reg. No. W0140-04)

Dear Sir/Madam,

I refer to the Agency's correspondence dated 27th March 2014 in relation to Ssection 83(2A) of the EPA Acts 1992 to 2013 and the Agency's consideration that the application must be made subject to an environmental impact assessment (EIA) and the Agency's request in accordance with the provisions of Section 87(11)(b) of the EPA Acts 1992 to 2013 to submit an environmental impact statement (EIS).

Enclosed is an original and two copies of the EIS and 16 copies of all files in electronic searchable pdf format on CD-ROM.

Yours sincerely,

Jim O' Callaghan

0913806/JOC/KC
Encs.
c.c. Mr. David Naughton, Nurendale.

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O'Callaghan Moran & Associates. Registration No. 8272844U

ENVIRONMENTAL IMPACT STATEMENT

PANDA WASTE SERVICES

RATHDRINAGH,

BEAUPARC, NAVAN

COUNTY MEATH

Prepared For: -

Nurendale Ltd.,
Rathdrinagh,
Beauparc,
Navan,
Co. Meath.

Prepared By: -

O' Callaghan Moran & Associates,
Granary House,
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May 2014

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Introduction

This Environmental Impact Statement (EIS) examines the potential impacts and significant effects on the environment associated with the proposal to develop a biological waste treatment plant and to expand the refuse derived fuel manufacturing line at the Nurendale trading as PANDA Waste Services (PANDA), Materials Recovery and Transfer Facility at Beauparc, Slane, County Meath

PANDA has operated its waste recovery plant at Beauparc for over 20 years and currently employs 100 workers at the facility. The site has planning permission from Meath County Council and a Waste Licence granted by the Environmental Protection Agency (EPA). The proposed development requires a revision of the current Waste Licence (W0140-03).

Description of the Development

Existing Site

The current planning permission and Waste Licence allow PANDA to take in and process up to 250,000 tonnes of non-hazardous waste annually. The wastes are collected from households, businesses and construction sites and are processed in three main buildings (Buildings 1, 2 and 3).

The processing includes sorting the wastes to pick out the clean paper, cardboard, plastics, wood, metals, organics, rubble, soil and stones that can either be recycled or used to manufacture refuse derived fuel. The remaining mixed materials, for example dirty paper and organic residues that are not suitable for recycling, can be treated in the compost tunnels before going to landfill.

Government Waste Management Policy

It is government policy to reduce the amount of waste going to landfill and currently there is a levy of €75 on every tonne of waste going into a landfill and it is likely that there will be further increases. The levy is on top of the cost of the landfill operator's cost and will have to be met by the producer of the waste, for example the householder.

Site Development

PANDA has looked at ways to reduce the amount of waste going to landfill so as to keep the costs to its customers as low as possible. The two best options are to expand the composting operation (biological treatment) for the food stuff and to improve the quality of the refuse derived fuel. This will not involve changing either the type or the amount of waste taken in, but will require the construction of a new building (Building 4).

Biological Treatment

The expansion of the composting system will involve the use of what is called a 'dry fermentation anaerobic digestion' plant at the initial stage of the process. This type of system is ideal for the types of waste PANDA accepts and is fully proven and safe.

It will consist of a series of fully enclosed tanks, called digesters, in which the wastes will be placed. The oxygen in the air in the digesters will be used up by the microbes in the waste to produce anaerobic (no oxygen) conditions. The microbes will break down the waste and, in the process, produce a number of different gases (biogas). The most common gas will be methane, which is the 'natural gas' supplied by Bord Gais. The biogas will be cleaned (scrubbed) to remove contamination and used as a fuel in new electricity generators, which will connect to the national grid.

While methane gas is explosive and can pose a risk of explosion when present in the air at certain levels, as is the case with natural gas used in homes, the dry fermentation process is designed to minimise the risk of this occurring. The design of the plant will be based on a rigorous hazard assessment including design and operational controls on the gas collection and ventilation systems, explosion protection, fire safety and lightning protection.

The digesters will reduce the amount of organic matter in the wastes, and convert it to biogas. The waste will then be moved to the composting area, where they will be composted in fully enclosed containers called tunnels. Unlike anaerobic digestion, the compost process requires oxygen and air will be pumped into the tunnels to ensure that oxygen levels are kept at the level needed to complete the composting.

The existing composting tunnels are provided with an odour control system that draws air from the tunnels into a bio-filter, where the substances that form the odours are removed. This type of system has proven very effective in controlling odours and bio-filters units are in operation at more than 15 other composting plants around the county. A similar system will be provided to treat the air inside the anaerobic digestion and composting building.

When the composting process is complete, the material will be pasteurised by raising and maintaining the temperature to a level that kill the microbes. The compost will be sold to farmers, market gardeners, landscape contractors and the general public.

Pasteurisation is required in the composting process to meet the requirements of the Department of Agriculture Fisheries and Marine for the treatment of wastes containing residues of meat and fish (Animal By-Products) so as to avoid the spread of animal diseases, for example mad cow disease and foot and mouth.

The Department has issued guidelines on how anaerobic digestion and composting plants must be designed and operated. The proposed design fully complies with the Departments guidance. Furthermore, approval must be obtained from the Department before the process can start. Once it is operational vets from the Department will also carry out inspections of the plant to ensure that it is operating properly. These inspections will be entirely separate from those carried out by the EPA.

Manufacture of Fuel

The remaining mixed wastes that are not suitable for recycling will be turned into a fuel, called refuse derived fuel RDF or Solid Recovered Fuel (SRF) which can be used in industrial plants in Ireland and abroad, for example cement making plants.

The mixed waste contains a lot of water and needs to be dried to improve its value as a fuel. This will be done using heat from a new furnace. It had been intended to use LPG (liquefied petroleum gas) as a fuel, but this was not the best environmental option because it is a fossil fuel and produces greenhouse gases that contribute to global warming.

A better environmental alternative is to use wood (biomass), as a fuel. Wood is a renewable source of energy and will help PANDA reduce its greenhouse gas emissions from fossil fuels. Waste plastic, paper, cardboard etc will not be burned in the furnace and the EPA will not approve such use.

The mixed waste will be placed inside a drying drum and the temperature raised using heat from furnace. The air inside the building and the steam from the dryer will contain odours. The air and steam will be sucked into pipes by fans and drawn into the furnace. The temperature of the furnace is designed to ensure that all the odour causing substances are destroyed.

It had been proposed to use a Regenerative Thermal Oxidiser (RTO), operating independently of the furnace to treat the steam from the dryer. However the RTO is fuelled by LPG and if it broke down the production of the RDF would have to stop. The biomass furnace is designed to achieve the same temperatures (800^0C to 850^0C) and same level of treatment performance as the RTO.

As a back-up measure for when the furnace is shut down for maintenance, the odorous air in the building will be treated in carbon filter unit. These units are commonly used in industries that use or manufacture odorous chemicals.

Existing Environment, Potential Environmental Effects and Mitigation Measures

Surface Water

Rainwater falling on the existing concrete yards is collected in an underground tank and stored before being sent off-site for treatment at a local authority owned sewage treatment plant. Treatment is required because rainfall on concrete yards where vehicles travel and park can become contaminated with silt and small quantities of oil that may leak from vehicle oil sumps.

PANDA has approval to change the drainage system to channel the water from the existing yards to a new reed bed that will be located beside Building 3. The reed bed will remove contaminants that may have been picked up by the rainwater and the treated water will discharge into a drain along the southern site boundary. This drain is a tributary of the River Boyne, which is 3km from the site.

Rainwater from the roof of the new building will be collected in a tank and used for spraying the yards to keep dust down. The rainwater from the new yards will pass through silt traps

and interceptors, which will reduce the contamination to acceptable levels, before going to a new soakaway.

Wastewater

Water from the canteen and the toilets is collected and initially treated in an on-site wastewater treatment plant before being sent to a local authority owned sewerage treatment plant. The water used clean the floors of the buildings and the water from truck wash is collected in an underground tank and also sent to a local authority owned sewage treatment.

The biological treatment process will produce wastewater and all of this will be collected in drains inside the new building and pumped to new storage tanks. The tanks will be fully enclosed by walls designed to trap any spills or leaks that may happen. The design and construction of the tanks and containing walls will be approved by the EPA.

Much of the wastewater will be reused in the process, but any that cannot, will be sent to the local authority treatment plant.

Groundwater

The only emission to ground will be the rainwater run-off from the new concrete yards. The rainwater will pass through silt traps and an oil interceptor before it enters the soakaway.

Dust

The main source dust emissions with the potential to cause a nuisance are vehicle movements over the concrete yards in dry weather and the Construction and Demolition Waste processing area. The proposed new waste activities will be carried out inside the new building, which will effectively prevent dust causing a nuisance.

Odours

The odour management measures, which have already been described, will ensure that smells from the new activities will not cause a nuisance. Odour surveys carried out by the EPA have confirmed that the site is not a source of obnoxious odours.

Noise

The noise sources include the waste processing equipment operating inside the main buildings the C&D processing plant and truck and car movements. The noise monitoring carried out by both PANDA and the EPA has consistently shown noise from the site is not causing a nuisance.

Vermin and Pests

Birds, rats and flies can be attracted to sites where there is available food. The waste accepted at the site include waste accepted at the site includes foodstuffs. All such wastes are and will continue to be processed and stored inside the buildings. This has already been effective in preventing bird attraction. A pest and vermin contractor is used to control flies and rodents.

Traffic

The proposed development will not result in any increase in the amount of waste that the facility already has approval to accept annually. The local road network has sufficient capacity to handle the traffic to and from the facility, taking account of the cumulative traffic from other activities in the surrounding area. Therefore mitigation measures are not required. However the visibility at the site entrance will be improved by cutting back hedgerows.

Cultural Heritage

The proposed development will not result in any damage to or interference with recorded monuments or to any known archaeological feature. If any such features are identified in the construction stage, they will be inspected by a qualified archaeologist and the works programme will be amended accordingly.

Human Beings

Waste handling and processing has the potential to cause environmental nuisance associated with odour, noise and vermin. At sites where biological treatment of wastes is carried out there is the potential health risks associated with airborne particles. The design and proposed method of operation of the facility will ensure that it will not give rise to nuisance and will not present a health risk. The development will have a positive impact in that it will result in additional jobs and help sustain existing employment levels at the site.

Material Assets

The development will not result in the loss of any amenity value either inside or outside the site boundaries. The existing agricultural use of the site will be lost, but the impact will not be noticeable in the context of the agricultural economy in County Meath.

Interaction of the Foregoing

The assessment took into consideration the impacts of the existing facility and the proposed changes.

- The aim of the development is to maximise the value of the waste already accepted at the site and there will be no change to the either the type, or amount of waste already approved.

- The proposed biological treatment plant is safe and does not present a threat to our staff or neighbours either through emissions to air, or explosions.

- The proposed biomass furnace is the best environmental option in terms of reducing greenhouse gas emissions from the site.

- The proposed development does not present a risk to the River Boyne.

PREAMBLE

This Environmental Impact Statement (EIS) examines the potential impacts and significant effects on the environment of the proposed expansion of the PANDA Waste Services (PANDA) Materials Recovery Facility at Beauparc, County Meath. The facility operates under a Waste Licence (W0140-03) issued by the Environmental Protection Agency (EPA).

PANDA intends to develop a biological treatment system comprising a combination of Anaerobic Digestion (AD) and Composting that will be located inside a new building and will incorporate a Combined Heat and Power plant and expand its Refuse Derived Fuel (RDF) manufacturing process. These changes require a revision of the Waste Licence.

PANDA submitted a Licence Review application in September 2009. Subsequently the EPA requested that an EIS be prepared in accordance with the provisions of Section 87 (II) (b) of the EPA Acts 1992 to 2013.

PANDA is also seeking approval to continue to process construction and demolition waste in a Lean-To located along the eastern boundary of the current licensed area. Although this activity is not one that requires the preparation of an EIS it has, for the purpose of providing a complete description of all the activities carried out at the facility, been included in this EIS.

The information contained in the EIS complies with Paragraph 2 of the Second Schedule of the European Communities Environmental Impact Assessment Regulations 1989, as amended by the European Communities (Environmental Impact Assessment) (Amendment) Regulations 2001.

The EIS follows the grouped format structure recommended in the Guidelines on the Information to be Contained in Environmental Impact Statements (March 2002), published by the Environmental Protection Agency (EPA), and the EPA's Advice Notes to these Guidelines. This structure assesses each relevant topic in a separate section, which describes the existing environment, the impacts associated with the activity and, where considered necessary, the proposed mitigation measures.

Public Consultation

PANDA notified Meath County Council of its intention to apply for a review of the Waste Licence. Upon receipt of the review application the EPA informed a number of public bodies, including the Health Services Executive, the Health & Safety Authority, Department of the Environment, Heritage and Local Government, the Central Fisheries Board and An Taisce that an application had been made and afforded these bodies the opportunity to make submissions.

All of the information on the application is posted on the EPA's website and is also freely available for review at the EPA's offices in Wexford. The EPA received a large number of submissions from the general public regarding the application, many of which voiced concerns over the potential adverse environmental impacts associated with the proposed changes. The content of these submissions was taken into consideration during the compilation of the EIS.

Project Team

O' Callaghan Moran & Associates (OCM) were the prime consultants, and were assisted by a number of specialist service providers. Unless otherwise referenced, OCM were responsible for completing the baseline surveys and assessment of impacts.

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Difficulties in Compiling the Required Information

OCM did not encounter any particular difficulties in compiling the required information.

1 INTRODUCTION

1.1 The Applicant

PANDA is one of the largest waste management companies in Ireland, serving customer in the North East and Greater Dublin Regions. It currently employs 480 people and operates six Materials Recovery and Transfer Facilities (MRTF) in Meath, Fingal and South County Dublin.

PANDA is committed to expanding its recycling and recovery business in order to reduce the amount of waste it sends to landfill, thereby meeting national targets on recycling and recovery, sustaining existing employment levels and creating new jobs at the facility.

1.2 Facility Overview

The Beauparc facility is PANDA's administration headquarters for its private and commercial customer base. Waste activities carried out include the recovery and recycling of non-hazardous household, commercial and industrial and construction and demolition wastes. It is also the base for PANDA's vacuum tankers that provide cleaning services to the owners of private septic tank and commercial grease traps and wastewater treatment plants. The facility operates under a Waste Licence (W0140-03) issued by EPA, which authorises the acceptance up to 250,000 tonnes of waste annually.

1.2.1 Site History

In 2002, Meath County Council granted planning permission (Ref 01/4301) for the operation of the waste transfer facility. The planning application included an EIS and the permission approved the acceptance of 44,600 tonnes of waste annually. The EPA granted the first Waste Licence (W0140-01) in March 2002.

In March 2004, the Council granted permission (SA/30347) to construct a new building (Building 2) and expand the recycling capacity to 165,000 tonnes. PANDA also applied to the EPA to revise the Waste Licence to approve the expansion of the site, which included composting using two 'Wright Tunnels'. An EIS was submitted with the application and the revised Licence (W0140-02) was issued in April 2005.

In 2006, PANDA applied to the Council for permission to construct a new building (Building 3), a skip repair building, install a reed bed surface water treatment area and extend the site area to allow an expansion of recycling activities. The Council granted permission (SA/60656) in September 2007.

In May 2007, PANDA applied to the EPA to revise the Waste Licence to increase the license area, construct Building 3 and increase the volume of waste inputs 250,000 tonnes per annum. The revised Licence (W0140-03) was issued in March 2009 and Building 3 was completed in 2010.

In June 2009, PANDA applied for planning permission to construct a new building (Building 4) to house a biological treatment plant and to manufacture Refuse Derived Fuel in Building 3. The Council granted permission (SA/900875) in September 2009.

On the 24th September 2009, PANDA applied to the EPA revise the Waste Licence to extend the licence area and construct Building 4 and to approve the expansion the RDF manufacturing process in Building 3.

In June 2012, there was a fire in building 3 that damaged the building structure and a number of plant items. PANDA implemented its emergency response procedures and called out the local authority emergency services. It took a number of days to extinguish the fire and a number of residents in the vicinity of the site were evacuated. The actions carried out by facility staff and the fire services ensured that there was no long term adverse environmental impact.

1.2.2 Waste Activities

The facility accepts and processes non hazardous mixed MSW and mixed and source segregated C&I waste and C&D wastes, which are primarily collected in the North East Region. The waste processing includes ;

- Transferring of the source segregated dry recyclables.
- Mechanical treatment of the mixed MSW to recover recyclables and manufacture RDF.
- Mechanical treatment of the C&D wastes to recover recyclables.

The current Waste Licence allows the composting of 20,000 tonnes of biodegradable wastes annually. It had been the intention to develop a composting process based on the Wright Tunnels, however experience proved that these could not produce a high quality product.

As an alternative, the Tunnels were used to treat the residual organic fraction recovered from the residual household and commercial wastes, known as 'black bin' waste that are not suitable for recycling before it is sent for disposal. The use of the tunnels for this purpose ceased in 2010.

1.3 Proposed Developments

PANDA intends to construct a new building (Building 4) on lands east of the existing site boundary that will house a biological treatment system comprising dry fermentation anaerobic digestion (AD) and composting. The system will treat the residual organic fraction recovered from the 'black bin' waste and source segregated household/commercial food waste.

The process will produce a bio-gas that will be used in an on-site Combined Heat and Power (CHP) Plant. The electricity generated in the CHP plant will be sold to the National Grid. The heat will be used in the RDF manufacturing process in Building 3.

PANDA also intends to expand its RDF manufacturing process in Building 3 by installing a biomass fuelled drier that will reduce the moisture content of the processed materials thereby increasing both the calorific and market value of the materials. The biomass furnace will form part of the odour control system in Building 3.

2 WASTE MANAGEMENT & PLANNING POLICY

2.1 Introduction

This Chapter presents an overview of the relevant national and regional waste and planning policies and demonstrates how the proposed development is consistent with both national and regional waste management policy objectives. It is based on national Waste Policy Statements, the Replacement Waste Management Plan for the North East Region 2005 – 2010 and the Meath County Development Plan 2013 -2019.

2.2 Waste Management & Planning Policy

2.2.1 National Waste Management Policy

The foundation policy statement on waste management *"Changing Our Ways"* was issued by the Department of the Environment and Local Government in September 1998. This statement firmly bases national policy on the EU Waste Management Hierarchy. In descending order, the current preference is: -

- Prevention;
- Preparing for Reuse;
- Recycling;
- Other Recovery (including energy recovery);and
- Disposal

The 2002 government policy statement *'Preventing and Recycling Waste - Delivering Change'* identified initiatives to achieve progress at the top of the Waste Hierarchy in terms of preventing waste arising and increasing recycling rates.

In *'Waste Management – Taking Stock and Moving Forward' 2004*, the significant improvement in recycling rates achieved since 1998 were recognised, but the need for further expansion was emphasised. The statement confirms that Ireland's national policy approach remains *'grounded in the concept of integrated waste management, based on the internationally recognised waste hierarchy, designed to achieve, by 2013, the ambitious targets set out in Changing Our Ways'*.

In 2006, the National Biodegradable Waste Strategy was published. Its primary focus was to meet the limits set for the quantity of biodegradable municipal waste which is permitted to be sent to landfill under the Landfill Directive (1999/31/EC). A key element is the collection of source separated organic household and commercial waste or "brown bin" material, its treatment, and the opportunities to use this material as a resource in the development of the biological treatment industry.

In 2008, the Department of the Environment, Heritage and Local Government initiated a review of waste policy. The scope was to identify possible changes to policy at national level that would assist Ireland to move towards a sustainable resource and waste policy, including

minimising the creation of waste and self-sufficiency in the reuse and recycling of materials. The review also sought to address how to better implement waste recovery in the context of the application of alternative technologies for waste management, which includes anaerobic digestion.

The EU Waste Framework Directive 2008/98/EC was introduced to coordinate waste management in the Member States to limit the generation of waste and optimise the organisation of waste treatment and disposal. The Directive also established the first EU wide recycling targets. The Directive was transposed into Irish Law by the European Communities (Waste Directive) Regulations 2011 (S. I. No.126 of 2011).

In response, the Department initiated a further review of national waste policy, one of the objectives of which was to provide the necessary measures to ensure that waste undergoes recovery operations in accordance with Articles 4 and 13 of the Directive. The consultation document issued by the Department stated that classification of a treatment process as a recovery activity will depend on the level of success in recovering material or producing heat and/or power and examples include anaerobic digestion plants.

The most recent Policy Statement '*A Resource Opportunity Waste Management Policy In Ireland 2012* is also predicated on the EU Waste Management Hierarchy and encompasses a range of measures across all tiers namely, prevention and minimisation, reuse, recycling, recovery and disposal.

The Statement sets out how the higher tiers can reduce Ireland's reliance on finite resources, virtually eliminate reliance on landfill and minimise the impact of waste management on the environment. It is a policy objective that when waste is generated, the maximum value must be extracted from it by ensuring that it is reused, recycled or recovered.

2.2.2 Waste Management Plan for the North East Region 2005-2010

The current Waste Management Plan for the North East Region 2005-2010 (the current Plan) encompasses areas of planning, regulation, collection, recycling, recovery and disposal of non hazardous wastes generated within the region. It sets out the policy for an integrated approach to waste management in the context of a cross regional dimension.

In 2011, an evaluation of the current Plan in 2011 in the context of the EU Waste Framework Directive concluded there was a need to prepare a new Plan to take account of the requirements of the Directive and the proposal to amend the existing waste management regions. However, the current Plan remains in force until the new Plan is adopted.

It is a policy objective of the current Plan to focus on encouraging householders and businesses to maximise reuse and recycling in the Region. It is a target to achieve a recycling rate of 45% for the Region by 2013. The current Plan recognises the value of private investment in ensuring the provision of adequate infrastructure for the recovery/recycling of materials.

The proposed change to the PANDA facility is consistent with national and regional waste policy objectives, as it will increase the treatment capacity in the North East Region to get the maximum value from the waste and will contribute to the achievement and maintenance of national and regional recycling targets.

2.2.3 Meath County Development Plan 2013-2019

The Meath County Development Plan sets out the development strategy (policies and objectives) for the sustainable future growth of the county. In relation to waste management, it is policy (WM POL1) to adopt the provisions of the EU Waste Management Hierarchy and meet the county's requirements under the current or any subsequent Waste Management Plan.

In relation to the provision of waste management infrastructure, it is policy (WM POL 6) to encourage the development of waste infrastructure and associated developments in appropriate locations, as deemed necessary in accordance with the requirements of the Regional Waste Management Plan.

It is a specific objective (WM OBJ1) to facilitate the provision of appropriate waste recovery and disposal facilities in accordance with the principles set out in the Waste Management Plan… It is also an objective (WM OBJ 14) to support developments necessary to manage food waste in accordance with the requirements of the Waste Management (Food Waste) Regulations and the Waste Management Plan.

In relation to energy, Meath County Council is committed to pursuing sustainable energy policies in accordance with the White Paper 'Towards a Sustainable Energy Future for Ireland 2007-2020'. The main sources of renewable energy are the wind, solar, hydropower, wave and tidal energy geothermal energy and biomass (wood, biodegradable waste and energy crops). The Council is also committed to developing a more diverse range and combination of energy sources including anaerobic digestion and CHP.

It is an energy policy objective (EC POL 3) to encourage the production of energy from renewable sources…subject to normal proper planning considerations, including in particular, the potential impact on areas of environmental or landscape sensitivity and Natura 2000 sites.

The proposed development of the biological treatment plant and the expansion of the RDF manufacturing process are consistent with the objectives of the EU Waste Management Hierarchy, as they will increase the amount of waste recovered and maximise the value from the wastes accepted at the facility.

The proposed development is consistent with Council's objective of supporting the development of waste management infrastructure and renewable energy sources in appropriate locations taking into consideration an assessment of the impacts on Natura 2000 Sites (Chapter 10) and landscape sensitivity (Chapter13).

2.3 Energy Policy

EU Directive 2001/77/EC, sets Ireland a national target of sourcing 16% of all energy consumption from renewables by 2020. Potential energy sources, such as the organic fraction of municipal waste, can be used to generate electricity and heat to assist in meeting the national renewable energy targets.

In May 2010, the Government launched the Renewable Energy Feed In Tariff (REFIT 3) Scheme to encourage the growth of renewable energies, particularly Anaerobic Digestion, as part of a programme to meet the Directive's objectives. The scheme sets the tariffs that will be paid to AD fuelled Combined Heat & Power (CHP) plants over a 15 year period.

In 2011, renewable energy represented 6.4% of Ireland's gross final energy use so there is significant room for expansion of capacity.

2.4 Climate Change

The National Climate Change Strategy charts the way to achieve and maintain reductions in greenhouse gas emissions under the Koyoto Protocol. It promotes the development of low carbon technologies, such as bio-heat and CHP, by industry as one of the key mechanisms of meeting the targets.

In 2009, the EU Commission agreed a package of proposals that will deliver on the EU's commitments to fight climate change and promote renewable energy up to 2020 and beyond. The package seeks to deliver a 20% reduction in total EU greenhouse gas emissions by 2020 (relative to 1990 levels) and at the same time to increase to 20% the amount of renewable energies in energy consumption.

To meet the 2020 targets, it is essential that Ireland reduces its dependence on fossil fuels while ensuring that very significant increases are achieved in the use of alternative energy sources (wind, ocean, biomass and others).

2.5 Need for the Development

The existing facility is an integral part of the waste recovery infrastructure in the North East Region. Its primary function has changed over time from waste disposal to waste recovery. The incoming wastes are processed to separate out the different recyclable materials, which include, paper, cardboard, plastics, metals, timber, rubble and organic content from the non-recyclable/recoverables.

Arising from waste policy changes promoting the diversion of waste from landfill towards alternative recovery activities that maximise the value of the waste, including waste to energy, it is imperative that PANDA expand its capacity to treat organic wastes and enhance the value of the processed wastes. While this will assist in achieving and maintaining regional and national recycling and waste recovery targets, it will also significantly contribute to securing the long term economic viability of the company.

3 ALTERNATIVES EXAMINED

3.1 Introduction

This Chapter describes the alternatives to the proposed development that were considered, including site location, treatment plant technologies and configurations and a 'Do Nothing' scenario.

3.2 Alternative Locations

The facility is specifically designed and has established use for waste management and in particular the current Waste Licence authorises the composting of 20,000 tonnes of biodegradable wastes, although this has not yet been developed.

The features of the site that render it suitable for the proposed biological treatment and expansion of the RDF manufacturing are:

- Existing authorisation to compost biodegradable wastes;
- Existing processing capacity to recover the organic fraction from the mixed MSW;
- Easy connection to National Electricity Grid via a new 20kv line;
- Existing processing capacity to produce RDF/SRF;
- Existing site services that can readily accommodate the proposed changes;
- Existing ground conditions (soil type/geology/hydrology) and distances from sensitive environmental receptors minimise the risk of unexpected emissions given rise to pollution, and;
- The facility is easily accessible by vehicles delivering wastes from PANDA's existing and prospective future customer base.

The site is suitable for the proposed biological treatment and the expansion of the existing RDF/SRF manufacturing process and an agreement to acquire the lands on which Building 4 will be constructed has been reached with the land owner.

The only alternative to the proposed development would be to construct a new waste management facility to house the biological treatment plant and the relocated RDF/SRF manufacturing line.

This would require the acquisition of land, the construction of two new waste processing buildings and supporting infrastructure (offices, maintenance workshops, weighbridge) and the provision of new site services (surface water, foul water, power, water supply, security etc). The development of a new facility offers no environmental advantages compared to extending the existing operations.

3.3 Alternative Technologies

3.3.1 Biological Treatment

PANDA carried out extensive research on a range of waste treatment technologies that could achieve its objectives of reducing to a minimum the materials that are consigned to landfill and replacing non-renewable energy sources. These technologies included stand alone AD, pyrolysis, stand alone composting and the manufacture of bio-diesel from recovered plastics.

While pyrolysis and the manufacture of bio-diesel are technically proven, they are complex processes and, based on international experience, there are doubts over their long term commercial viability, particularly the manufacture of bio-diesel which relies on government subsidies.

While standalone AD and composting of MSW have been proven commercially viable, each has drawbacks. Standalone AD generates liquid and solid residues that must be disposed of, typically by application to agricultural lands, which requires the availability of suitable land banks. Although composting can produce a high quality end product that is suitable for agricultural and horticultural use, it does not allow the exploitation of the energy value of the waste.

Therefore, the proposed combined AD/composting process allows the recovery of the maximum value from the waste, while minimising the generation of residual wastes that require disposal/further treatment.

PANDA assessed the proposed design against the requirements of the European Commission's Reference Document on Best Available Techniques for the Waste Treatment Industries 2006 (BREF), which specifies the Best Available Techniques (BAT) for AD and composting plants. This addresses design, operational and procedural matters, including efficient processing, waste acceptance, emission controls and environmental management systems (EMS).

Section 4.2 of the BREF describes the Techniques that should be considered in biological treatments. It requires the provision of appropriate waste reception, storage and quarantine areas; suitably designed and constructed fermentation vessels and composting bays; screening areas, and the installation of suitable monitoring sensors to monitor the treatment process and confirm that the required operational criteria (for example temperature, moisture content), are achieved.

Section 4.2.6 of the BREF describes the techniques to reduce emissions to air when biogas is used as a fuel. Section 4.2 8 describes the techniques to improve mechanical biological treatments, Section 4.2.10 describes the aeration control techniques for mechanical biological treatments (MBT) and Section 4.2.11 describes the management of exhaust gases from MBTs.

Condition 2 of the current Waste Licence requires PANDA to develop and implement an EMS for the facility. The scope of the EMS is consistent with BAT 1 to 6, which are presented in Sections 5.1.1 to 5.1.6 of the BREF, and requires PANDA to prepare operational control procedures for all waste activities and ensure that facility staff are provided with the appropriate skills and training to perform their assigned functions.

BAT for Biological Treatment (Anaerobic Digestion and Composting Plants) is described in Section 5.2 of the BREF (BAT 65 to 71) , which deals with the techniques to be applied in the storage and handling of the wastes, improving treatment and reducing emissions.

The proposed design takes into consideration the requirements of Sections 4.2.2, 4.2.4, 4.2.6, 4.2.8, 4.2.10, 4.2.11, 5.1 and 5.2 of the BREF. In particular;

- BAT requires the collection and treatment of odorous air from the waste reception area. This will be achieved by a combination of building design and construction; provision of a negative air system, and the treatment of the odorous air in appropriately designed and operated treatment plant.

- BAT requires the collection and the appropriate management of wastewater generated from the treatment process. The proposed design includes for the collection and reuse of percolate from the digestion and compost stages process.

- BAT requires all emissions from biological treatment plants to comply with minimum criteria. The emissions from the proposed AD/Composting Plant will meet the emission limit values set in the Waste Licence.

3.4 Alternative Configurations

The type of AD that is proposed is 'Dry Fermentation'. It will be carried out is a series of fourteen (14 No.) fully enclosed fermenters and will produce a bio-gas, which will be scrubbed and used as a fuel in the CHP plant. The electricity generated by the CHP plant will be fed into the national grid. The heat will be used to raise the temperature of the both the digesters and the pasteurisers and in the manufacture of the RDF/SRF, which will be carried out in Building 3.

After the dry fermentation stage, the residual materials will be composted in a series of fully enclosed forced aeration tunnels, followed by a pasteurisation stage that will meet the specifications set by Department of Agriculture Fisheries and Food (DAFF) under the Animal By-Products (ABP) Regulations for the operation of Bio-gas and Composting Plants treating ABP. These are designed specifically to protect human and animal health.

There is the alternative of pasteurising the wastes at the start of the digestion process. However, initial stage pasteurisation is commonly only applied to wet fermentation systems, typically at farms where farm animals are kept and where the feedstock is liquefied and pumped through the process in sealed pipework/tanks.

Final stage pasteurisation is the preferred method at dry fermentation plants that handle ABP containing wastes, where solid wastes are moved through the process using mechanical loaders. In Ireland, final pasteurisation is also the preferred method at composting plants that process ABP containing wastes.

Pasteurisation, unlike sterilisation, is not intended to kill all of pathogens present, but to reduce the level of viable pathogens so they are unlikely to cause problems. The European Union (EU) ABP pasteurisation requirements require the initial screening of the wastes to a particle size less than 12mm, following which the wastes are subjected to temperature of 70^0C for one hour.

Initial stage pasteurisation would very significantly reduce the total micro-organism population in the wastes. Furthermore, as the dry fermentation process requires a particle size of between 20mm to 30mm to allow liquid to circulate through the waste, screening to 12mm would adversely affect the circulation rate. Therefore, initial stage pasteurisation would, due to the reduction in both the micro-organism population and the particle size, significantly inhibit the fermentation process.

Final stage pasteurisation is the best environmental option in that it maximises the operational efficiency of the process and ensures that the finished product meets the ABP pasteurisation requirements.

3.4.1 RDF/SRF Manufacturing

The EPA Guidance on the processing wastes and the manufacture of RDF[1]/SRF stipulates that the processing must result in a substantial alteration of the properties of the waste. Typically, following the removal of large or bulky items, the waste is shredded, passed through a trommel or screen that produces an oversize and undersize fraction. The next stage can have varying degrees of complexity and may include a combination of processes including magnets, manual picking lines, blowers, wind-shifters and eddy current separators.

This type of mechanical processing substantially alters the properties of the waste, however to demonstrate that the processed wastes can be categorised as RDF/SRF, they must be subjected to sampling and testing to confirm there has been an increase in the net calorific value (NCV) between inputs and outputs at the treatment process.

The processing of mixed MSW (black bin waste) to remove the organic fraction and non combustibles (metals) increases the calorific value. However, the moisture content of the residues can be in the range of 30% to 40%. The optimum moisture content for RDF is 15% and levels above this typically affect the market value. Therefore, there is a need to reduce the moisture content to maximise the value of the processed waste. One of the most effective ways of achieving this is to use a rotary drum drier.

As the wastes are odorous there is a need is a need to provide an odour abatement system to treat the air leaving the drier. The odour abatement system originally considered by PANDA comprised particulate removal (dust cyclone), followed by venturi and alkaline scrubbers that cleaned the air before it was fed to a Regenerative Thermal Oxidiser (RTO) fuelled by liquid petroleum gas.

A detailed assessment of the RTO established that it was not the best option in the context of greenhouse gas emissions and that an alternative biomass fuelled furnace could achieve the same level of odour emission treatment, with a significantly lower carbon footprint.

3.5 The Do Nothing Alternative

If the biological treatment plant is not installed, PANDA will continue to rely upon external energy supplies and will not be able avail of the renewable energy potential of the organic wastes it accepts. The facility's carbon footprint will remain unchanged, with no contribution to the reduction in national greenhouse gas emissions.

[1] EWC Classification of Mixed Municipal Waste Exiting Waste Management Facilities (2012)

4 FACILITY DESCRIPTION

4.1 Introduction

This Chapter presents an overview of the existing facility location, layout, operation and emissions. More information on the ambient environmental conditions is presented in the following Chapters, which address specific impacts associated with the proposed development.

4.2 Site Location

The facility is located is in the townland of Rathdrinagh, at National Grid Reference: E2973 N2689 (Drawing No. 2009-101-100). It is on the N2, approximately 4 kilometres (km) south of Slane. It is bordered to the west by the N2 and to the north by the Knockcommon Road. To the south and east are agricultural lands.

4.3 Site Layout

The current operational area occupies 4.7 hectares and is shown on Drawing No 10-05-100. The majority of the site is either paved (35,000m^2), or occupied by buildings (10,000m^2). There is an unpaved area to the west of Building 3. There are three main waste processing buildings (Buildings 1-2,800m^2, Building 2-2,600m^2 and Building 3-4,208m^2), a skip repair building, a weighbridge an associated office and an administration building. In addition to the buildings, there is an external C&D processing area, the two Wright Tunnels, three above ground oil storage tanks, an above ground water reservoir, underground surface water holding tanks and underground wastewater holding tanks.

4.4 Surrounding Land Use

The surrounding land use is predominantly agriculture, however there are some commercial units to the west. There are nine residential dwellings with 0.5km of the site along Knockcommon Road, with a further thirteen residences within 0.5km, along the N2 and Senchelstown Road (Ref Drawing No 2).

4.5 Services

Drinking water and water used in the canteen and toilets is obtained from the mains supply Water for all other uses (e.g. dust suppression) is obtained from two on-site wells. There is a 660m^3 water tank and associated pump house located at the northern boundary, which is topped up from the wells as required. Electricity is provided by utility companies (Energia and Airtricity) and there are two electrical substations, one in Building 2 and one in Building 3.

4.6 Drainage

4.6.1 Surface Water

A land drain that runs along the southern boundary connects to an unnamed tributary of the Roughgrange River. The Roughgrange is a tributary of the River Boyne, which it joins approximately 3km downstream from the site.

A second drain that runs along the southern boundary, parallel to the N2, originally entered the site and flowed southwest beneath the footprint of Building 3 to join the drain on the southern boundary. As part of the emergency response measures implemented to combat the fire in Building 3 in 2012, this drain was diverted and now runs along the western boundary to a new connection point with the drain on the southern boundary.

When the site was first developed, rainwater run-off from the roofs and paved yards discharged to the land drain on the southern site boundary. This changed in 2006, when the internal drains were diverted to an underground holding tank via silt traps and an oil interceptor. The run-off is now stored pending consignment to an off-site waste water treatment plant.

4.6.2 Foul Water

Sanitary wastewater from the Administration Building is collected and directed to an on-site Biocycle wastewater treatment plant, located to the south of the building. The treated effluent used to discharge to an on-site percolation area, but this has been discontinued and the effluent is currently sent off-site for treatment in a local authority owned municipal wastewater treatment plant.

Water from floor wash downs inside the waste processing buildings discharges to three underground holding tanks located near the buildings. Leachate from the Wright Tunnels is collected in two underground holding tanks and the washwater from the vehicle wash is collected in a separate underground storage tank. All the wastewater is sent to the municipal wastewater treatment plant.

PANDA monitors the quality of the wastewater that is sent for off-site treatment. The wastewater quality is monitored for the parameters specified in the Waste Licence and the results confirm that wastewater is suitable for treatment in the plant to which it is consigned.

4.7 Facility Management & Staffing

The Facility Manager and all facility personnel are provided with appropriate training and have the requisite qualifications and experience to complete their assigned tasks. The Facility Manager has more than 7 years' experience in waste management. The Environmental Manager has more than 7 years' experience in waste management.

PANDA has prepared a documented Environmental Management Programme (EMP), which serves as a guidance document for facility staff and describes operational control and management practices. The EMP is a core element of the facility's Environmental Management System (EMS). There are currently 100 full time employees based at the facility, including management, administration, general operatives, drivers and maintenance staff.

4.8 Hours of Operation

With the exception of the operation of the Wright Tunnels, which is a continuous process, the operational hours are 07.30 to 19.00 Monday to Friday and 8.30 to 17.00 on Saturdays. The facility does not operate on Sundays or Public Holidays, but can do so subject to the approval of the Agency.

4.9 Waste Types & Quantities

The facility is licensed to accept the following waste types and quantities: -

- Dry Recyclable Household (35,000 tonnes),
- Commercial & Industrial (75,000 tonnes),
- Construction & Demolition (120,000 tonnes),
- Source separated biodegradable waste for composting (20,000 tonnes)

The actual amounts of each waste type accepted can vary as long as the maximum of 250,000 tonnes is not exceeded.

4.10 Waste Acceptance and Handling

All waste loads arriving at the site must pass over the weighbridge, where the following information is recorded:

- Description of the waste including waste types and relevant European Waste Catalogue (EWC) codes;
- The origin of the waste, including all customer details;
- Haulier Details;
- Vehicle Registration;
- The weight of the waste load.

Upon leaving the weighbridge, all waste delivery vehicles are directed to the appropriate off-loading points, where the materials are inspected to ensure they are suitable for processing. Any loads considered to be suspect are removed to a dedicated Quarantine Area inside Building 2 for further inspection. If the inspection identifies the materials do not meet the relevant acceptance criteria, the staff arrange for the load to be returned to the producer.

Waste processing activities have evolved over time in response to changes in waste management policy, the opening of new markets for recyclable materials and the development of new treatment technologies.

Building 1 was originally used to process mixed MSW, with the organic fines loaded into the two Wright Tunnels south of the building for treatment before being sent to landfill. An odour abatement system is provided on the Tunnels, comprising air extraction and treatment in an on site biofilter.

Owing to the introduction of source segregation collection systems and the access to alternatives to landfill, the processing of the mixed MSW and the use of the Tunnels has temporarily stopped. However they may be used in the future either in the initial stage of the biological treatment or in the manufacturer of RDF/SRF.

Building 2 is used to process the C&D waste, using a shredder, trommel, density separator, magnet, ballistic separator and a picking line to recover ferrous and non ferrous metals, rubble, timber and inorganic fines. The 'light fraction' which comprises paper and plastics, are sent to Building 3 for further processing to produce SRF, while the 'heavy fraction is sent to the crusher.. Wood and timber recovered from the in-coming waste is shredded and then sent to various outlets for different uses, such as the manufacturing of pallet blocks.

The C&D processing plant adjacent to Building 3 comprise a crusher, a magnet, a screener (flip-flop) and an enclosed density separator. Heavy items (>1kg), such as concrete blocks and rubble, are passed through the crusher, which produces an inert aggregate. The smaller fraction is passed through the 'flip flop' screen, which produces two fractions. The larger fraction (>12mm) is passed through the density separator, which removes paper and plastics.

The materials processed in the 'flip flop' are stored in bays. The inert aggregate produced by the crusher is stockpiled in the open yard. The materials from the density separator are stored in roofed bays.

Building 3 was constructed in 2010 and used for processing of mixed and source separated dry recyclables and the trial of the RDF manufacture. The building was damaged by fire in 2012, but is now back in operation. It now produces SRF from the 'lights' from Building 2 and residuals from dry recycling MRFs. The plant includes a shredder, magnets, eddy current separator, ballistic separator, density separators and final shredders.

4.11 Plant & Equipment

The type and number of operational fixed and mobile plant used to handle and process the waste are shown in Table 4.1.

Table 4.1: Fixed & Mobile Plant List

Description	Duty Capacity
2 x Composting Tunnels	130 Tonnes per hour (not in use)
1 x Doppstadt Wood Shredder	30 Tonnes per hour
1 x M&J 4000 Shredder	40 Tonnes per hour
1 x Trommel	100 Tonnes per hour
1 x Magnet	5Tonnes per hour
1 x Nihot Density Separator	50 tonnes per hour
1 x Ballistic Separator	30 Tonnes per hour
1 x Flip Flop	70 tonnes per hour
1 x Magnet	20 Tonnes per hour
1 x Wind Shifter	20 Tonnes per hour
1 x Rubble Crusher	50 Tonnes per day
Mobile	
3 x Volvo L120	2 x Kobelco Track

1 x Teleporter	2 x Hoists
1 x Volvo L60	1 x Forklift
2 x Fuchs Grab	1 x Shunter
1 x Doppstadt Shredder	30 tonnes per hour
1 x Scarab Roadsweeper	
2 x Ballistic Separator	50 tonnes per hour
6 x Overband Magnets	15 tonnes per hour
1 x Eddy Currents	10 tonnes per hour
1 x Optical Sorter	20 tonnes per hour
2 x Untha shredder	20 tonnes per hour
1 x Nihot Single Drum Separator	40 tonnes per hour
1 x M&J 6000 Shredder	50 tonnes per hour
1 x trommel	60 tonnes per hour

All key plant items have 100% duty and 50% standby capacity to handle the amount of wastes authorised for acceptance. Critical spares are maintained on-site and a preventative maintenance programme is implemented. In the event of a breakdown supporting plant items may be hired in for use for short periods.

The skip trucks and rear end loaders based at the facility are refuelled on site, but are not serviced.

4.12 Oil / Chemical Storage

Diesel and gas oil are stored in above ground tanks (59,000 litres and 14,000 litres respectively) in dedicated structure at the eastern boundary, close to Building 1. The tanks are provided with individual bunds, each of which has a minimum capacity of 110% of the volume of the tank. The bunds are subject to routine integrity testing, as required by the Licence conditions and are structurally sound.

Adblu, a diesel additive, is stored in a 1,000 litre IBC which is bunded and located adjacent to the oil bunds. The maximum amount of fuel and Adblu stored on site at any one time are is shown in Table 4.2.

Table 4.2 – Raw Materials

Products	Quantity Stored litres
Diesel Oil	59,000
Gas Oil	14,000
Adblu	900

4.13 Energy Efficiency and Resource Consumption

Facility operations involve the consumption of water, oil and electricity. Energy consumption is a significant operational cost and PANDA is committed to improving energy efficiency. The estimated quantities used in 2013are given in Table 4.3.

Table 4.3 Estimate of Resource Consumption 2013

Resource	Quantities 2012
Gas Oil	290,365 litres
Electricity	2376.43 MWh
Hydraulic/Gear,Grease	10,000litres/
Engine Oil	600itres
Mains Water	Not metered

PANDA carries out quarterly reviews of energy and resource usage to monitor the consumption rate and minimise both the amounts consumed and the associated costs.

4.14 Waste Generation

Waste generated by facility administration and maintenance activities includes office and canteen waste, waste oils and spent batteries. PANDA implements waste prevention, minimisation and segregation procedures to minimise the amounts of wastes arising and ensure that as much as possible is recycled and recovered.

The fixed plant and equipment is subject to on-site maintenance. Waste oils and spent batteries are removed from for disposal/recovery at licensed treatment/recovery facilities. Maintenance is carried out on the mobile plant in the adjacent garage, which is outside the licensed area.

4.15 Nuisance Control

PANDA provides the abatement equipment and operational procedures specified in the current Waste Licence to minimise the risk of site activities being a source of nuisance to neighbours and members of the general public. These include measures to mitigate the impacts of noise, dust, litter and odour emissions.

PANDA has a contract with a specialist vermin control company to carry out nuisance control at the facility. The contractor provides and maintains eighteen external bait boxes at the facility and also carries out insect control measures as required. Daily nuisance and litter inspections and daily litter picks are carried out.

There is a mobile rotary atomiser-fogging unit for dust control in Building 2 which also uses odour neutraliser in conjunction with the spray system. A sprinkling system is on each doorway into Building 1 and between the back-up weighbridge and commercial premise on the western boundary of the facility.

PANDA has prepared and adopted a complaints procedure to ensure that all complaints received from neighbours and the general public are fully investigated and addressed. More detail on the number and type of the complaints received and the corrective actions taken are presented in the Chapters on Air and Noise.

4.16 Safety and Hazard Control

PANDA has prepared and adopted an Accident Prevention Policy (APP) and Emergency Response Procedure (ERP) for the facility. The APP addresses all potential hazards, with particular reference to the prevention of accidents that may cause damage to the environment.

The ERP identifies all potential hazards and specifies the roles, responsibilities and actions required to deal quickly and efficiently with all foreseeable major incidents in a manner that minimises environmental impacts. The effectiveness of the ERP was proven in the response to the fire in Building 3 in June 2012.

All facility personnel and visitors are obliged to comply with PANDA safety guidelines regarding access to and from the facility and on-site traffic movement.

All site personnel are provided with, and are obliged to wear, personal protective equipment (PPE) appropriate for their particular functions. PPE includes facemasks, gloves, safety glasses, steel-toed footwear, overalls, reflective jackets and helmets.

4.17 Emissions

Potential and actual emissions from the facility include: -

- Noise,
- Dust,
- Surface Water,
- Waste Water.
- Odours

The current Waste Licence sets emission limits for air, surface water discharge, noise and dust and also specifies a monitoring programme to assess the impacts of the emissions. The results of the monitoring and the assessment of the impacts are discussed in the following Chapters.

5 PROPOSED DEVELOPMENT

5.1 Introduction

This Chapter describes the proposed AD/Composting plant and the expansion of the RDF manufacturing process. It provides details of the proposed infrastructure, waste handling and treatment and support activities. It describes the emission control measures incorporated into the design and the method of operation intended to either eliminate or effectively mitigate environmental impacts. A detailed assessment of the impacts is provided in the following Chapters.

5.2 Site Development

The proposed site layout is shown on Drawing No 2009-101-103. The majority of the proposed infrastructure will be constructed on an area adjoining the eastern site boundary, which encompasses 3.2ha. The overall development will include:

- Construction of Building 4 (12,183m^2) to the east of Buildings 2 and 3;
- Construction of 2 No above ground steel process wastewater storage tanks (154m^2 and 78.5m^2) and 2 No above ground concrete process wastewater storage tanks (each 61.45m^2);
- Provision of an access road from the existing facility and hardstanding areas (3,350m^2) for vehicle manoeuvring;
- Installation of a Combined Heat and Power Plant, with associated stacks (2No) and 1 No gas flare;
- Provision of odour control abatement bio-filter on the roof of Building 4 and carbon filter adjacent to Building 3;
- Provision of biomass furnace in Building 3 and rotary drier that will provide heat to dry the RDF and also serve as part of the odour abatement system;
- In addition, the proposed development will include concrete paving surrounding the proposed new structures and an extension to the surface water drainage system and other ancillary works.

The new building will be positioned to the east of the existing Buildings 2 and 3 and elevations are shown on Drawing No 2009-101-201.

5.3 Construction Stage

As planning permission has been granted for the development, works have started on the installation of the RDF manufacturing plant at Building 3, including the rotary drum dryer and the provision of the odour abatement plant (carbon filter). However, these will not be commissioned prior to the grant of the Waste Licence.

The main construction stage will involve the following:

- Site clearance and excavation work for the foundations the new building and the extension of the surface water drainage system. The development will require cut and fill to reach formation levels, with the soils excavated in the northern part of the building footprint used to raise the ground level in the southern part;
- Construction of new access road to Building 4;
- Construction of Building 4, including the digesters, composting bays and the above ground percolate storage tanks;
- Construction of the new surface water drainage lines and soakaway;
- Installation of new odour abatement system including biofilter ducting and electrical fans in Building 4;
- Installation of the CHP plant and ancillaries including gas engines and backup flare;
- Connection to National Electricity Grid via new 20kv line.

Following the completion of the construction phase the AD/Composting plant, odour abatement system and CHP plant will be commissioned.

The construction and commissioning will be phased over an eight month period and up to 30 people will be employed in the site clearance and civil engineering works; concrete casting and formwork; steel fabrication and erection and electrical fit out, also their will be indirect jobs as all materials and sub contractors will be sourced locally.

The works will typically be carried out between the hours of 07:00 – 19:00 Monday to Friday and 07:00 – 17:00 on Saturdays. Normally, no works will take place on Sundays or Public holidays. The actual construction hours may vary depending on weather conditions and seasonality.

The works will involve the use of standard construction plant, such as:

- Tracked Excavators.
- Dumpers.
- Generators.
- Wheeled Excavators.
- Mobile Crane.
- Teleporter(s).
- Delivery vehicles (for plant and equipment) including articulated and rigid body vehicles

5.3.1 Construction Management Plan

A detailed Construction Management Plan (CMP) will be prepared prior to the start of the main construction works. One of the objectives of the CMP is minimise the impacts to the environment during construction. It will define the working hours, construction traffic management and parking arrangements and the environmental protection measures to reduce the environmental impact of the construction activities. The latter will be based on the Conditions in the Waste Licence and will include:

- Measures to prevent surface water and groundwater contamination, including the provision of appropriate storage area and spill containment/clean-up equipment for potentially polluting substances,(fuel and hydraulic oils, cleaning agents etc), suitable on-site welfare facilities and work practices that minimise the risk of blocking of surface drains and watercourses;

- Measures to minimise noise and vibration nuisance, including where necessary the provision of appropriate acoustic barriers and limitations on the use of heavy plant;

- Measures to ensure that all wastes generated by the construction works are properly segregated, stored and either removed from the site or, in the case of clean soils and subsoils and other potentially suitable materials, reused in the development works;

- Measures to ensure that the works do not encroach into or damage terrestrial and aquatic habitats, including the setting of set back distances;

- Measures to ensure that the public roads in the vicinity of the site are maintained free from all mud and debris trafficked on vehicle wheels, and

- Measures to ensure that on completion of the works, the lands on which the construction compound was located is returned to its original/reasonable condition.

5.4 Services

It is not proposed to connect the new building to the mains supply, as canteen and toilets will not be provided. The only additional demand on the mains water supply will be associated with the additional employees that will be recruited. It is expected that 15 new positions will be created.

5.5 Surface Water Drainage

The surface water drainage system serving Building 4 is shown on Drawing No. 2009-101-103**.** Run-off from the extension area will be intermittent and linked to rainfall. The rainwater run-off the paved yards will discharge to a soakaway via an oil interceptor.

Run-off from the roof of Building 4 will be kept separate from yard run-off and will be collected in an existing aboveground water storage tank, which has a capacity of 660m^3 and is used to supply a dust suppression system, the road sweeper and the jet vac fleet. At present, the tank is filled with water abstracted from two on-site wells. The rainwater will replace the groundwater, but the wells will be retained as back-up during dry weather.

5.6 Wastewater

It is not proposed to install additional welfare and canteen facilities and sanitary wastewater will continue to be treated in the on-site system. The only increased demand on the mains water supply will be the additional 15 employees. The extra water demand, which will result in an increase in sanitary wastewater, is estimated at $3m^3$/day based on a consumption rate of 200l/employees/day.

The AD/Composting system will generate wastewater. In so far a possible, the wastewater will be reused in the process, but surplus liquid will be sent to the local authority owned municipal wastewater treatment plant where the wastewater currently produced at the facility is treated.

5.7 Waste Types and Quantities

The proposed changes will not result in any changes to either the quantities of waste accepted, or the general waste acceptance procedures described in Section 4.10 of this EIS.

5.8 Biological Treatment Building 4

Detailed information on the proposed AD/Composting process, including plant capacity, is provided in Appendix 1 and an overview presented below. The type of AD that is proposed is 'Dry Fermentation' and it will be carried out in a series of fourteen (14 No.) fully enclosed fermenters located in the northern part of the building (Drawing No. 2009-101-202). This will produce a bio-gas, which will be scrubbed and used as a fuel in the CHP plant.

After the dry fermentation stage, the residual materials will be composted in a series of fully enclosed forced aeration tunnels, followed by a pasteurisation stage. The finished product will be suitable for horticultural or agricultural use.

All waste handling will be carried out internally, which will prevent the attraction of birds and facilitate the effective control of vermin and pests. An odour management system will be installed to control odours and will comprise air extraction, scrubbing and treatment in a roof mounted bio-filter.

A mass balance of wastewater likely to be produced from the system and the proposed management measures that will be applied are provided in Appendix 1. In so far a possible the wastewater will be reused in the process, but surplus liquid will be sent to an off-site wastewater treatment plant.

5.8.1 Animal By-Product Regulations

The process design and layout will comply with the Department of Agriculture, Food and Marine (DAFMF) requirements regarding Animal By-Products Regulations.

PANDA submitted an application to DAFM for a Stage 1 Approval under the Animal By-Products Regulations EC No 1069/2009 in August 2009. PANDA subsequently met the DAFM on the 16th January 2010, at which clarification on certain aspects of the proposed

facility was provided. The DAFM ABP application is being progressed by PANDA.

A copy of the application, which describes the process and the measures that will be implemented to comply with the Regulations, and the DAFM acknowledgement of receipt is in Appendix 2.

Building 4 will located at an adequate distance from any areas where farm animals are kept and there is no access to the building from any place where farm animals or other animals are kept.

Building 4 will be separated from the other waste processing buildings and will be surrounded by stock proof fencing. The access route from the public road to Building 4 is laid out in a manner that ensures the separation between the road used by vehicles delivering the waste to the building and those transporting the finished product from the plant. The routes are shown on Drawing No CCS/JOB/024/004 in Appendix 2.

Building 4 will be segregated into 'Dirty' and 'Clean' Areas, as shown on Drawing No CCS/JOB/24/001 in Appendix 2. There will be a 'one way' materials flow system to avoid interaction between operators and equipment causing cross contamination of the finished product and the non-pasteurised materials. The materials flow, including the access and egress for vehicles, is shown on Drawing No CCS/JOB24/006 in Appendix 2.

The building will be provided with dedicated access/egress routes for operators and vehicles to avoid contaminated materials being inadvertently being brought out of the 'Dirty' Area. The waste reception area will be cleaned at least once daily when in use and disinfected/steam cleaned at least once a week.

The wheels of all vehicles leaving the 'Dirty Area' will be cleaned using a disinfectant in the dedicated 'Wash Down Area'. All personnel access doors to the 'Dirty' Area will be provided with disinfectant boot washes/ foot baths. The locations of the personnel door and 'Wash Down Area' are shown on Drawing No CCS/JOB24/005 in Appendix 2.

When the Wright Tunnels are in operation the treated materials from the tunnels will require further processing in either Building 3 or Building 4. Materials sent to Building 4 will be handled in a similar manner to untreated organic waste to ensure that the finished product is not contaminated.

The access/egress route for Building 4, which is shown on Drawing 2009-101-103, is to the north of and separate from the access to Building 1. This will ensure that the finished product consigned from Building 4 does not come near the processing area in Building 1.

A pest control programme which will include a bait map and bait servicing schedule will be implemented at the plant at the required frequency. The bait points will be visible and clearly numbered. The results of inspections carried out at the bait points, as well as the corrective actions taken, will be recorded.

5.8.2 Bio-Gas

The AD stage will produce a bio-gas that consists largely of methane and carbon dioxide, but also contains a small amount of hydrogen sulphide and ammonia, as well as traces of other gases. The biogas will be treated to reduce the levels of ammonia and hydrogen sulphide.

The treated gas will be used as a fuel in two gas engines in CHP plant. There are a number of utilisation options for the heat and electricity generated in the CHP, which include meeting on-site energy needs and export to the national grid. A gas flare with a capacity of 600m^3/hour will be provided as a back–up for when the gas engines are shut down for routine servicing.

5.8.3 Odour Management

An odour management system will be installed to control odours from Buildings 3 and 4 and will comprise air extraction, scrubbing and treatment in a roof mounted bio-filter. The building roof plan is shown on Drawing No. 2009-101-203. More detailed information on the treatment system is provided in Chapter 11.

5.9 RDF/SRF Manufacturing Building 3

The types of waste and the processing plant will be the same as that currently deployed (bag shredder, trommel, eddy current separator, magnets and a density separator), but a rotary drum drier will be provided at the end of the separation process, which will be used to reduce the moisture content. The drier will be fuelled by a biomass furnace located inside the building.

5.9.1 Odour Management

As the materials that will be processed are odorous an odour abatement system will be provided in Building 3. The mechanical waste processing area will be segregated from the rest of the building and provided with a negative air pressure system. Odorous air will be extracted from both the mechanical treatment area and the drier and directed to the odour abatement system.

The abatement system will comprise particulate removal (dust cyclone), followed by venturi and alkaline scrubbers that will treat the air before it is fed into a furnace. The temperature in the furnace will be maintained at between 800 and 850^0 Centigrade (C). A back up carbon filter will be provided and used to treat the odorous air in the building when the furnace is shut down for routine maintenance. More detailed information on the treatment system is provided in Chapter 11.

5.10 Safety and Hazard Control

5.10.1 Bio-Gas

The bio-gas generated in the fermenters will occupy the head space above the waste from where it will be drawn directly to the CHP plant and will not be stored in bulk. The total area occupied by the fermenters is 2,992m^2. Assuming a head space of 1.5m and that all of the fermenters are operational, the maximum volume of bio-gas in stored at any one time will be 4,488m^3. It should be noted that the maximum volume in the headspace in any one of the fermenters will be 321m^3 and the pressure will be 25mbar.

The control measures that will be applied in the biological treatment facility and CHP plant to mitigate against fire and explosion risks are described in the report prepared by AWN Consulting, in Appendix 3. As the biological treatment process does not involve the bulk storage of bio-gas, the proposed plant is lower risk than many other anaerobic digestion facilities that do have bulk storage.

Not withstanding the low risk, the facility will be designed and operated in accordance with the Safety, Health and Welfare at Work (General Application) Regulations 2007; Part 8 Explosive Atmospheres at Places of Works. This will include completion of a Hazard Identification (HAZID) and Hazard and Operability Study (HAZOP) and the preparation of an Explosion Protection Document (EPD) which will be submitted to the Health and Safety Authority (HSA) for approval before operations begin.

5.10.2 Pathogens and Micro-Organisms

There is the potential for a build-up of pathogens and/or other harmful micro-organisms in the in the bio-trickling filter, the carbon filter in the RDF plant and on equipment used prior to the pasteurisation step. A detailed assessment of the control measures that will be applied is presented in the Odour Monitoring Ireland Ltd report in Appendix 4 and an overview is presented below.

As dry fermentation and composting are biological processes that depend on bacteria and other micro-organisms to treat the waste, it is counterproductive to attempt to either kill, or reduce the numbers prior to the pasteurisation stage. However, a strict cleaning and hygiene programme will be implemented at the facility to prevent contamination of the pasteurised materials by the unpasteurised wastes (Ref Appendix 2).

Final stage pasteurisation does not present a risk of the microbiological build up of pathogens and other harmful bacteria either in the process area, or the air treatment system. The wastes that will be accepted and processed are the same as those already treated at existing composting plants in Ireland, many of which have less sophisticated air handling systems to that proposed for PANDA's facility.

Monitoring at these facilities has demonstrated that bioaerosols, which are the primary vectors by which bacteria can move from the process area to off site receptors, are not a cause of concern. There is no evidence to indicate that the current controls applied at the facilities are not effective at minimising the risk of build up of pathogens and other micro-organisms present.

Pre treatment will be provided on the air ducted to both the biofilter in Building 4 and the back up carbon filter serving Building 3. In the case of the biofilter, the pre-treatment will comprise a wet scrubber designed to remove particulates and bioaerosols, and a vane eliminator that can remove water droplets >1um. The air leaving the biofilter will then be sterilised using a plasma injector before it enters the carbon filter. This will not only remove odorous compounds, but also sterilise the carbon filter bed and improve operational efficiency.

The odorous air drawn directly to the carbon filter will first pass through a high efficiency dust filter, which is designed to achieve a particulate removal efficiency of 99.5%. This will ensure the molecular voids in the carbon filter are not blocked thereby impeding its proper functioning as an odour control system. The air leaving the dust filter will be injected with

plasma that will oxidise any bacteria present and also sterilise the carbon bed.

The wastes treated in the AD/Composting plant will comprise household and commercial wastes that are collected in standard refuse collection vehicles. The vehicles will be subject to routine cleaning and maintenance. The wheels of the vehicles that enter the waste reception area in Building 4 will be cleaned and disinfected and any gross external contamination removed.

5.11 Emissions & Mitigation Measures

The actual and potential emissions associated with the construction and operation of the development facility include noise, dust and particulates, exhaust gases from vehicles and mobile plant, exhaust emissions from the CHP stacks, odours, bioaerosols and surface water run-off. These emissions, the proposed mitigation measures and an assessment of the impacts are described in the following Chapters.

6 CLIMATE

6.1 Introduction

This Chapter describes the climate at the facility and assesses the impact the proposed increase in the amounts of waste will have on the climate and microclimate.

6.2 Methodology

The assessment was based on meteorological data obtained from Dublin Airport Meteorological Station, which is 50 km to the southeast of the facility.

6.3 Existing Conditions

The climate in the area can be described as mild and wet, with the prevailing wind direction from the south west. Average rainfall, temperature, humidity and wind speed and direction for the Meteorological Station at Dublin Airport is presented in Table 6.1.

Table 6.1 Meteorological Data : Dublin Airport

Rainfall –	
Annual average	732.7 mm
Average maximum month (Dec)	75.6 mm
Average minimum month (July)	49.9mm
Temperature	
Mean Daily	9.6°C
Mean Daily Maximum (July)	18.9°C
Mean Daily Minimum (Feb)	2.5°C
Relative Humidity	
Mean at 0900UTC	82%
Mean at 1500UTC	72%
Wind (Knots)	
Prevailing direction	South West
Prevailing sector	South West

The average annual rainfall at the site is 732.7 mm. Because of the relatively flat topography infiltration rates are very likely to be high. The winds are predominantly from the south west sector.

6.4 Impacts

The AD process will produce biogas containing methane and carbon dioxide and the composting process will produce carbon dioxide. Methane and carbon dioxide are greenhouse gases. The biogas will be combusted in the CHP, which will convert the methane to carbon dioxide and water.

Carbon dioxide arising from the bioconversion of organic waste and from the combustion of renewable fuels is not considered a net contributor to greenhouse gas emissions, since the carbon is stored in the biomass for a limited number of years (short carbon cycle), whereas in the case of fossil fuels the carbon is stored for millions of years (long carbon cycle). Therefore, there will be no net contribution to greenhouse gas emissions.

Furthermore, the reduction in reliance on non renewable sources of electricity due to on-site generation of electricity using the biogas will have a positive impact in reducing the facility's overall carbon footprint.

6.5 Mitigation Measures

Diesel fuelled plant engines are only turned on when wastes are being processed and PANDA has a policy of not allowing engine idling. This also applies to heavy goods vehicles accessing the facility.

6.6 Assessment of Impacts

The proposed change will have not result in the generation of additional greenhouse gases and will have no impact on either the climate, or microclimate. The use of the biomass furnace will have a positive impact by reducing the facility's carbon footprint.

7 TRAFFIC

7.1 Introduction

This Chapter describes existing road traffic conditions and includes an assessment of the impacts the proposed impacts will have on the local road network. It is based on a Traffic Impact Assessment (TIA) conducted by Trafficwise, whose full report is in Appendix 5.

7.2 Methodology

The methodology applied is detailed in Section 2 of the Trafficwise Report and is based on the guidance in 'Spatial Planning and National Roads (Guidelines for Planning Authorities – January 2012), the National Road Authority (NRA) Traffic and Transport Assessment Guidelines and the Chartered Institution of Highways & Transportation (CIHT) 'Guidelines for Traffic Impact Assessment' (September 1994).

7.3 Existing Conditions

7.3.1 Existing Road Network

The facility is bounded to the north by the Knockcommon Road and to the west by the N2 Dublin to Derry Road. The Knockcommon Road, the N2 and the L1013 Painestown Road form the staggered junction known as the Rathdrinagh Crossroads.

The stagger between the Knockcommon Road and the Painestown Road is the NRA: Design Manual for Roads and Bridges (DMRB) preferred right-left type and the stagger distance is approximately 30m.

The Knockcommon Road is a single lane road of approximately 6.0m width and is subject to a speed limit of 80kph. It leads to Duleek, approximately 7km to the east of the facility. The facility has direct vehicular access to the Knockcommon Road via a single simple priority entrance on the northern site boundary. The entrance is approximately 70m to the east of the junction of the Knockcommon Road and the N2.

The N2 is one of the main traffic arteries in the country and is the primary access route to the site. It is has a posted speed limit of 100kph and is a wide single carriageway road, characterised by hard shoulders and the provision of ghost island right turning lanes at significant junctions, including Rathdrinagh Cross Roads (L1013) McGruders Cross (L1600) to the north, and the Kentstown Cross Road (R150) and Balrath Cross Road (R153) to the south.

The Painestown Road (L1013) connects to the R153 Kentstown to Navan road approximately 6km to the southwest of the facility and approximately 4km to the west of Navan.

The Knockcommon Road is in good condition and the delineation at the junction with the N2 is in accordance with the requirements of the NRA: Traffic Signs Manual. Access from the N2 onto the Knockcommon Road for right turning vehicles is facilitated by the provision of a ghost island turning lane. There is also a left turn taper between the N2 and Knockcommon Road.

The ghost island right turn lane has a turning length of 20m and a deceleration length of 80m. This is in accordance with the requirements of the NRA: Design Manual for Roads and Bridges for a road design speed of 100kph and where the up/down gradient of the road is between 0-4%.

7.3.2 Existing Traffic

Traffic surveys were conducted in October 2006 as part of the TIA submitted with the planning application to increase the amount of waste accepted to 250,000/year. The survey locations were on the N2 and the Knockcommon Road and the surveys were conducted using video surveillance over the period 07:00-19:00. Further surveys were commissioned for the purpose of revising and updating the TIA, and these were undertaken on Thursday 14th March 2013.

The surveys were carried out on 'neutral' days of the week, since generally traffic flows on such days are considered more likely to be representative of typical traffic conditions on the local roads network. Both October and March are 'neutral' months in traffic terms and include for normal schools related traffic, which can have a significant impact on the operation of the general roads network during the commuter peak hour.

The surveys recorded the number of vehicle movements, the category of vehicle entering and exiting the facility and the turning movements undertaken by every waste transport vehicle at the Rathdrinagh Crossroad. The results are in Appendix A of Trafficwise's TIA Report.

N2 Traffic

The morning and evening peak hour periods for general network traffic flow on the N2 past the site in both the 2006 and 2013 were 08:00-09:00hrs and 17:00-18:00hrs respectively.

The 2006 peak hour accumulative two-way traffic flow on the N2 in the morning period was 820 vehicle movements; 694 of which are cars and light vans and 126 were heavy goods vehicles (HGVs). Of these vehicles, 485 cars and 69 HGVs travelled southbound, while 209 cars and 57 HGVs travelled northbound.

The 2013 peak hour accumulative two-way traffic flow in the morning period was 636 vehicle movements; 555 of which were cars and light vans and 81 HGVs. Of these, 393 cars/vans and 36 HGVs travelled southbound and 162 cars/vans and 45 HGVs travelled northbound.

Between 2006 and 2013 there has been an overall reduction in general traffic movements on the N2 in the morning peak period of 184 vehicles per hour or 22.5%. The reduction in cars and light vans was 139 vehicles per hour (20%), while the reduction in HGVs was 139 per hour or 36%.

The 2006 peak hour accumulative two-way traffic flow in the evening period on the N2 was 1,009 vehicle movements; 871 of which were cars and light vans and 138 HGV. Of these,

248 cars and 52 HGVs travelled southbound, while 623 cars/vans and 86 HGVs travelled northbound.

The 2013 peak hour accumulative two-way traffic flow in the evening period was 728 vehicle movements, 654 of which are cars and light vans and 74 HGVs. Of these, 208 cars/vans and 22 HGVs travelled southbound, while 446 cars/vans and 52 HGVs travelled northbound.

Between 2006 and 2013 there has been an overall reduction in general traffic movements of the order of 281 vehicles per hour, or 27.8%. The reduction in cars and light vans is 217 vehicles per hour or 25%, while the reduction in HGVs was 64 per hour or 46%.

During the day, the volume of traffic is generally consistent in both directions. Between 10.00 and 16.00 the traffic flows in either direction are practically equal, with average combined 2-way hourly traffic flow in the order of 400 vehicles, a reduction of 123 vehicles per hour from the 2006 survey.

Over the entire 2013 12hr survey period, the N2 carried 3,154 vehicles northbound, of which 590 (18%) were HGVs. 2,911 vehicles travelled southbound, of which 476 (16%) HGVs. This means that between 2006 and 2013, the 12 hour HGV traffic flow has reduced from 1,561 to 1,066, a decrease 495 (32%).

Applying the NRA Guidance RT201 to convert the recorded traffic levels gives an indicative AADT for the N2 in 2006 somewhere in the range of 8,600 to 11,400 vehicles (12hr x 1.29 ± 14%), equating to 10,000± 14%. For 2013, the AADT is estimated to be somewhere in the range of 7,200 to 9,300 vehicles (12hr x 1.36 ± 13%), equating to 8,250± 13%.

Some of the reduction in peak hour general traffic is associated with the opening of the M3 in 2010 nonetheless some element of the reduction, especially relating to HGV flows, is likely to be attributable to the economic conditions.

Knockcommon Road

The morning and evening peak hour periods on the Knockcommon Road are the same as on the N2 i.e. 08:00-09:00hrs and 17:00-18:00hrs respectively.

The 2006 morning peak accumulative two-way traffic flow was 128 movements; 101 of which are cars and light vans and 27 HGVs. Of these, 74 cars and 7 HGV travelled eastbound whilst 27 cars and 20 HGV travelled westbound.

The 2013 peak hour accumulative two-way traffic flow was 104 movements; 88 of which were cars and light vans and 16 HGVs. Of these, 57 cars and 5 HGVs travelled eastbound (toward the Panda site access) while 31 cars and 11 HGVs travelled westbound.

Between 2006 and 2013 there was a 19% reduction in total morning peak hour traffic flow. The reduction in peak hour car traffic is 12.8%, while the reduction in HGV traffic is 41%.
The 2006 evening the peak hour accumulative two-way traffic flow was 138 movements, 123 of which were cars and light vans and 15 HGVs. Of these, a total of 65 cars and 6 HGV travelled eastbound (towards the facility access), while 58 cars and 9 HGV travelled westbound.

The 2013 evening the peak hour accumulative two-way traffic flow was 128 movements, 119 of which were cars and light vans and 9 HGVs. A total 43 cars and 3 HGVs travelled eastbound, while76 cars and 6 HGV travelled westbound.

Between 2006 and 2013 there has been 7% reduction in total evening peak hour traffic flow, which is not considered significant. The reduction in peak hour car traffic flow is negligible while the reduction in HGV traffic flow is 40%.

During the day, there is a relatively consistent volume of traffic in both directions. Between 10.00 and 16.00 the flows in either direction are practically equal, with an average combined 2-way hourly traffic flow generally in the order of 80 vehicles.

Compared to the N2, the Knockcommon Road does not carry a significant amount of traffic In 2006, the indicative AADT for the road was in the range of 1,480 ± 14% for 2006, while the equivalent figure for 2013 is 1,361± 13%.

7.3.3 Facility Generated Traffic

In 2006, during the entire survey period, a total of 493 vehicles were recorded at the facility. Of these 288 were HGV and 205 were cars/light vans (Table 7.1). In 2013 a total of 437 vehicles were recorded; of these 132 were HGV and 305 were cars/light vans (Table 7. 2).

Table 7.1 Daily Traffic Generation 2006

Traffic Generation				
Total Movements	**In Cars/Vans**	**In HGV**	**Out Cars/Vans**	**Out HGV**
493	93	144	112	144

In 2006, an average of 12 HGVs entered the facility hourly throughout the day, while an average 8 cars/vans entered hourly. The maximum number of HGVs entering in any one hour was 21 between 15:00-16:00hrs. The average HGV departure rate was 12 per hour, with a maximum of 19 recorded between 0800-0900hrs.

The average hourly number of light vehicles entering the site was 8, with an average of 7 leaving per hour. The maximum number of car/vans leaving the site in any one hour occurred between 18:00-19:00hrs, when 29 vehicles were recorded.

Table 7.2 Daily Traffic Generation in 2013

Traffic Generation				
Total Movements	**In Cars/Vans**	**In HGV**	**Out Cars/Vans**	**Out HGV**
437	135	78	170	54

In 2013, an average 11 cars/light vans accessed the site every hour during the survey period, while the average HGV entry was 7 HGV per hour. The maximum HGV entry traffic flow in any one hour period was between 15:00-16:00hrs, when 17 HGV were recorded.

The average number of light vehicles leaving the site was 14 per hour, while busiest period occurred between 17:00-18:00hrs, when 56 vehicles were recorded. The average HGV departure traffic flow was 6 HGVs per hour, while the busiest period for HGVs leaving was between 12:00-13:00hrs, when 9 HGV were recorded.

In 2006, there were approximately 40 vehicle movements hourly, of which 25 were HGV and 15 were cars or light vans. In 2013, the average hourly flow was 38 vehicle movements, of which 12 were HGV and 26 were cars or light vans.

In 2006, the busiest was between 08:00-09:00hrs, when a total of 55 vehicle movements were recorded. Of these, 32 were HGVs and 23 were cars or vans. The busiest period in 2013 was between 17:00-18:00hrs, when a total of 70 vehicle movements were recorded. Of these, 6 were HGV and 64 were cars or vans.

Between 2006 and 2013 there was reduction in overall traffic flow of 11% and a reduction in HGV flows in the order of 54%, however there was an increase of 48% in the number of light vehicles entering the site. Furthermore, there has been a change in the type of HGVs entering the site from an approximate 50/50 split in 2006 between articulated vehicles and rigid body skip trucks to a 70/30 split now in favour of the smaller rigid bodied vehicles.

This change in the character and composition of the traffic flow at the facility indicates a reduction in the amount of waste accepted, nonetheless there has been a significant increase in the volume of car and light vehicle traffic. This increase is due to the additional staff employed at the facility, which is now PANDA's main administration centre.

7.3.4 Visibility

The Knockcommon Road is subject to a speed limit of 80kph and the appropriate 'desirable' minimum Stopping Sight Distance for a design speed of 85kph is 160m. The desirable setback distance from road edge by which the 160m 'visibility sightline is measured is 3.0m. A relaxation to 2.4m is permitted for simple junctions in stop controlled situations, while on regional and local roads a setback of 2.0m is permitted.

In the case of the Knockcommon Road, which is a local road, a set back distance of 2.4m is satisfactory. Applying this to the existing site access, the visibility to the left (towards the N2) is good, with a 1.0m high wall along the adjacent property boundary and offset from the road edge, which ensures no visibility obstructions from any hedgerows or trees.
Drivers exiting the site can see Rathdrinagh Cross Roads, which is some 75m to the west of the access. Visibility to the right is currently impaired by the existing trees/hedgerow .

100% of HGV traffic accesses the facility via the Rathdrinagh Cross Roads. The N2 is subject to a speed limit of 100kph and the appropriate 'desirable' minimum Stopping Sight Distance for a design speed of 100kph is 215m.

The desirable setback distance from road edge at which the 215m 'visibility sightline is measured is 3.0m. There is a full visibility envelope of 215m from a point 3.0m from the

edge of the road in both directions. Furthermore, there is a forward visibility of 215m in both directions from a point 1.5 times Stopping Sight Distance (or 323m) in advance of the access.

7.4 Predicted Conditions

7.4.1 Traffic Generation

Maximum, minimum, average and 85th percentile daily HGV traffic generation rates for the facility were derived from weighbridge data for 2007 taking into account the differential between the amount accepted in 2007 (232,527 tonnes) and the currently authorised 250,000 tonnes/year. The figures are presented in Table 7.3.

Table 7.3 Forecast Traffic Generation

Traffic Generation	Loads Over Weighbridge		Total Trips
	Inbound	Outbound	In/Out
Minimum Daily Traffic Generation	77	25	102
Average Daily Traffic Generation	118	48	167
85%ile Daily Traffic Generation	137	58	195
Maximum Daily Traffic Generation	169	88	257
(Recorded HGV March 2013)	78	54	132

An assessment of the changes in traffic movements from current levels (March 2013) to when the facility is operating at its currently approved maximum capacity (250,000 tonnes/year) was based on the 85th percentile daily traffic generation at the facility in 2007, when approximately 232,000 tonnes/year were accepted, taking into consideration increasing the levels of future traffic (7%). The projected increase in HGV movements is shown in Table 7.4.

Table 7.4: Forecast 85th Percentile Assessment Traffic Generation

Traffic Generation	Vehicle Movements	
	Inbound	Outbound
85%ile Assessment Traffic Generation	137 + 58 = 195	58 + 137 = 195
Recorded HGV March 2013	78 + 54 = 132	54 + 78 = 132
Difference	63	63

The HGV traffic will increase by 63 inbound and 63 outbound movements per day compared to those recorded in the March 2013 survey.

In addition to HGVs, there will be staff and visitor traffic movements. It is estimated that there will be an additional 15 staff working in the RDF/SRF and AD and composting plants, however it is not expected that staff numbers and visitors will increase on a pro rata basis with the waste acceptance rate, nor is it expected that visitors such as the postman etc., would visit any more frequently.

As the recorded 12 hour HGV traffic flow on the N2 has reduced from 1,561 HGV to 1,066 HGV between 2006 and 2013, a reduction in the order of 32%, it is unlikely that the increase of 63 vehicle movements will have a significant impact upon the operation of the N2.

Furthermore it must be noted that traffic associated with the facility in 2007, which was prior to M3 Motorway opening did not cause any capacity, when general traffic flows on the network were higher than today.

7.4.2 Capacity Assessment

The computer modelling program PICADY (Priority Intersection CApacity and DelaY) has been used for the assessment of major/minor priority junctions on the local road network, principally the junction of the Rathdrinagh Cross Roads.

The key parameters were the Ratio of Flow to Capacity Value (RFC) where values of 0.850-0.900 are accepted at junctions in urban areas (0.700-0.750 in rural areas), however this figure should not be considered in isolation and should be viewed together with queuing and delay information.

Table 7.5 presents the morning peak hour PICADY modelling analysis undertaken for the Rathdrinagh Cross Roads for the base year (2014).

Table 7.5 Base Year (2014) Capacity Assessments

Traffic Movement at Crossroads	Expected No. of Vehicles (veh/hr)	Queuing Delay per vehicle (sec)	Max Queue (vehs)	Max RFC	Reserve Capacity
Scenario 1: Base Year (2014) Without Waste Acceptance Increase to 250,000/year - PM Peak					
B-C	12.8	7.2	0	0.031	96.9%
B-AD	26.5	7.8	1	0.068	93.2%
A-D	17.4	6.0	0	0.036	96.4%
D-ABC	75.0	6.6	1	0.146	85.4%
C-B	11.9	5.4	0	0.022	97.8%
Scenario 2: Base Year (2014) Accepting Maximum Approved Wastes of 250,000 tonnes/year - PM Peak					
B-C	12.8	7.2	0	0.031	96.9%
B-AD	27.4	7.8	1	0.073	92.7%
A-D	20.1	6.6	0	0.045	95.5%
D-ABC	78.6	6.6	1	0.160	84.0%
C-B	11.9	5.4	0	0.022	97.8%
A: N2 South B: L1013 C: N2 North D: Knockcommon Road					

The existing junction is operating well within capacity. Under both base year 2007 traffic flows with and without the increase to the maximum approved waste acceptance rates, the reserve capacity of the junction does not fall below 80% during the morning peak hour period. A reserve capacity of 25% is normally accepted to be the threshold below which a rural junction is considered to be over capacity.

Table 7.6 Presents the morning peak hour PICADY modelling analysis undertaken for the Rathdrinagh Cross roads for the base year +5 (2019). By 2019, assuming the currently maximum approved amount of waste is accepted, there will be a 4.7% reduction in the reserve capacity of the junction, from 87.9% to 83.2%. Such a reduction is considered to be insignificant.

Queues will not increase, however minor increases in delays are expected for vehicles turning to and from the L1013 and are in the region of 0.6 seconds per vehicles. This increase in not considered to be significant.

Table 7.6 PICADY Modelling Analysis 2019

Traffic Movement at Crossroads	**Expected No. of Vehicles** (veh/hr)	**Queuing Delay per vehicle** (sec)	**Max Queue** (vehs)	**Max RFC**	**Reserve Capacity**
Scenario 3: Base Year Without Waste Acceptance Increase to 250,000/year +5 (2019) - PM Peak					
B-C	13.7	7.2	0	0.026	97.4%
B-AD	27.4	7.8	1	0.055	94.5%
A-D	18.3	6.6	0	0.030	97.0%
D-ABC	78.6	6.6	1	0.121	87.9%
C-B	12.8	5.4	0	0.019	98.1%
Scenario 4: Base Year Accepting Maximum Approved Wastes 0f 250,000 tonnes/year + 5 (2019) - PM Peak					
B-C	13.7	7.2	0	0.034	97.6%
B-AD	28.3	8.4	1	0.077	92.3%
A-D	21.0	6.6	0	0.047	95.3%
D-ABC	82.3	6.6	1	0.168	83.2%
C-B	12.8	5.4	0	0.024	97.6%
A: N2 South **B:** L1013 **C:** N2 North **D:** Knockcommon Road					

Table 7.7 presents the morning peak hour PICADY modelling analysis undertaken for the Rathdrinagh Crossroads for the base year +15 (2029).

By 2019, the reserve capacity will reduce by 1.4%, from 82.7% to 81.3%, which is not considered to be significant. Queuing at the cross roads will not be affected and delays will generally remain unchanged, except for vehicles turning from the Knockcommon Road onto the N2, where an extra delay of approximately 0.6 seconds per vehicle is likely.

Table 7.7 PICADY Modelling Analysis 2029

Traffic Movement at Crossroads	**Expected No. of Vehicles** (veh/hr)	**Queuing Delay per vehicle** (sec)	**Max Queue** (vehs)	**Max RFC**	**Reserve Capacity**
Scenario 5: Base Year Without Waste Acceptance Increase to 250,000/year +15 (2029) - PM Peak					
B-C	14.6	7.2	0	0.037	96.3%
B-AD	31.1	8.4	1	0.085	91.5%
A-D	19.2	6.6	0	0.040	96.0%
D-ABC	85.9	6.6	1	0.173	82.7%
C-B	13.7	5.4	0	0.026	97.4%
Scenario 6: Base Year Accepting Maximum Approved Wastes 0f 250,000 tonnes/year +15 (2029) With Development - PM Peak					
B-C	14.6	7.2	0	0.037	96.3%
B-AD	32.0	8.4	1	0.089	91.1%
A-D	21.9	6.6	1	0.049	95.1%
D-ABC	89.6	7.2	1	0.187	81.3%
C-B	13.7	5.4	0	0.026	97.4%

7.4.3 Construction Stage

The construction stage will generate traffic on the local road network including the deliveries of construction materials and construction staff private vehicles. Based on the scale of the works and the current traffic levels, the short term construction related traffic will be significantly less that the traffic projected to occur when the facility is operating at its current maximum approved capacity.

7.5 Impacts

Increasing the amount of waste accepted at the facility to the maximum currently authorised will result in an increase in HGV traffic on the local road network. The construction of Building 4 will also result in additional construction related traffic to and from the facility

vehicles. However, as the levels will be significantly lower than the traffic generated when the facility is operating at full capacity, it is not necessary to assess the short term impacts.

7.6 Mitigation Measures

The TIA has confirmed that the existing road networks has the capacity to accommodate the traffic that will be generated when the facility accepts the currently authorised maximum annual intake of 250,000 tonnes and therefore mitigation measures are not required.

At the facility access off the Knockommon Road, the visibility to the right on exiting is currently impaired by the existing trees/hedgerow. Some of the trees/hedgerow located to the east of the access will be removed to provide the full visibility sightline of 160m.

7.7 Impact Assessment

The existing access junction has the capacity to handle the estimated increase in traffic associated with the additional waste inputs, taking into consideration the cumulative effects of other developments in the vicinity of the site. The existing road network has the capacity to accommodate the traffic associated with the traffic when the facility is operating at the currently approved waste acceptance rate of 250,000 tonnes/year. The overall impact of the increased traffic will be imperceptible.

8 SOILS AND GEOLOGY

8.1 Introduction

This Chapter describes the soils and bedrock conditions at the facility and assesses the impacts of the proposed development including the construction and operational stage.

8.2 Methodology

The assessment is based on a review of available information on the local geological conditions derived from databases maintained by Teagasc and the Geological Survey of Ireland (GSI), the borehole logs of the two on-site wells and the results of a hydrogeological risk assessment carried out by OCM in 2009. The OCM report, a copy of which is in Appendix 6, contains a detailed description of the soils and geology, including geological maps.

8.3 Existing Conditions

8.3.1 Subsoils

The soil maps prepared by Teagasc indicates that the subsoil type beneath the site is a till derived from Namurian Shales and Sandstones (TNSSs). The 2009 site investigation confirmed the subsoils comprise a brown clay to approximately 1m, which is underlain by a grey/black clay. The groundwater well logs indicate that the subsoils are at least 10-12m deep.

8.3.2 Bedrock

The site is underlain by the Balrickard Formation. It is described by the GSI as coarse sandstone, shale. It is bounded to the north and south by the Donore Formation which is shale, sandstone and limestone. To the east is the Walshestown Formation which is described as shale, sandstone and limestone. The Loughshinny Formation (dark micrite & calcarenite, shale), Platin Formation (crinoidal peloidal grainstone-packstone) and the Donore Formation are to the west.

8.4 Impacts

The proposed development will involve the excavation of soils and subsoils for the foundations of the new building and the storage tanks together with the associated services including the installation of surface water drains, a soakaway and underground ductwork. The excavated soils and subsoils will be retained on site and used to achieve building formation levels, to construct an acoustic berm and for landscape works.

The only direct emission to ground at the facility was the treated effluent from the on-site wastewater treatment plant, which discharged to a percolation area. However, due to operational difficulties, the discharge to the percolation area was stopped and the treated effluent is now sent off site for treatment at a local authority owned municipal wastewater treatment plant.

The only new emission to ground will be rainwater run-off from the new paved yards, which will discharge to a new soakaway via an appropriately sized interceptor.

There is the potential for spills/leaks to occur when refuelling vehicles and mobile plant during the construction stage. Such leaks/spills could impact the exposed subsoils. In the operational stage, there is the potential for leaks/spills to occur to ground during the delivery and handling of the incoming wastes and leaks from the above ground digestate storage tanks.

The potential pathways to the soil include the new soakaway, direct infiltration in unpaved areas and leaks from the surface water drainage systems.

8.5 Mitigation Measures

8.5.1 Existing

The existing mitigation measures include the provision of extensive low permeability paving across the site; the operation of a sanitary wastewater treatment plant, the provision and maintenance and integrity testing of spill containment infrastructure, and the routine inspection and survey of the surface water and foul water drainage systems.

8.5.2 Construction Stage

The topsoil will be stripped and stockpiled in a manner that does not adversely affect the soil structure. The measures by which this will be achieved will be detailed in the CMP (refer to Section 5.3.1). The CMP will also specify how substances with the potential to adversely affect soil quality, for example oil, will be stored and handled in a manner that minimises the risk of accidental spills or leaks and complies with the Licence Conditions.

Relatively small volumes of potential polluting substances, for example diesel, lubricating and hydraulic oil, will be stored on site during the construction stage, and based on the mitigation measures that will be applied, it is considered that any impact on the soils associated with spills and leaks will be negligible, with no long term effects.

8.5.3 Operational Stage

In the operational stage, all waste processing will be carried out inside fully enclosed buildings, digesters and compost bays. The digesters and bays will be provided with impermeable concrete floor, which will prevent any accidental spills or leaks from impacting on the underlying soils.

The design and construction of the new steel and concrete digestate storage tanks will comply with the Waste Licence Conditions that requires all such areas are impervious to the materials stored and that there is adequate retention capacity to contain any accidental spills or leaks.

The concrete floors inside the buildings, in the bunded areas and in the paved open yards used by vehicles will meet the requirements of British Standard (BS) 8110-Structural Use of Concrete, or an equivalent agreed with the EPA. All containment bunds and the underground surface water drainage pipes will be subject to routine inspection and integrity testing to confirm they are fit for purpose.

The site design and the inspection and testing of the bunds and tanks, pipelines and containers, which will be conducted in the operational phase, minimise the risk of uncontrolled release of spills/leaks to the ground.

The design of the soakaway is based on a hydrogeological risk assessment, which involved the excavation of trial pits and completion of percolation tests. The report on the assessment is in Appendix 6. The design is based on a storm duration of 60 minutes with a 1:100 year return period.

The "first flush" of storm water after a dry period can contain pollutants collected from the ground surface e.g. oil from road surfaces and sediment. Therefore an oil water interceptor will be installed up gradient of the soakaway.

8.6 Assessment of Impacts

With the exception of the area south of Building 3, where the Integrated Constructed Wetland (ICW) will be installed, and the landscaped areas around Building 4, the remainder of the site will either be paved with concrete, or occupied by buildings that prevent infiltration to the subsoil.

The provision of secondary containment for oils and chemicals that have the potential to adversely impact on soil quality, in conjunction with the extensive impermeable paving, minimises the risk of short term direct or indirect discharges to ground in the event of a spill or leak.

The impact of the proposed development, both in the construction and operational stages, on the soils and bedrock will be negligible, with no long term effects.

9 WATER

This Chapter describes the surface water and groundwater regimes at the facility and assesses the impacts the proposed development, including the construction and operational stages, will have on surface water and groundwater quality.

9.1 Methodology

The assessment of surface waters is based on a review of the Eastern River Basin District Management (EBRD) Plan; databases maintained by the EPA the National Parks and Wildlife Service (NPWS), the Office of Public Works (OPW) and the results of surface water monitoring carried out by PANDA.

The assessment of groundwater is based on a review of EBRD Plan; databases maintained by the GSI, Teagasc and the EPA; the borehole logs of the two on-site wells and the results of the OCM Hydrogeological Risk Assessment carried out in 2009. The OCM report, a copy of which is in Appendix 6, contains a detailed description of the hydrogeology, including the aquifer classification and vulnerability maps.

9.2 Existing Condition-Surface Water

9.2.1 Drainage System

A land drain that runs along the southern boundary connects to an unnamed tributary of the Roughgrange River. The Roughgrange is a tributary of the River Boyne, which it joins approximately 3km downstream from the site.

A second drain that runs along the southern boundary, parallel to the N2, originally entered the site and flowed southwest beneath the footprint of Building 3 to join the drain on the southern boundary. As part of the emergency response measures implemented to combat the fire in Building 3 in 2012, this drain was diverted and now runs along the western boundary to a new connection point with the drain on the southern boundary.

When the site was first developed, rainwater run-off from the roofs and paved yards discharged to the land drain on the southern site boundary. This changed in 2006, when the internal drains were diverted to an underground holding tank via silt traps and an oil interceptor. The run-off is now stored pending consignment to an off-site waste water treatment plant.

Planning permission and EPA approval has already been granted for an integrated constructed wetland (ICW) on the open ground west of Building 3. When constructed surface water run-off from the paved area will be directed to the ICW after first passing thorough silt traps and an oil interceptor. The outfall from the ICW will be to the land drain on the southern

boundary. The current Licence sets emission limit values (ELV) for this discharge and these are given in Table 9.1.

Table 9.1 Surface Water ELVs

Parameter	ELV
BOD	5 mg/l
Suspended Solids	25 mg/l
Ammonia	1 mg/l

In addition, the ICW is designed to achieve a phosphorous ELV of 0.5mg/l and nitrogen of 0.25 mg/l.

9.2.2 Surface Water Catchment

The facility is in the catchment of the River Boyne and is in the Boyne Lower Water Management Unit (WMU) as designated in the ERBD Management Plan prepared under the EU Water Framework Directive (WFD). The WMU comprises a number of different Water Bodies and the site is in the Rathdrinagh Upper Water Body.

The ERBD Plan contains reports on the 'Status' of each water body. Status means the condition of the water in a watercourse and is defined by its ecological status and chemical status, whichever is worse. Waters are ranked in one of five status classes, High, Good, Moderate, Poor and Bad .

The WFD requires measures to ensure waters achieve at least 'Good Status' by 2015, and that their current 'Status' does not deteriorate. Where necessary, for example in heavily impacted or modified watercourses, extended deadlines (2021 and 2027) can be set for achieving the following objectives:-

- Prevent Deterioration
- Restore Good Status
- Reduce Chemical Pollution
- Achieve Protected Areas Objectives

The objectives for particular watercourses are based on Pressure and Impact Assessments of human activity, including point and diffuse emissions, landuse (e.g. peat harvesting, quarrying, industrial and residential use) and morphological conditions (e.g. river depth and width, structure and substrate of river bed) on surface waters to identify those water bodies that are 'At Risk' of failing to meet the WFD objectives.

'At Risk' does not necessarily mean that the water bodies have already been adversely impacted, but that there is a likelihood that a water body will fail to meet its objectives unless appropriate management action is taken.

The Rathdrinagh Upper Water Body is ranked as being of Moderate Status based on the overall ecological status and is 'Probably At Risk' of not achieving its Objective of 'Restoring Good Status' by 2027. A copy of the Water Body Status Report is in Appendix 7.

9.2.3 Surface Water Quality

When the site was first developed, surface water run-off from the roofs and paved yards discharged to the land drain on the southern site boundary. This changed in 2006 when the internal drains were diverted to an underground holding tank via silt traps and an oil interceptor. The water is now stored pending consignment to an off-site waste water treatment plant.

There is no up to date water quality data available for the drain along the southern boundary. Until 2006 the water quality in the drain had been monitored, but this was discontinued with the agreement of the EPA after the discharge to the drain stopped.

The current Licence authorises the installation of an ICW on the open ground south of Building 3, however this has not yet been provided. An overview of the ICW is presented in Section 4. 6 and the design details are presented in the Bartley O'Suilleabhan Report in Appendix 8. When it is installed, surface water run-off from the existing paved areas will be directed to the ICW. The outfall from the ICW will be to the drain on the southern boundary.

9.3 Existing Conditions-Groundwater

9.3.1 Wells

The first of the two on-site wells (BH1) was installed in April 2003 to a depth of 91m (300ft) with the depth to bedrock recorded at 10-12m (30-35ft). The yield was estimated at 13.6m^3 per hour (3000 gallons per hour). The second well (BH2) was installed in June 2006 to a depth of approximately 135m (400 ft) with the depth to rock being 12.5m (38ft). The yield was estimated at 45m^3 per hour (10,000 gallons per hour).

9.3.2 Aquifer Classification

The Balrickard Formation, is classified by the GSI as a bedrock aquifer that is generally unproductive except for local zones **(Pl)**. The aquifer beneath the site is part of the Donore Groundwater Body as designated in the ERBD Plan.

9.3.3 Aquifer Vulnerability

Vulnerability is defined by the GSI as the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The GSI uses four groundwater vulnerability categories - extreme, high, moderate and low - for mapping purposes and in the assessment of risk to groundwater.

The Vulnerability map for Meath indicates that the vulnerability at the site is Low. The site specific information on subsoil thickness (10-12m) confirms that this low vulnerability.

9.3.4 Groundwater Flow Direction

Based on the topography, the local direction of groundwater flow is considered to be from the north to the south.

9.3.5 Groundwater Quality

A copy of the Donore Groundwater Body status report is in Appendix 9. The condition of a water body is defined by its chemical and quantitative status, whichever is worse, and groundwater quality is ranked in one of two status classes: Good or Poor. The Donore Groundwater Body is categorised as being of 'Good' status and is 'Probably Not At Risk' of retaining this status.

9.4 Impacts

The proposed development will extend the impervious area of the site, which will increase the volume of rainwater water run-off and reduce potential groundwater recharge. Rain water run-off from the roof of Building 4 will be kept separate from yard run-off.

The roof water will be directed to an existing aboveground water storage tank (660m^3), while run-off from the yard will be directed to a new soakaway. Therefore the potential recharge loss is only associated with the new building. The run-off from the roof (12,183m^2) generated in a 1:25 year storm event (26.57mm/hr 60min duration) is estimated to be 324m^3. For a 1:100 storm event (33.00 mm/hr 60min duration) is estimated to be 402m^3.

Activities with the potential to impact on surface water and groundwater quality during the construction stage include:

- Run-off from excavation and construction areas that may be contaminated with silt of oil from leaks from road vehicles and mobile site plant and elevated pH from mass concrete construction,
- Spills and leaks of stored fuels.

Activities with the potential to impact on surface water and groundwater quality during the operational stage include:

- Run-off from open yard areas, that may be contaminated with silt and small amounts of oil from leaks from road vehicles and mobile site plant,
- Spills and leaks of materials, for example oil, leachate, digestate, with the potential to cause pollution, and
- Firewater run-off.

9.5 Mitigation Measures

9.5.1 Construction Stage

The construction works will be carried out in accordance with CMP (Ref Section 5. 3.1) that will specify the measures that must be implemented to prevent/minimise adverse

environmental impacts, including measures to ensure that substances with the potential to adversely affect water quality, for example oil, will be stored and handled in a manner that minimises the risk of accidental spills or leaks and complies with the Licence Conditions.

Materials with the potential to adversely affect surface and groundwater quality, for example oil, will be stored and handled in a manner that minimises the risk of accidental spills or leaks. Appropriate spill containment and clean-up equipment will be maintained at the construction area, as required by the Licence conditions.

Given the relatively small volumes of material that will be stored on site during the construction stage, and the mitigation measures that will be applied it is considered that any impact on surface water associated with spills and leaks will be negligible, with no long term effects.

Based on the nature and thickness of the subsoils (>10m of clayey till), any leaks or spills at the ground surface or leaks in the shallow subsurface will have negligible impact on groundwater.

9.5.2 Operational Stage: Surface Water

The exiting water storage tank is used to supply the dust suppression systems, the new composting process, the road sweeper and the jet vac fleet. At present, the tank is filled with water abstracted from two on-site wells. The rainwater run-off from the roof of Building 4 will replace the groundwater, but the wells will be retained as back-up during dry weather. The tank has a capacity of 660m^3, which is significantly greater that the estimated run-off from the roof in a 1:100 year rain event (402m^3).

The run-off from the new paved areas (5,000m^2) generated during a 1:100 year event will be 165m^3. This run-off will discharge to a new on-site soakaway via an oil interceptor. The soakaway is designed to accommodate 1:100 year storm event (165m^3) and the percolation area is 130m^2.

When it is installed a shut off valve will be fitted at the outfall from the ICW. This will be activated in the event of an incident that could give rise to surface water contamination, for example a fire or accidental release of oils.

In the operational stage, all waste processing will be carried out inside fully enclosed buildings and digesters. Percolate generated in AD process will be collected and stored in above ground storage tanks located in appropriately sized and constructed bunds that will prevent any accidental spills and leaks from entering the surface water drainage system. The levels in the tanks will be monitored to ensure the liquid does not overflow the tanks, and escape from the building. Leachate from the composting bays will also be collected and recirculated.

There will be no direct or indirect discharge of leachate or sanitary wastewater to the surface water drainage system. Sanitary wastewater will be discharged to the new septic tank.

Materials with the potential to adversely affect surface and groundwater quality, for example oil, will be stored and handled in a manner that minimises the risk of accidental spills or leaks The design and construction of all the tank and drum storages areas will comply with the Waste Licence conditions, which requires that all such structures/areas are impervious to the

materials stored and that that there is adequate retention capacity to contain any accidental spills or leaks.

PANDA has site specific procedures to deal with spills and any emergencies that may arise to ensure that the appropriate response actions are taken by trained staff to minimise any associated environmental impacts. Appropriate spill containment and clean-up equipment is provided at the facility, as required by Waste Licence conditions.

In the event of an incident or accident at the facility, including a fire that could give rise to the risk of surface water pollution, the shut off valve on the outlet from the ICW will be closed to contain the contaminated surface water within the facility's drainage system. Following any such incident, the water that accumulates in the drainage system will be tested to identify the appropriate management option.

9.5.3 Operational Stage: Groundwater

The concrete floors inside the buildings, in the bunded areas and paved open yards used by vehicles will comply with design specified in the Waste Licence and will meet the requirements of British Standard (BS) 8110-Structural Use of Concrete, or an equivalent agreed with the EPA. All the bunds, tanks and the underground drainage pipes will be subject to routine inspection and integrity testing to confirm they are fit for purpose.

The site design and the inspection and testing of the bunds and tanks, pipelines and containers, which will be conducted in the operational phase, will minimise the risk of uncontrolled release of spills/leaks to the subsoil which is the pathway for the downward movement of contaminants towards the water table. The nature and thickness of the subsoils (>10m of clayey till) will effectively impede the downward migration of contaminants.

9.6 Assessment of Impacts

Given the relatively small footprint of Building 4 and the nature and thickness (10m) and of the subsoils, which currently severely limit recharge, the reduction in potential groundwater recharge (maximum of 402m^3/year) will have no effect on the bedrock aquifer at either a local, or Water Body scale.

The risk of impact on surface water quality during the construction stage is low, while the risk to groundwater is negligible. The risk of impact on surface water quality during the operational stage is low, while the risk to groundwater is negligible.

10 ECOLOGY

10.1 Introduction

This Chapter describes and evaluates the habitats with their representative flora and fauna and assesses the impacts associated with the proposed development. It is based on an Ecological Assessment Report prepared by EcoFact Environmental Consultants that comprised a desktop study and site evaluation. EcoFact's full report containing all of the supporting information and references, is included in Appendix 10.

OCM prepared a Natura Impact Statement (NIS) Stage 1 Screening Report to inform the Appropriate Assessment process. This is a separate process from the EIS, but is also included in Appendix 10 for information purposes.

10.2 Methodology

The data sources reviewed in the desktop study included databases maintained by the National Parks and Wildlife Service (NPWS), OSI maps and relevant published literature, including the digital database of the 'New Atlas of the British and Irish Flora' (Preston et al, 2002).

EcoFact carried out a Phase 1 Habitat Survey of the site out in August 2009 in accordance with guidance developed by the Joint Nature Conservation Committee (1993). Habitats were classified using the descriptions and codes in the Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). Plant species nomenclature followed Stace's 'New Flora of the British Isles' (1997). The habitats identified were recorded on a habitat map following the 'Habitat Survey Guidelines (Draft)', published by the Heritage Council (2005).

10.3 Existing Conditions

The existing site occupies 4.7 hectares, the majority of which is either paved (35,000m^2), or occupied by buildings (10,000m^2). There is an unpaved area to the west of Building 3, where the proposed ICW will be installed. The site is in the catchment of the River Boyne and the drain along the southern boundary connects to an unnamed tributary of the Roughgrange River, which joins the Boyne, approximately 3km downstream from the site.

The proposed extension area slopes gently from the north to south. The majority of the area is improved agricultural grassland, some of which was found to be wet and waterlogged. The field boundaries are dominated by ash tree lines and hawthorn hedgerows, with the exception of the western boundary which comprised a steel railing fence. An unpaved access road bisects the site.

10.3.1 Designated Sites

There is no Natura 2000 Site immediately adjacent to the site. The closest Natura 2000 Site is The River Boyne and River Blackwater Special Area of Conservation (SAC). In addition, there are two Natural Heritage Areas (NHA) within 2.5km of the site. Summary details of these sites and the potential for effects from the proposed extension are shown in Table 9.1.

Table 9.1 Designated Sites

Designated Site	Distance (km)	Notes	Assessment of Potential Effects
River Boyne and Blackwater SAC (002165)	3km to the north east of the site	Annex I Habitats: Alkaline Fen, Alluvial Woodlands. Annex II species: Atlantic salmon, Otter and River Lamprey.	Potential impacts possible as the surface water run-off from the facility will discharge to a tributary of the River Boyne.
River Boyne and River Blackwater SPA (004232)	3.5km to the north east of the site	SPA qualifying interest is it is a breeding ground for Kingfishers.	Potential impacts possible as the surface water run-off from the facility will discharge to a tributary of the River Boyne.
Thomastown Bog NHA (1593)	2.5km to the east of the site.	Peatland Habitat	No potential for adverse effects as there is no connection between this Site and the proposed works
Balrath Woods NHA (1579)	2.5km to the south of the site	Woodland Habitat	No potential for adverse effects as there is no connection between this Site and the proposed works

The River Boyne and River Blackwater was selected as an SAC for alkaline fen and alluvial woodlands, both habitats listed on Annex I of the E.U. Habitats Directive and also for the following species listed on Annex II of the same directive – Atlantic Salmon, Otter and River Lamprey. The site was selected as an SPA as it is a breeding ground for Kingfishers.

10.3.2 Terrestrial Habitats

A total of eight habitats were identified within the proposed development area, as shown on Figure 10.1, which is derived from the EcoFact Report. An overview of theses habitats is presented below along with an evaluation of their importance, with full details in Section 3.2.1 of the EcoFact report.

Improved Agricultural Grassland (GA 1)

This is the dominant habitat within the site and is actively grazed by cattle. Grass species recorded included perennial rye grass, meadow grasses and cocksfoot. Common herb species include plantains, creeping buttercup, white clover, dandelions, docks, nettle, common mouse-ear spear thistle, and creeping thistle. This type of managed and improved habitat is widespread throughout the Irish countryside. The species diversity is poor and the habitat is classified as being of low ecological value.

Wet Grassland (GS4)

The north eastern part of the extension area comprises a wet grassland habitat that is waterlogged and poached by cattle. A greater diversity of broadleaved herbs were recorded in this area, although the habitat is dominated by improved agricultural grassland species. Species recorded included creeping buttercup, celery-leaved buttercup, redshank and

Yorkshire fog. This type of managed and improved habitat is widespread throughout the Irish countryside. The species diversity is poor and the habitat is classified as being of low ecological value.

Marsh (GM1)

The southern part of the extension area is dominated by improved agricultural grassland; however, a narrow strip of marsh is present, considered to be associated with a recolonised section of the access track that bisects the site. Portions of this habitat were drier, with species indicative of recent disturbance. This habitat is characterised by the presence of hydrophilous species including broadleaved herbs and grasses. Brooklime, buttercup species, willowherb species, broadleaved dock, redshank and knotgrass were all common; with grass species including floating sweet grass recorded. This wetland habitat is in a low lying area and due to its small size and relatively low diversity it is of low ecological value.

Hedgerows (WL1)

Hedgerow habitats are present in the northwestern part of the site, forming the site boundary and extending into the adjacent field. This habitat is dominated by hawthorn, with bramble and ivy dominating the understory. Occasional holly, ash, honeysuckle and wild rose are also present. The ground flora is influenced by the agricultural management of the site and is dominated by improved grassland species. In the southern and eastern part of the site, hawthorn hedgerows are also present as an understory to a well-developed ash treeline.

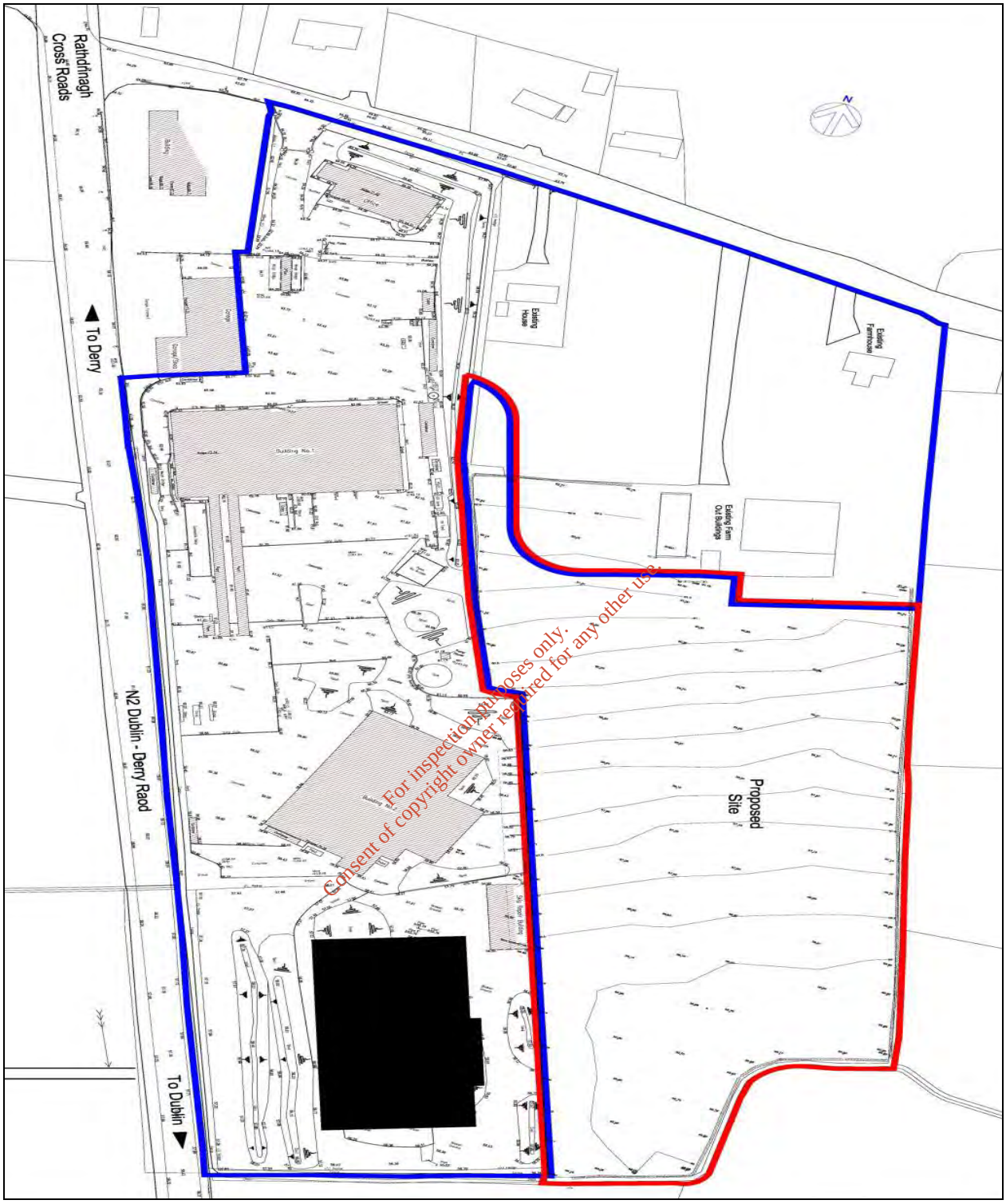
Hedgerows are an important aspect of the Irish landscape, as well as being of value to mammal and bird fauna as wildlife corridors. The hedgerows in the extension area form part of a continuous network in the surrounding landscape. In association with treelines, the hedgerows provide a refuge and foraging habitat for small mammals and birds and are therefore considered to be of local ecological importance.

Treeline (WL2)

The southern and western boundaries of the extension area are dominated by treelines of mature ash. The northern boundary, west of the existing farm buildings, also comprises a treeline of ash. All of the treelines have an understory of hawthorn hedgerow. The treeline along the eastern boundary is more widely spaced and is bounded to the west by a land drain (dry).

Treelines comprising generally native tree species such ash form part of the Irish agricultural landscape and are of local ecological importance, functioning as wildlife corridors and also as commuting routes for bats.

Figure 10.1 Habitats



Drainage Ditches (FW4)

A drainage ditch, which flows from west to east, forms the southern boundary of the extension area. No suitable fisheries habitat was identified and furthermore no in stream flora was present. The ditch is considered to have a limited capacity to support aquatic ecological diversity.

Buildings and Artificial Surfaces (BL3)

There are a number of farm buildings and a concrete hardstanding area in the northern part of the extension area, which is outside the footprint of the new building. These buildings have limited potential for flora and are of low ecological value.

Bare ground (ED2)

An unpaved access track from the existing farm buildings to the north of the proposed development area crosses the site in a north to south direction. The bare earth may provide suitable habitat for recolonising species in the future, however it is classified as being of low ecological value.

10.3.3 Rare Plant Species

The 'New Atlas of the British and Irish Flora'(2002) indicated that two species listed on the Irish Flora Protection Order (1999) could be present. These were the red hemp nettle and hairy St. John's wort.

The red hemp nettle is an annual of arable land, waste places and open ground on calcareous substrates, including limestone pavements and scree. It is also found on eskers and on coastal sand and shingle. This species was not identified during the survey and is considered unlikely to occur given the improved nature of the dominant agricultural grassland habitat within the site.

Hairy St. John's wort is a perennial herb of well-drained, neutral to basic soils in open or partially shaded habitats including rough and ungrazed grassland, woodland rides and clearings, river banks, roadside banks and verges. It was not recorded during the survey. The majority of the site is considered to be too wet and heavy for this species, while drier habitat associated with the hedgerow habitats on the site have been affected by intensive agricultural management.

The NPWS database lists two species of protected flora with a 10km radius of the proposed development site. Both of these, meadow barley and meadow saxifrage, have been recorded to the north of the proposed development. Neither species was identified during the survey.

10.3.4 Fauna

No direct evidence of protected mammal species was noted during the survey and the site was found to be significantly devoid of mammal activity; limited to a single rabbit trail at the treeline at the eastern boundary of the site and a single fox scat at treeline at the northern boundary of the site.

Badgers are likely to be present in the wider landscape and may forage on the extension area occasionally. However, no signs of badger activity (habitual trails or crossings, scats or 'snuffle holes') were recorded within or in the vicinity of the development site. Many of the mature and semi-mature ash trees in the treelines have good ivy cover and offer some limited potential for roosting bats.

The hedgerows are used by a variety of songbirds and passerine species common in the Irish countryside. Bird species recorded included magpie, starling, swift, woodpigeon, pied wagtail and jackdaw.

Mammal activity and potential is evaluated as being of low ecological importance, while the avifauna diversity is also considered to be of low ecological importance.

The NPWS databases have records that protected fauna have been identified in the vicinity of the proposed development area. These include the otter which was identified on lands to the north and east of the proposed site and is associated with the River Boyne. Other protected species recorded in this part of County Meath include the pygmy shrew, hedgehog, red squirrel, stoat and the brown long-eared bat. However there is no record of any of these species being identified within 10km grid square (N96) within which the proposed site is located.

10.4 Impacts

The proposed development involves the construction a large building to house an anaerobic digestion plant and composting system, with associated combined heat and power plant, on a green field area located directly adjacent to PANDA's existing waste management facility. The development will have associated access roads and hardstanding areas, wastewater storage tanks and a surface water percolation area.

The construction works will take place on an area of improved agricultural grassland. Sections of the existing hedgerow and treeline habitats along the northern boundary will be removed, however the hedgerows and treelines on the eastern and southern boundary of the site will be retained.

Potential impacts on terrestrial habitats and fauna include direct habitat loss and disturbance or displacement of fauna due to increased noise and disturbance during the construction and/or operation phase.

10.4.1 Terrestrial Habitats

The construction of buildings and hardstanding areas will impact directly on improved agricultural grassland and wet grassland (dominated by improved grassland species). There will be further impacts on a small area of marsh habitat in the south of the site.

The construction of the access roads will require the removal of ca. 7m of hedgerow in the northern portion of the site and ca. 25m of treeline at the northern boundary of the site. There is the potential for further impacts affecting the hedgerow and treeline habitats on the site boundaries during the construction phase, including disturbance, damage or removal.

10.4.2 Fauna

The construction and operational stages does not involve any works that will affect important faunal habitats. The mammal and bird species recorded at the site are common in the Irish countryside and are likely to use the site following the implementation of the proposed landscaping measures.

Although no bat roosts were identified during the current survey, common bat species could potentially use the trees along the boundary of the study area. While it is considered unlikely that any significant bat roost is present in the trees that will be removed, as all bat species are protected under Irish legislation mitigation measures must be provided.

10.4.3 Designated Sites

The development area is approximately 2.5km west of the Thomastown Bog NHA and 2.5km north of the Balrath Woods NHA. There are no potential impacts associated with the proposed development that could affect these designated sites.

The nearest Natura 2000 site, The River Boyne and River Blackwater SAC/SPA, is ca. 3.6km to the north of the development area. There are no direct impacts associated with the propose development that might affect this designated site.

The land drain along the southern site boundary is connected to the River Boyne via a third order tributary that joins the Boyne ca. 3 km northeast of the site at Roughgrange. Therefore there is the potential for indirect water quality impacts that could affect the water quality and conservation interests of the SAC/SPA.

Activities with the potential to impact on surface water during the construction stage include:

- Run-off from excavation and construction areas that may be contaminated with silt of oil from leaks from road vehicles and mobile site plant and elevated pH from mass concrete construction, and
- Spills and leaks of stored fuels.

Activities with the potential to impact on surface water during the operational stage include:

- Run-off from open yard areas, that may be contaminated with silt and small amounts of oil from leaks from road vehicles and mobile site plant;
- Spills and leaks of materials, for example oil, leachate, digestate, with the potential to cause pollution, and
- Firewater run-off.

10.5 Mitigation Measures

10.5.1 Terrestrial Habitats

The following mitigation measures are proposed to minimise the impacts caused by the loss of habitats within the proposed extension area.

Insofar as possible, all hedgerow and treeline habitats bordering the site will be retained. Where access points are opened along the northern boundary, these will be kept within the minimum extent possible and the remaining hedgerow and treeline habitats area will be fenced off and retained.

In the construction stage, the use of heavy machinery will not normally be permitted within 2.5m metres of the hedgerows and 4m of the treelines that will be retained in the north of the site. High visibility fencing will be installed as a buffer zone around all treelines and hedgerows that will be retained to ensure the conservation of the root protection area. Compaction of the soil within this buffer zone will be avoided and no heavy machinery or storage of site materials will be carried out within this area.

Refuelling of machinery will be undertaken away from all hedgerows, treelines and drains. and construction site management will include provisions for removing wastes.

To compensate for the loss of the hedgerow habitats, native tree and shrub species will be incorporated into the landscape plan which will include underplanting on the existing hedgerow on the eastern boundary (Refer Chapter 13). Suggested species include ash, sycamore, whitethorn, blackthorn and holly.

10.5.2 Fauna

As no mammal dwellings were recorded on the site, mitigation measures are not required. Mitigation measures for the protection of birds involves compliance with the requirements of the Wildlife Act (1976) as amended that stipulates that the clearance of vegetation, scrub, hedgerow or treeline is not permitted during the bird nesting season, between the months of March to August, inclusive.

The trees that will have to be removed will be first be surveyed for the presence of bats by a qualified ecologist. All ivy-covered trees felled will be let fall gently to the ground and will be left to lie undisturbed overnight to allow any bats within cracks or crevices to escape.

During the construction phase, site lighting will be directed away from retained boundary treelines and hedgerows to avoid impacts on foraging bats. The permanent lighting associated will take into account the possibility of bats using the treelines with only the minimum lighting required for safety purposes.

Bat boxes and bird nesting boxes will be provided as these will enhance the biodiversity value of the surrounding landscape and compensate for the loss of any potential bat roosts.

10.5.3 Designated Sites

As the development area is approximately 2.5km from the two designated terrestrial NHA sites and there is no pathway by which impacts associated with the proposed development could impact on these sites, mitigation measures are not required. Given the potential for impacts on the River Boyne and Blackwater SAC/SPA mitigation measures are required.

During the construction stage, materials with the potential to adversely affect surface quality, for example oil, will be stored and handled in a manner that minimises the risk of accidental spills or leaks. Appropriate spill containment and clean-up equipment will be maintained at the construction area, as required by the Waste Licence conditions.

In the operational stage, all waste processing will be carried out inside fully enclosed buildings and digesters. Percolate generated in AD process will be collected and stored in above ground storage tanks located in appropriately sized and constructed bunds that will prevent any accidental spills and leaks from entering the surface water drainage system. The levels in the tanks will be monitored to ensure the liquid does not overflow the tanks, and escape from the building. Leachate from the composting bays will also be collected and recirculated.

There will be no direct or indirect discharge of leachate or sanitary wastewater to the surface water drainage system. Sanitary wastewater will be discharged to the new septic tank.

Materials with the potential to adversely affect surface and groundwater quality, for example oil, will be stored and handled in a manner that minimises the risk of accidental spills or leaks The design and construction of all the tank and drum storages areas will comply with the Waste Licence conditions, which requires that all such structures/areas are impervious to the materials stored and that that there is adequate retention capacity to contain any accidental spills or leaks.

PANDA has site specific procedures to deal with spills and any emergencies that may arise to ensure that the appropriate response actions are taken by trained staff to minimise any associated environmental impacts. Appropriate spill containment and clean-up equipment is provided at the facility, as required by Waste Licence conditions.

In the event of an incident or accident at the facility, including a fire that could give rise to the risk of surface water pollution, the shut off valve on the outlet from the ICW will be closed to contain the contaminated surface water within the facility's drainage system. Following any such incident, the water that accumulates in the drainage system will be tested to identify the appropriate management option.

10.6 Assessment of Impact

10.6.1 Terrestrial Habitats

The proposed development will have an imperceptible negative impact on the improved agricultural grassland and marsh habitats. The impact on the hedgerow and treeline habitats within the site will also be imperceptible negative. There will be no ongoing impacts on the habitats during the operational phase.

10.6.2 Fauna

The disturbance to non-volant mammals (badger, otter, fox, rabbit) during the construction phase will have an imperceptible negative impact due to the general absence of such species within the development site. The required felling of mature trees does not involve the removal of an entire corridor and the proposed mitigation measures will ensure that the impacts on bat species within the site will be imperceptible negative.

All the bird species identified at the site are expected to continue using the site following implementation of the proposed landscaping measures and therefore the impact on birds will be imperceptible negative.

10.6.3 Designated Sites

The only designated site that could potentially be impacted by the proposed development is the River Boyne and Blackwater SAC/SPA given that the drain along the southern site boundary connects to a tributary of the Boyne.

Given the relatively small volumes of materials that will be stored at the site during the construction stage, and the mitigation measures that will be applied it is considered that any impact on surface water associated with spills and leaks will be negligible, with no long term effects. The risk of impact on surface water quality during the operational stage is low, with no long term effects and will not give rise to any significant impacts on the River Boyne and Blackwater SAC/SPA.

11 AIR

11.1 Introduction

This Chapter describes the ambient air quality and the existing and proposed emissions to air. It presents details of the proposed mitigation measures and assesses the impact, including odours, of the proposed development on air quality.

11.2 Methodology

The assessment is based on the EPA's ambient air quality databases, dust monitoring conducted by PANDA, and detailed odour impact assessment and emission dispersion modelling conducted by Odour Monitoring Ireland (OMI) Ltd. The OMI reports, which describe the methodologies applied in the impact assessment and modelling, are included in Appendix 11 and an overview of the findings is presented below.

11.3 Existing Conditions

11.3.1 Ambient Air Quality

The EPA implements an air quality monitoring programme at a number of monitoring stations across the country. Although PANDA's facility is in an area categorised as Non Urban (ZONE D), the closest monitoring station that was considered representative of air quality at the site is in Navan (Urban Zone C).

Monitoring for carbon monoxide, sulphur and nitrous oxides, particulates, benzene and lead was conducted between April 2007 and February 2008 and the results indicate that, with the exception of particulates (PM_{10}), the air quality was good. A copy of the monitoring report is in Appendix 11.

11.3.2 Dust

Current activities are potential sources of dust emissions. The potential sources of dust emissions are vehicle movements over paved areas during dry periods, processing of C&D wastes.

However, the mitigation measures currently employed, including damping down paved areas, have proven to be effective in controlling emissions from such sources, as is demonstrated by the results of the dust deposition monitoring carried out by PANDA in accordance with the current Licence requirements.

The monitoring is conducted at five monitoring locations within the site boundary, which are shown on Drawing No 3 Rev A. The measurements were carried out using Bergerhoff gauges specified in the German Engineering Institute VDI 2119 document entitled 'Measurement of Dustfall Using the Bergerhoff Instrument' (Standard Method).

The results of the monitoring carried out in 2012 and 2013 are presented in Tables 10.1 and 10.2, which also include the dust deposition limit (350 mg/m^2/day) specified in the Licence. In all of the monitoring events, the dust levels recorded were all well below the deposition limit.

Table 10.1 Dust Monitoring Results 2012

Dust Emission (mg/m^2/day) Sample Location	May 2012 30 Days	July 2012 30 Days	Sept 2012 30 days	Dec 2012 30 days	Deposition Limit (mg/m^2/day)
AD-1	160	240	50	60	350
AD-2	320	75	60	50	350
AD-3	220	70	65	50	350
AD-4	175	70	60	300	350
AD-5	160	75	175	60	350

Table 10.2 Dust Monitoring Results 2013

Dust Emission (mg/m^2/day) Sample Location	Feb/March 2013 30 Days	March/April 2013 30 Days	Aug/Sept 2013 30 days	Nov/Dec 2012 30 days	Deposition Limit (mg/m^2/day)
AD-1	41	50	104	29	350
AD-2	52	42	90	90	350
AD-3	92	82	86	32	350
AD-4	76	79	77	36	350
AD-5	156	13	101	199	350

11.3.3 Odours

The potential sources of odours from the current activities are the processing of mixed MSW and the operation of the Wright Tunnels. The current Waste Licence requires the routine monitoring of the efficiency of the biofilter treating the air extracted from the Wright Tunnels. In 2010 PANDA suspended the use of the tunnels for operational reasons, however the results of the survey carried out in 2011 confirmed that the abatement system had been operating effectively.

Prior to 2010, PANDA had received few complaints from neighbours concerning odours. Any such complaints were recorded and investigated. Where site activities were identified as

being a potential cause of the complaint, corrective actions are implemented and the results communicated to the complainant.

In 2011 PANDA received ten complaints from the general public about the facility operation, seven of which related to odours. In 2012, a total of eighteen complaints were received, of which fourteen related to odour. In 2013, a total of 35 complaints about odours were received.

In response to the complaints, the Agency carried out a number of unannounced odour assessments, beginning in 2011 and continuing into 2012 and 2013. A survey completed in November 2011 identified odours at two off-site locations. The EPA instructed PANDA to implement corrective action to ensure that activities were carried out in a manner that odours did not result in a significant interference with the amenities or environment beyond the site boundary.

Three subsequent unannounced odour assessment surveys carried out by the EPA in May, August and December 2012 and a further three assessments on the 13th, 14th and 15th May 2013 did not identify odours that gave rise to significant impairment of amenities or the environment outside the site boundary.

11.4 Impacts

11.4.1 Fugitive Emissions

The proposed AD/Composting and manufacture of RDF/SRF are potential sources of dust and odours. Vehicles travelling on the new paved areas are a potential source of dust in dry weather.

11.4.2 Point Emissions

The CHP plant and the biomass furnace will be new sources of air emissions. The CHP plant will comprise two gas engines and a stand-by flare, each forming a separate emission point. The odour abatement systems provide in Building 3 and Building 4 will each have a point emission. The locations of the gas engine stacks, flare, furnace stack and odour abatement plant stacks are shown on Drawing No. 3 Proposed Monitoring & Emissions Locations Rev A**.** Details of the stack heights, maximum flow rates and efflux velocities for each emission point are presented in Table 11.1.

Table 11.1 Emission Point Details

Emission Point	Dry Fermentation A2-1	Biomass Furnace A2-2	Gas Flare A2-3	Gas Engine 1 A2-4	Gas Engine 2 A2-5	RDF Carbon Filter A2-6
Stack Height above Ground Level(m)	16	16	8	17	17	14
Temperature (K)	293	523	1273	473	473	293
Efflux Velocity (m/s)	18.76	20.23	12	19	19	<15
Max Flow (Nm^3/hr)	96,764	21,670	3,000	5,500	3,800	35,523

11.5 Mitigation Measures

The CHP plant and the RTO will be designed and operated to achieve the proposed Emission Limit Vlaues (ELVs) presented in Tables 11.2, 11.3 and 11.4. The ELVs are based on BAT and designed to ensure, that the emissions will not result in any environmental impairment outside the facility boundary.

Table 11.2 Emissions from Biomass Furnace Stack (A2-2)

Pollutant	ELV (mg/Nm^3 11% O_2)	Flow (Nm^3/hr ref 11% O_2)	Mass Emission Rate (g/s)
Carbon Monoxide	800	21,670	4.82
Oxides Of Nitrogen	400	21,670	1.20
Sulphur dioxide	150	21,670	1.20
Total Particulates	200	21,670	1.204
Hydrogen Chloride	10	21,670	0.060
Hydrogen fluoride	3	21,670	0.018

Table 11.3 Emissions from Biogas Flare Stack (A2-3)

Pollutant	ELV (mg/Nm^3 11% O_2)	Flow (Nm^3/hr ref 11% O_2)
Carbon Monoxide	50	3000
Oxides of Nitrogen	150	3000
Sulphur Dioxide	250	3000
Hydrogen Chloride	10	3000
Hydrogen Flouride	3	3000

Table 11.4 Emissions from Gas Utilisation Engine 1 (A2-4)

Pollutant	ELV (mg/Nm^3 11% O_2)	Flow (Nm^3/hr ref 11% O_2)	Mass Emission Rate (g/s)
Carbon Monoxide	1,400	5,500	2.14
Oxides Of Nitrogen	500	5,500	0.76
Sulphur dioxide	250	5,500	0.38
Total Particulates	130	5,500	0.199
Hydrogen Chloride	10	5,500	0.015
Hydrogen fluoride	3	5,500	0.005

Table 11.4 Emissions from Gas Utilisation Engine 2 (A2-5)

Pollutant	ELV (mg/Nm^3 11% O_2)	Flow (Nm^3/hr ref 11% O_2)	Mass Emission Rate (g/s)
Carbon Monoxide	1,400	3,800	1.48
Oxides Of Nitrogen	500	3,800	0.53
Sulphur dioxide	250	3,800	0.26
Total Particulates	130	3,800	0.137
Hydrogen Chloride	10	3,800	0.011
Hydrogen fluoride	3	3,800	0.0030

At present, when the Wright Tunnels are in use, odorous air is extracted and treated in the biolfilter. New odour abatement systems will be provided to treat odorous air within the Building 3 (RDF manufacture) and Building 4 (AD and Composting). A detailed description of the proposed mitigation measures is provided in Section 3.2 of the OMI Odour Impact Assessment Report, including the design and reserve treatment capacities and an overview is presented below.

11.5.1 Building 4

In Building 4, the odour abatement system will comprise a staged air extraction, scrubbing and treatment in a roof mounted bio-filter. The building roof plan is shown on Drawing No. 2009-101-203. The system will have a design capacity of 104,000m^3/hour. The actual extraction volume from the building will be 96,764m^3/hour, giving a reserve treatment capacity of 7,263m^3/hour.

The first stage will involve high efficiency acid scrubbing to remove alkaline based odours, particulates, and bioaerosols, which are similar to fine particulates in the particle size range of 1um to 2.5um. This stage will also incorporate a high efficiency vane eliminator capable of removing all mist greater than 1 um to an efficiency of 99.5%.

The second stage will be a biotrickling filter that will remove odours gases and this will be followed by third stage polishing utilising carbon filtration that will also assist in removing particles and odorous gases. The fourth stage involves the injection of plasma after the biotrickling filter and before the air enters a carbon filter.

11.5.2 Building 3 RDF/SRF

In Building 3, the mechanical waste processing area will be segregated from the rest of the building and provided with a negative air pressure system. Odorous air will be extracted from both the mechanical treatment area and the drier and directed to the odour abatement system. The system will have a design capacity of 40,824m^3/hour. The actual extraction volume from the building will be 35,253m^3/hour, giving a reserve treatment capacity of 5,300m^3/hour.

The abatement system will comprise particulate removal (dust cyclone), followed by venturi and alkaline scrubbers that will treat the air before it is fed into the furnace. The temperature in the furnace will be maintained at between 800 and 850^0 Centigrade (C). A back up carbon filter will be provided and used to treat the odorous air in the building when the furnace is shut down for routine maintenance.

11.5.3 General Mitigation Measures

In addition to the new odour abatement systems provided in Buildings 3 and 4, the following mitigation measures will be applied;

- The new building will be provided with a high integrity building fabric;
- The buildings will be fitted with rapid closing doors;
- Separate air extraction systems for the waste reception area, composting tunnels and finished compost areas;

- Routine cleaning of the building interiors;

- The new buildings and odour treatment system will be assessed by an independent experienced contractor to confirm the building integrity (leakage rate, smoke integrity test and absolute pressure test) and odour treatment performance;

- An odour management plan (OMP) will be prepared for the entire facility. The plan will specify the routine inspections and maintenance that must be carried out to ensure the odour control system continues to operate efficiently.

11.6 Assessment of Impacts

OMI carried out air dispersion modelling to assess the impacts of the emissions in the context of the relevant air quality standards and guidance, which included:

- Air Quality Standards Regulations (S.I. No 271 of 2002);
- Directive 2008/50 EC on ambient air quality and cleaner air for Europe
- Horizontal Guidance Note, IPPC H4 Parts I and 2 UK Environment Agency
- Air Dispersion Modelling from Industrial Installations Guidance Note AG4 2010 (EPA).

The assumptions, including the performance specification of the new odour abatement system and mitigation measures that will be incorporated into the design and construction of the new building, used in the modelling and the methodologies applied are detailed in the OMI Report. As the gas flare will only run when one of the gas engines is shut down for servicing, and the emissions are less than that from the engine, it was not included in the modelling.

The modelling confirms that all the emissions from the site, including those from the existing and proposed emission points, will comply with the applicable air quality standards (oxides of nitrogen, oxides of sulphur, carbon monoxide, hydrogen chloride, hydrogen fluoride, benzene and particulates). The odour plume will spread in a north-westerly to south easterly direction, between 100 and 200m from the emission points and will not impact sensitive receptors. Therefore the proposed development will have a neutral impact.

12 NOISE

12.1 Introduction

This Chapter describes the existing noise environment and the existing sources of noise emissions. It presents details of the mitigation measures and assesses the impacts of the proposed development.

12.2 Methodology

The assessment is based on the findings of an ambient noise surveys carried out at the facility in compliance with the requirements of the Waste Licence and predictive assessment of the noise emissions from the proposed development, both of which were completed by Noise and Vibration Consultants Ltd. The report on the ambient noise monitoring carried out in 2009 and the predicative assessments, which include details of the methodology applied, are in Appendix 12.

12.3 Existing Conditions

Facility activities involve the use of plant and equipment that are sources of noise emissions. The primary sources of noise are timber shredding, waste processing plant within the buildings, the C&D processing area at the Lean To and the compost tunnels. The heavy goods vehicles that access the facility and the manoeuvring of skips in the yards are secondary sources of noise emissions. The noise emission levels associated with each operation are presented in Table 12.1, which also includes details of the current mitigation measures.

Table 12.1 Existing Noise Emissions

Location/Name	Noise Level dB(A) – Range	LAeq dB	Ameliorative Measure	Tonal Hz- Outside
Building 2 – Doppstadt Wood Shredder	91.7 – 100.5	96	Housing enclosure	Non-tonal
Building 2 – Trommel Shredder	86.2- 95.3 84.3 – 93.8	91.2 90.5	Housing enclosure	Non-tonal
Building 3 -Shredders Separator, Trommels	93.8 – 96.4	94.8	Housing enclosure	Non-tonal
Rubble Crusher	89.2 – 96.4	94.3	Outside Building 3 and ameliorated by Lean To and to south by Building 3 and to the north by Buildings 1 and 2	Non-tonal

Note: Housing is of concrete blocks / Kingspan Panels KS2000

The current Waste Licence sets daytime noise emission limits of 55 dB(A) LAeq(30 minutes) and night time 45 dB(A) LAeq(30 minutes) and requires quarterly noise surveys to be carried out at four (4) off-site locations. The results of the noise surveys carried out in 2010, 2011 and 2012 found that ELV was not exceeded at either the monitoring locations specified in the Licence or the noise sensitive locations and the results demonstrate that noise emissions from the facility consistently comply with the Licence limits. The dominant source of noise in the area is traffic on the N2.

In August 2009 PANDA also carried out monitoring at two (2) off-site noise sensitive locations. Noise sensitive locations are defined as a dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.

The first location (N1) was 35m from road edge, in a garden along side of a house facing existing facility and the second (N2) was in the back garden of house facing existing facility. The results are contained in the Noise & Vibration Consultants report in Appendix 12.

The results of the surveys carried out between in 2011, which was conducted by Noise and Vibration Consultants Ltd, are presented in Table 12.2 and the results of the monitoring carried out in 2012 and 2013 are in Tables 12.3-12.10.

Table 12.2 Noise Monitoring Results over 5 Surveys expressed as 30 min intervals

Location	Date	Time	Leq	Comments
NSL1	2011	Daytime	45 -48	Panda noise source from site between 45 and 48 45 dBA
NSL2	2011	Daytime	44-47	Panda waste site noise between 44 and 47 dBA
NSL3	2011	Daytime	<49	N2 road traffic with Panda site noise just audible at less than 49 dBA
NSL4	2011	Daytime	Inaudible	Inaudible on all occasions due to N2 road traffic noise

Table 12.3 Noise Monitoring Results January 2012

Location	Time	Leq	L10	L90	Comments
NSL1	14.40	53.1	53.8	44.3	N2 and slip road traffic. Panda noise source is less than 45bDA
NSL2	14.45	52.5	53.2	46.1	N2 and slip road traffic. Panda noise source is less than 46.1dBA
NSL3	14.50	72.4	75.2	49.1	N2 and slip road traffic. Panda noise source just audible at less than 49.1dBA
NSL4	15.30	71.7	73.1	48.9	N2 and slip road traffic. Panda noise source is just audible at 48.9dBA

Table 12.4 Noise Monitoring Results May 2012

Location	Time	Leq	L10	L90	Comments
NSL1	15.20	52.5	53.2	44.1	N2 and slip road traffic. Panda noise source is less than 44dBA
NSL2	15.25	51.4	52.8	45.6	N2 and slip road traffic. Panda noise source is less than 45.6 dBA
NSL3	15.30	73.6	76.3	50.5	N2 and slip road traffic. Panda noise source is just audible at less thaN50.5 dBA
NSL4	16.10	72.5	74.8	49.2	N2 and slip road traffic. Panda noise source is just audible at 48.9 dBA

Table 12.5 Noise Monitoring Results October 2012

Location	Time	Leq	L10	L90	Comments
NSL1	15.40	52.5	55.1	48.0	N2 and slip road traffic. Panda noise source is less than 48dBA
NSL2	15.45	50.7	53.5	45.9	N2 and slip road traffic. Panda noise source is less than 45.9dBA
NSL3	15.50	76.4	81.0	55.3	N2 road traffic with panda noise source is Just audible at less than 47.8 bBA which was Lmin
NSL4	16.30	76.7	81.9	54.0	N2 road traffic with panda noise source is Just audible at less than 50.7 bBA which was Lmin

Table 12.6 Noise Monitoring Results December 2012

Location	Time	Leq	L10	L90	Comments
NSL1	10.30	51.9	53.8	46.6	N2 and slip road traffic. Panda noise source is less than 46.6dBA
NSL2	10.35	51.2	52.4	46.5	N2 and slip road traffic. Panda noise source is less than 46.5dBA
NSL3	10.40	76.8	78.2	55.4	N2 road traffic with panda noise source is Just audible at less than 50.8bBA which was Lmin
NSL4	11.20	75.9	79.2	53.2	N2 road traffic with panda noise source is Just audible at less than 46.9 bBA which was Lmin

Table 12.7 Noise Monitoring Results April 2013

Location	Date	Time	Leq	L10	L90	Comments
NSL1	22nd April'13	14.30	50.3	51.5	45.3	N2 and slip road traffic. Panda noise source from site less than 45.3 dBA
NSL2	22nd April'13	14.45	50.8	51.6	45.2	N2 & slip-road road traffic. Panda waste site noise less than 45.2 dBA
NSL3	22nd April'13	15.50	75.4	77.8	56.1	N2 road traffic with Panda site noise just audible at less than 48 dBA which was L_{min}
NSL4	22nd April'13	16.30	76.6	80.3	54.7	N2 road traffic with Panda site noise inaudible at less than 49.1 dBA which was L_{min}

Table 12.8 Noise Monitoring Results July 2013

Location	Date	Time	Leq	L10	L90	Comments
NSL1	12th Jul'13	15.00	48.8	52.2	41.7	N2 and slip road traffic. Panda noise source from site less than 45.0 dBA
NSL2	12th Jul'13	15.45	47.2	51.1	41.2	N2 & slip road road traffic. Panda waste site noise less than 45.0 dBA
NSL3	12th Jul'13	16.30	77.4	79.4	56.1	N2 road traffic with Panda site noise just audible at less than 49.6 dBA which was L_{min}
NSL4	12th Jul'13	17.00	76.8	79.0	55.8	N2 road traffic with Panda site noise inaudible at less than 45.2 dBA which was L_{min}

Table 12.9 Noise Monitoring Results September 2013

Location	Date	Time	Leq	L10	L90	Comments
NSL1	23rd Sept'13	10.30	46.3	45.7	37.3	N2 and slip road traffic. Panda noise source from site less than L50 of 44.5 dBA
NSL2	23rd Sept'13	11.15	46.0	45.3	37.1	N2 & slip road road traffic. Panda waste site noise less than L50 of 44.2 dBA
NSL3	23rd Sept'13	12.00	77.5	81.0	53.4	N2 road traffic with Panda site noise inaudible at less than 43.7 dBA which was L_{min}
NSL4	23rd Sept'13	12.30	75.2	80.0	52.6	N2 road traffic with Panda site noise just audible at 45.6 dBA

Table 12.10 Noise Monitoring Results November 2013

Location	Date	Time	Leq	L10	L90	Comments
NSL1	23rd Nov'13	11.00	51.2	52.1	44.5	N2 and slip road traffic. Panda noise source from site less than L50 of 47.9 dBA
NSL2	23rd Nov'13	11.45	50.7	52	44.9	N2 & slip road road traffic. Panda waste site noise less than L50 of 48.0 dBA
NSL3	23rd Nov'13	12.30	78.8	82.3	54.7	N2 road traffic with Panda site noise inaudible at less than 45.8 dBA which was L_{min}
NSL4	23rd Nov'13	13.00	76.4	81.3	53.8	N2 road traffic with Panda site noise just audible at 53.8 dBA

Prior to 2011, PANDA had not received any complaints from neighbours concerning noise. In 2011 PANDA received ten complaints from the general public about the facility operation, three of which (September, October and November) related to noise. In 2012, a total of eighteen complaints were received, of which four related to noise, and in 2013 22 complaints about noise were received.

In response to the complaints received in 2011, the Agency carried out an unannounced noise survey on 1st December 2011, which confirmed that noise emissions from the facility were below the ELVs and were not a cause of noise nuisance. Notwithstanding the fact that the facility was not a cause of noise nuisance, PANDA prepared a Noise Reduction Plan, a copy of which is in Appendix 12.

12.4 Impacts

The construction and operational stages of the proposed development will be sources of new noise emissions at the facility. In the construction stage, the primary noise sources will be plant and equipment, with secondary sources being vehicle movements associated with the delivery of construction materials. Typical sources and noise levels 20m from the centre of the construction activity are shown in Table 12.7.

Table 12.7 Construction Noise

Noise Source	Noise Level Leq 1 hour
Readymix truck	70 dB(A)
Large Excavator	73 dB(A)
Vibratory Roller	68 dB(A)
Dump truck	71 dB(A)

The main noise sources and associated noise levels in the operational are listed in Table 12.8.

Table 12. 8 Main Noise Sources and Associated Noise Levels

Plant item	Noise Level (dBA) @ 1m	Comment
CHP unit- JMC 316 GS-B.L (rating 1400kva) inside	87	Unit inside an insulated container located inside the superstructure
AD & Composting system Output fans x 8 each rated at 11kw Input fans x 8 each rated at 22kw Stack Fan	 80 83 75	 All fans will be housed in Fan Room, inside the superstructure At stack exit
Air treatment biofilter system Fans x 3 each at 55kw	 80	 Fans to be located inside fan room
Shredder Trommel screen Transfer conveyor Front-end loader x 3 Telescopic loader	96^{+} 95^{+} 80^{+} 98^{+} 95^{+}	Measurement inside building Measurement inside building Measurement inside building Measurement inside building Measurement inside building
Biofilter pump Scrubber pump Dosing pump	75 78 80	Free-field Free-field Free-field

The main building is referred to as superstructure

12.5 Mitigation Measures

All construction will be carried out in accordance with the measures specified in the Construction Management Plan. This will require the works to comply with BS 5228: Part 1: 2009 Noise and Vibration Control on Construction and Open Sites BS5228- Part 1: 2009 Code of Practice for Basic Information and Procedures for Noise Control.

The construction works will be carried out during the daytime period. All construction traffic will have effective well-maintained silencers. Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery and to limit the hours of site activities that are likely to give high noise level emissions. Where possible, the Contractor will be instructed to use the least noisy equipment.

Construction activity due to its nature is a temporary activity and thus any impacts will be short term.

The following mitigating measures will be implemented:

- A 4m high acoustic berm will be constructed to the north and east of Building 4 using soils excavated from the site.

- Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery, turn off equipment / plant when not in use and limit the hours of site activities that are likely to give high noise level emissions.

- All extraction fans, openings for cooling units/vents to the outside of the main building (superstructure) will be acoustically treated (by acoustic louvers or alternative) so that noise emissions at the facility boundary will be less than 45 dB(A) and less than 35 dBA at all residences (with no clearly audible tonal component).

- The main building (superstructure) will have a concrete base wall with a minimum height of 3m with the remaining height to finished height and roof, of Kingspan double skinned cladding with insulation, or equivalent. (a concrete wall of mass per unit area of 300kg/m^2 will give an average transmission loss of 50 dB^2 while a double skinned cladding of Kingspan type equivalent will give a sound transmission loss of 30 dB).

- All doors (including the roller shutter doors) to the main building will be kept closed during operations.

- Any openings for cooling or forced ventilation will have acoustic louvers or equivalent fitted.

- All fans will be housed inside the main building inside a fan room.

- The CHP container unit will be acoustically treated and housed inside the main building (superstructure).

12.6 Assessment of Impacts

The maximum noise levels associated with the development will occur during the construction stage will pertain for short periods only. In the operational stage, the noise emissions from the facility will have a negligible impact by day no impact at night.

13 LANDSCAPE & VISUAL IMPACT

13.1 Introduction

This Chapter describes the landscape and provides an assessment of the visual impacts of the proposed development on the landscape and visual amenity. It includes a landscape character assessment and photomontages prepared by Sean Boyle Architects.

13.2 Methodology

The assessment was carried out in accordance with on guidelines in the document '*Landscape and Landscape Assessment, Consultation Draft of Guidelines for Planning Authorities'* published by the Department of the Environment and Local Government (June 2002).

The objective was to determine the magnitude and significance of the changes to the landscape character and visual setting. The significance is dependant on the sensitivity of the affected landscape or visual receptor and the magnitude of change that is judged to have resulted from the proposed development. These are based on:

- **Landscape Effects:** The likely nature and scale of changes to individual landscape elements and characteristics and the consequential effect on the landscape character and quality, resulting from this proposal; and

- **Visual Effects:** The change in the character of the available views resulting from this proposal and the change in the visual amenity of its receptors (i.e. those who will see it).

In considering the magnitude and significance of any change the following were taken into account:

- The sensitivity of the view taking into account both the public accessibility of the land where views are possible and the likely sensitivity of that view given the distance, travelling speed, intervening vegetation and land usage;

- The quality and value of the existing landscape at each Visual Reference Point;

- The degree to which the proposal will be visible within the surrounding area; and

- Any other changes in the existing landscape e.g. new road junctions.

The study area was defined based on the visibility of the development area and the analysis of public viewpoints. The choice of viewpoint was influenced by the identification of private residences, key vantage points and the visibility of the existing structures.

13.3 Existing Conditions

13.3.1 Surrounding Landuse

The surrounding land use is predominantly agriculture; however there are some commercial units to the west. There are nine residential dwellings with 0.5km of the site along Knockcommon Road, with a further thirteen residences within 0.5km, along the N2 and Senchelstown Road.

The land immediately to the north, east, and south of the proposed development area is used as pasture. The northern, eastern and southern field boundaries around the development area are dominated by mature ash tree lines and hawthorn hedgerows. The existing facility (Building 2 and 3) are immediately to the west.

There are farm buildings to the north of the footprint of Building 4 and further north in the Knockcommon Road. The N2 Dublin Derry Road runs along the western boundary of the existing facility.

13.3.2 Existing Site

The site is large scale MRF, with three main processing buildings (Building 1, 2 and 3) aligned north to south, with ancillary buildings along the eastern boundary. The facility has an industrial appearance, given the layout, building design and the colour and nature of the materials used in the building fabric.

13.3.3 Landscape Character

Landscape Character Areas (LCA) are units of the landscape that are geographically specific and have their own character and sense of place. Each has its own distinctive character, based upon patterns of geology, landform, land use, cultural, historical and ecological. The Meath County Development Plan 2013 to 2019 Assessment divides the county into 4 landscape character types (LCTs).

- Hills and Uplands Areas;
- Lowland Areas;
- River Corridors and Estuaries, and;
- Coastal Areas.

An LCT is distinct types of landscape that is relatively homogenous in character and generic in nature that may occur in different localities throughout the country. The development site is located in what is termed a Central Lowland Area, which is described as ‘large lowland landscape area composed of rolling drumlins interspersed with numerous large estates and associated parkland. Thick wooded hedgerows, with some conifer plantations, and shelterbelts of ash and larch, separate medium to large fields’.

Hedgerows are perhaps the most characteristic feature of the Meath landscape and provide valuable refuges for biodiversity in a landscape dominated by large tracts of intensive agriculture.

13.3.4 Landscape Sensitivity

The current Meath County Development Plan defines the sensitivity of an LCA 'as its overall resilience to sustain its character in the face of change and its ability to recover from loss or damage to its components.

Sensitivity is evaluated using criteria ranging from 'High' to 'Low' and is based on the interaction of individual components such as landform, amount of evident historical features (time depth) and distribution of viewers. A highly sensitive landscape is likely to be vulnerable, fragile and susceptible to change whereas a landscape with low sensitivity is likely to be more robust and/or tolerant of change'. The development site is in an area designated by the Council as having a Moderate Sensitivity.

On a site specific level, the industrial appearance of the existing buildings immediately to the west of the development area have a good ability to absorb further development without causing severe landscape or visual impacts. Screening is also provided by the surrounding hedgerows.

13.4 Impacts

The proposed development is described in Chapter 5 of the EIS. In brief, it comprises the construction of one new building (Building 4), above ground percolate tanks and CHP plant. The proposed layout is shown on Drawing No. 2009-101-103 and the general elevations are shown on Drawing No. 2009-101-201. Drawing No 2009-101-301 shows the elevation of the new structures as viewed from the N2.

The elements of the development likely to be most relevant to the visual impact include height, massing and exterior appearance of the proposed structures (in comparison to that existing) and any potential alterations to existing vegetation. A photomontage of the proposed development, with views from the northern, eastern, southern and western perspectives is in Appendix 13.

13.5 Mitigation Measures

The purpose of mitigation is to avoid, reduce and where possible remedy or offset any significant negative (adverse) effects arising from the proposed development and mitigation measures were taken into consideration ad the design stage and are integrated cohesively within the propose development.

The development site is in an area is effectively screened from public viewing points due to a combination of the existing buildings, the topography and the mature hedgerows. The primary mitigation measures are siting the development area to the east of existing Buildings 2 and 3 and the full retention of the mature hedgerows along the southern, eastern boundaries, and limiting the removal of the hedgerows on the northern boundary to the minimum required for safe access.

Secondary measures include the implementation of a comprehensive landscaping plan, as shown on the Landscape Master Plan in Appendix 13, which includes the construction of a berm along the northern and eastern sides of the building, which will also function as an acoustic barrier, Additional lighting required in the operational areas to allow safe access in the darker winter months will be directed towards the operational area and not the site boundary.

13.6 Assessment of Impacts

The development site is in an area designated as Central Lowlands, an LCA that is relatively common in County Meath. The landscape sensitivity is categorised as Moderate and has the capacity to absorb visual impacts depending on the nature of the development.

There will be temporary short-term adverse effects during the construction period. Large plant items used in the construction works, such as cranes are likely to have localised adverse visual impacts during construction of the proposed development.

The proposed development will result in a loss of the existing grasslands, but will not affect the existing mature hedgerows to any significant extent. The existing buildings will effectively screen views of the new building from the N2 and the visual impact is limited by the small area of visual influence to the south and west. For residential properties to the north, the impact on visual amenity will be negligible to slight adverse over the situation that pertains at present.

Overall it is considered that the proposed development will result in a negligible to slight adverse alteration on the existing landscape character and visual amenity.

14 HUMAN BEINGS

14.1 Introduction

This Chapter describes the economic activity, social consideration; land uses in the vicinity of the facility and assesses the impacts of the proposed development on the local population.

14.2 Methodology

The assessment was based on the planning zoning status, the landuse in the vicinity of the facility, population density and employment sectors. The data was derived from data bases maintained by the Central Statistics Office and the Meath County Council Development Plan.

14.3 Existing Conditions

The surrounding land use is predominantly agriculture, however there are some commercial units to the west. There are nine residential dwellings with 0.5km of the site along Knockcommon Road, with a further thirteen residences within 0.5km, along the N2 and Senchelstown Road.

The main use of land in the area surrounding the site is agricultural, predominantly grassland used in dairy and beef production. The County Development Plan identifies the environmental regulations and schemes, for example the Rural Environmental Protection Scheme (REPS), which encourage farmers in the area to work in an environmentally friendly and productive manner. The uptake of such schemes assists with reducing potential hazards like water pollution from the storage and land application of animal manures and fertilisers.

14.4 Human Health

Bioaerosols (airborne micro-organisms typically <5 um in diameter) can be generated during the handling and turning of organic waste materials and they present a potential health risk at biological treatment facilities. A study conducted by Cre (the Composting Association of Ireland) concluded that, based on a review of international literature, the general population is not at risk and that there is no clear evidence that either the public or workers at composting facilities have been affected by bioaerosols.

The proposed AD and composting will be carried out indoors, which reduces the potential for the spread of the bioaerosols. The air extraction and treatment system, details of which are provided in Chapters 5 and 11 further reduces the risk of the escape of bioaerosols from the building. All facility staff will be provided with the appropriate training and personal protective equipment to minimise the risks of health impacts.

While odours do not present a direct risk to health, they can be a significant nuisance and cause of discomfort, which can indirectly affect human health. All wastes are and will be stored and processed either indoors or inside fully enclosed digesters, thereby mitigating any potential health impacts on occupants of the nearest residences and farms.

Building 4 is designed to minimise the escape of odours from waste processing areas. Odorous air from the waste handling and processing areas in Buildings 3 and 4 will be collected and treated in appropriately designed and operated abatement systems that will ensure odours associated with the proposed changes will not be a nuisance. Details of the existing and proposed odour control measures are presented in Chapter 11.

There will be no routine emissions to either ground or groundwater, which minimises the risk to groundwater and the risk to groundwater use a drinking water supply either at present or in the future.

14.5 Socio-Economic Activity

The construction stage will generate approximately 30 jobs directly. As the works will be carried out by locally based contractors, it is expected that the majority of the employees will be from the county. The development will increase employment levels at the facility and contribute to sustaining the existing jobs.

The proposed development is in keeping with national and local waste management policy objectives and existing site use, and will not result in the loss of any amenities or rights of way. When operational, the plant will not adversely affect the existing economic activities in the surrounding area, nor will it reduce the potential for the future expansion of economic activities.

The biological treatment plant will comply with Department of Agriculture Food and Marine requirements on the protection of animal health and the prevention of spread diseases and will be subject to regular inspections by the Department vets. It will have no impact on either agriculture, or tourism in the area.

14.6 Environmental Nuisance

The existing facility and the proposed development are designed and will be operated in accordance with the conditions of the Waste Licence. This will either eliminate, or minimise to the greatest practical extent, the risk of environmental nuisance, (noise, dust, odours, birds and vermin). The relevant mitigation measures are described in detail in Chapters 4, 5, 11 and 12.

14.7 Impact Assessment

There are a number of positive environmental and socio economic benefits associated with the development;

- **Energy Production.** The development will generate renewable energy (Biomethane) from the organic waste. The electricity supplied to the grid will reduce the carbon

footprint of the operation and assist in reducing reliance on importing fossil fuels for electricity generation.

- **Compost:** The compost will be very suitable for use as a fertiliser and soil conditioner both for use in horticultural operations, commercial landscape works and private gardens.

- **Waste Recovery:** The REF and biological treatment plants will provide an alternative and environmentally better management option for the wastes that might otherwise be sent to landfill or land spread.

- **Employment**: The development will provide additional short term employment in the area during the construction phase and, in the long term, both increase job numbers and assist in sustaining employment levels at the facility, which have been threatened by the downturn in the economy

The construction of Building 4 will result in the loss of the existing agricultural land use.

14.8 Mitigation

The measures to mitigate the impacts on human being that have incorporated into the design and method of operation of the existing facility and the proposed development are described in previous Chapters.

14.9 Assessment of Impact

Given the relatively small size of the land take (ca 3.2 ha), this will have no perceptible impact on the agricultural productivity in the county. Overall, the proposed development will have a neutral impact with imperceptible consequences for Human Beings.

15 ARCHAEOLOGY & ARCHITECTURE HERITAGE

15.1 Introduction

This Chapter describes the archaeological significance of the facility and describes the closest architecturally significant structures in the vicinity of the site. The study was based on information derived from the Records of Monuments and Places published by the Department of Arts, Heritage & Gaeltacht and information contained in the Meath County Development Plan.

15.2 Archaeological and Historical Background

The search of the Sites and Monuments Records and the List of Registered Monuments Map in the County Development Plan did not identify any record of any archaeological feature either within the existing site or the proposed extension area.

15.3 Architectural Heritage – Protected Structures

There is no record of any protected structure (e.g. medieval structure, church).

15.4 Impact

There is no record of any archaeological feature on the site. The proposed development comprises construction in a previously undeveloped area to the east of the existing site boundary and has the potential to impact on unidentified archaeological features.

15.5 Mitigation Measures

Any archaeological material must not to be unduly damaged or destroyed and sufficient opportunity be afforded to investigate and record any material of archaeological significance at proposed new developments. In the unlikely event that archaeological finds are discovered, the construction works programme will be amended to allow a thorough examination by an experienced competent archaeologist.

15.6 Assessment of Impact

There is no record of any archaeological features within the proposed extension area. If any such features are identified in the construction stage, they will be examined and recorded. When operational the facility will not impact on archaeological features in the vicinity of the site.

16 MATERIAL ASSETS / NATURAL RESOURCES

16.1 Introduction

This Chapter describes the material assets on and in the environs of the site. It identifies the potential impacts, describes the proposed mitigation measures and assesses the impacts.

16.2 Methodology

The assessment is based on information obtained from the surveys carried to assess the impacts of all of the different elements of the proposed development, including ecology, air quality and noise, and data derived from the current Meath County Development Plan.

16.3 Amenities

Neither the existing facility nor its immediate environs have a significant leisure or amenity potential. The development will require the loss of grassland, however at present this is privately owned and there therefore, the proposed changes will not have any impact on amenity use in the vicinity of the site.

16.4 Infrastructure

The impact of the proposed development on the local and regional road network is described in Chapter 7. The local road network can accommodate the traffic associated with the facility when it takes in the maximum currently approved amount of waste annually (250,000 tonnes). Electricity generated in the on-site CHP plant will be connected to the National Grid.

16.5 Agriculture

The proposed development will not have any impact on agricultural land use in the area. The development will require the removal of grassland however this will have an imperceptible impact on agricultural production capacity in the county.

16.6 Natural Resource Consumption

Facility operations involve the consumption of water, oil and electricity. The quantities used in in 2013 are given in Table 16.1.

Table 16.1Estimate of Resource Consumption 2013 –

Resources	Consumption 2013
Gas Oil	290,365 litres
Electricity	2376.43Mwh
Hydraulic/Gear Oil, Grease	10,000 litres
Engine Oil	600 litres
Water	Not metered

There will be an increase in electricity consumption due to the electrical motors installed in the AD plant (mixers, elevators and conveyors) and additional yard lighting, however this will be off set by the electricity generated in the on-site CHP plant. Rainwater form the roof of Building 4 will replace the groundwater that is currently abstracted for non-potable use.

16.7 Mitigation

As the proposed development will not have any adverse impacts on materials assets and resource consumption, mitigation measures are not required.

16.8 Assessment of Impact

The proposed development will have a beneficial impact on resource consumption by reducing reliance on fossil fuels.

17 INTERACTION OF THE FOREGOING

17.1 Introduction

Earlier Chapters describe the impacts associated with the proposed changes and the mitigation measures. This Chapter discusses the significance of the actual and potential direct, indirect and cumulative effects of the changes due to interaction between relevant receptors. It is based on the combined physical, environmental, visual and socio-economic impact of the development on the receiving environment.

17.2 Human Beings / Air

The proposed development has the potential to impact on human beings arising from noise, dust, vehicle exhaust emissions and odour. The location, design and proposed method of operation have taken account of these emissions and effective mitigation measures, which comply with the requirements of the Waste Licence, have been identified and applied. These measures, which are described in detail in Chapter 10, include ensuring the building fabric integrity is appropriate and the installation of a new odour abatement systems. The biomass furnace is the best environmental option in terms of reducing greenhouse gas emissions from the site.

17.3 Surface Water / Ecology

Surface water run-off from the site will discharge to a drain along the southern site boundary following the installation of the constructed wetland. The drain is a tributary of the River Boyne, which it eventually joins 3km from the facility. The Boyne is an cSAC and there is the potential for contaminants in the run-off to impact on the river ecosystem.

The proposed design and method of operation, incorporates measures to minimise the risk of contamination of the run-off. These measures, which include the provision of a new oil interceptor up gradient of the constructed wetland and retention capacity in the event of any incidents at the site, will minimise the risk of impact on the Boyne.

17.4 Cumulative Effects

The assessment of the impacts of the proposed development took into consideration the impacts of the existing facility. The baseline surveys were conducted during typical operational hours and the predictive assessments included the impacts of both the existing emissions and those associated with the additional waste types that will be accepted at the proposed development.

APPENDIX 1

APPENDIX 2

APPENDIX 3

APPENDIX 4

APPENDIX 5

APPENDIX 6

APPENDIX 7

APPENDIX 8

APPENDIX 9

APPENDIX 10

APPENDIX 11