ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Vol II- Main Report

Unit 5 Caherdavin Business Centre,
Ennis Road,
Limerick
www.axisenv.ie

Contents

1.0 Introduction

1.1 General

AXIS Environmental Services were commissioned to complete an Environmental Impact Assessment Report to identify all potential impacts from the design, construction, development and operation of the existing and proposed new development for Aurivo Dairy Ingredients Limited (ADIL), Ballaghaderreen, Co. Roscommon.

This Environmental Impact Assessment Report (EIAR) was requested by the Environmental Protection Agency as part of an application to review the Industrial Emissions Licence P0802-02 application in which the EPA determined the activity to be "*likely to have significant effects on the environment*".

This report forms part of and should be read in conjunction with the planning application documentation, reference file number 186[1] submitted in connection with the proposed development which is available from the Planning Section of Roscommon County Council and also the Licence application P0802-03[2] available on the EPA website.

Aurivo Dairy Ingredients (Ireland) Ltd. (ADIL) is an existing business which have been in operation at the site on the Dublin Road, Ballaghaderreen, since its inception in 1972 and where is has operated under an EPA licence since 2008. The site comprises of c. 5 hectares and is located approximately one kilometre from Ballaghaderreen town centre in an area zoned 'Industrial Uses' (ref Appendix 3.0 Local Area Plan). The proposed development is located wholly within the existing permitted development area. The site is located beside the road L1224.

The changes, as proposed by the planning application and licence review, relate primarily to the inclusion of an additional dryer with higher capacity on the existing site. The latter will allow for the expansion and development of the business in order to respond to an increase in milk supply and market conditions.

The upgrade in production capacity is required to allow for the expansion and development of the business. The company has a national network of businesses and a global target market. This facility once complete will produce over 50,000 tonnes of milk powders and 15,000 tonnes of butter each year. The Aurivo milk supply has expanded by 25% since the removal of milk quotas in April 2015 and it is expected to increase by a further 25% from 2018 to 2022 as part of Aurivo's 5 year strategic plan projections. It is of critical importance that Aurivo will continue to be in a position to process this increasing volume of milk from its 1070 milk suppliers. The Aurivo milk suppliers can expand with confidence in the knowledge that Aurivo will be capable of processing this increasing milk supply.

Aurivo Dairy Ingredients Limited applied for planning permission to Roscommon County Council, reference file number 186 for the following activities;

(1) The construction of an extension to the existing spray dryer facility to contain a new replacement spray dryer plant;

(2) Alterations to the existing car park to accommodate the new extension together with associated local underground drainage and miscellaneous site works. The activity of the proposed development requires an Integrated Pollution Prevention and Control Licence (IPC). There is an existing (IEL) in place for the facility. (Licence No.: P0802-02); at the existing Aurivo Dairy Ingredients Facility at Ballaghaderreen, Co. Roscommon.

Conditional Planning permission was subsequently granted on the 27/04/2018.

Following on from the approval of planning permission, Aurivo Dairy Ingredients submitted a Licence review application to the EPA on 31/05/2018. The application requested the following changes to the existing licence (P0802-02);

1. **Removal of Carbon Monoxide Limit from A1-2**

There are no limits in BAT or the combustion plant directive for Carbon Monoxide (CO). CO emissions from the biomass boiler are heavily dependent on the moisture content of the fuel been burnt. With biomass suppliers in Ireland, the moisture content from virgin wood is variable and subject to change due to our Irish climate therefore CO emissions from the boiler are also inconsistent.

An air dispersion model using hugely exaggerated emissions data for CO has determined that there is no impact from the biomass boiler in the local community. The current CO limit is not required by legislation therefore it is requested that this be removed.

1 http://www.eplanning.ie/RoscommonCC/searchresults

2 http://www.epa.ie/terminalfour/ippc/ippc-view-filter.jsp?regno=P0802-03&filter=b&docfilter=go

2. **Reintroduction of an auxiliary boiler.**

The emission limit values previously applied to this boiler in the original licence have been included in this application. The boiler is being reintroduced as a back-up boiler in the event of either the Biomass or Main HFO boiler having to come off line for whatever reason.

3. **Addition of new Emission Points**

Aurivo is planning to expand its capacity at the installation. This will include installation of a new 5 tonne per hour spray dryer and a local 6,100kW LNG burner for heat transfer. There will be 2 major emission points from the extension planned:

A2-4: Dryer Emission Point
A1-4: LNG Burner Emission Point

These emission points have been included in the air dispersion model and it was determined that the emission limits applied for will not adversely impact on the local community.

1.2 The EIA Process

An Environmental Impact Assessment is a process whereby the anticipated impacts of a project are determined. The latter allows potential impacts to be removed or mitigated from the initial stages of project design through to operation and results in the generation of an Environmental Impact Assessment Report (EIAR). Environmental Impact Assessment (EIA) regulations derive from the European Communities Directive 85/337/EEC[3] as codified and replaced by 2011/92/ EU and assess the effects of certain public and private projects on the environment. 2011/92/EU has since been amended by 2014/52/EU. The requirements of the amended 2014/52/EU[4] have been transposed into Irish Legislation, through the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, in September 2018.

The requirements of the Directive, in the context of this project, are primarily transposed through Schedule 5 (Parts 1 and 2) of the Planning and Development Regulations 2001, as amended. Projects listed in Annex I of the EIA Directive have mandatory EIA requirements. Each Member State decides on a case-by-case basis whether Annex II projects of the EIA Directive require an EIA. Thresholds have been set for Annex II projects in Irish legislation, reference Schedule 5, Part 2 of the Planning and Development Regulations, 2001 under which the projects falls for consideration.

The Environmental Protection Agency, as the Competent Authority, issued a letter requesting Further Information on the 22nd October 2018 which requested the following:

''Having considered the information provided by the applicant, it has been determined that the activity constitutes a project to which the EIA directive applies and is likely to give rise to significant effects on the environment by virtue of its nature size and location".

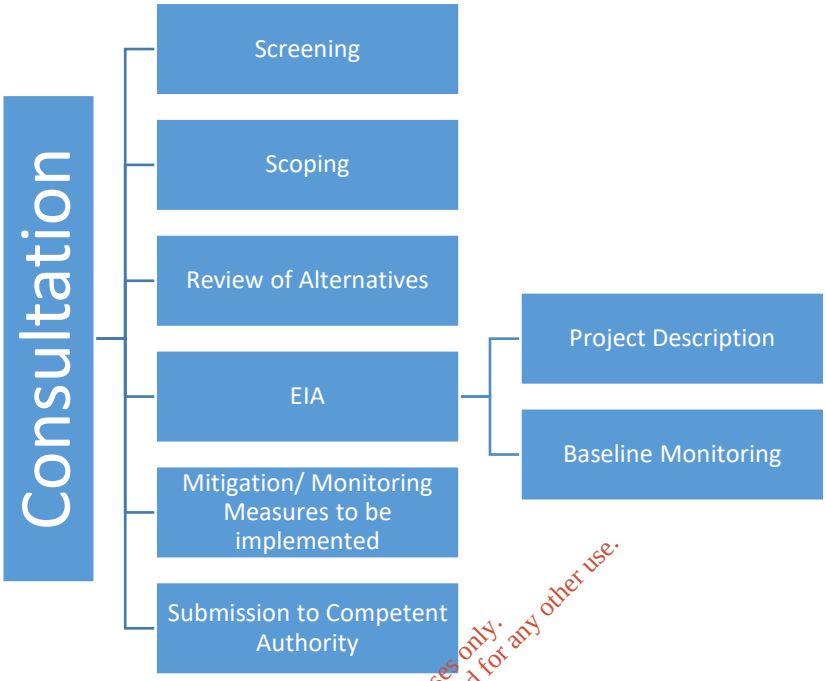
The activity exceeds the following threshold in Schedule 5 of the Planning and Development Regulations 2001 as amended

"Installations for manufacture of dairy products, where the processing capacity would exceed 50 million gallons of milk equivalent per annum.''

[3] **Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment**
[4] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0052&from=EN

1.3 Consultation

Figure 1.0 Steps in the EIA Process



1.3.1 Summary of Consultation with Roscommon County Council

The proposed addition to the existing development was submitted to the local planning authority, Roscommon County Council on the 10th January 2018. Final grant of planning permission was issued on the 27th April 2018, see Vol. III, Appendix 3.2 for the Planning report.

1.3.2 Summary of Consultation with Neighbours

Consultation was held with neighbours regarding the construction of the new dryer. Local residents who live adjacent to Aurivo Dairy Ingredients, in particular the residents on the Dublin Road and the local housing estate, the Meadows, were contacted and discussions took place regarding construction hours and days. No objections were recorded. The residents who participated in the consultation process are listed as part of the planning file ref: 186 which is available to view on the Roscommon County Council website. A copy of the consultation with neighbours is also available in Volume III, Appendix 3.3 of this report.

1.3.3 Summary of consultation with other Prescribed Bodies

This EIAR has been requested as part of a new Industrial Emissions Licence (IE) P0802-03 review.

Through the application for planning ref: 186, the Roads and Transportation Department of Roscommon County Council, the Area Engineer for Roscommon County Council as well as the Environmental Section of Roscommon County Council were notified of the planning application. No objections were recorded. The Environment Section did stipulate two conditions regarding the construction of the plant which formed part of the conditional planning permissions granted;

All C & D and ongoing operational waste shall be recovered and/or disposed of at authorised waste facilities.

Any storm or surface water from the building site goes to the storm water drain which is monitored. In the unlikely event of contamination, this will be diverted to the wastewater treatment plant via existing controls in place.

Consultation has also been undertaken indirectly by the EPA with the list of prescribed bodies detailed below in relation to the Licence submission to date;

- Health Service Executive
- An Taisce Department of Agriculture, Food and the Marine Department of Transport,
- Tourism and Sport Department of Culture, Heritage and the Gaeltacht
- Health & Safety Authority
- Teagasc
- The Heritage Council
- An Bord Pleanála
- Roscommon County Council - Planning Sec Spec
- Body Roscommon County Council-Environ Section Spec Body
- Inland Fisheries Ireland - Spec Body
- Dept of Comms, Climate Action & Env - Sp Bd(1)
- Dept of Comms, Climate Action & Env - Sp Bd(2) Fáilte Ireland - Spec. Body
- Irish Water - Spec. Body

Only one of the prescribed bodies has responded to the consultation process to date. A summary of the communication can be found below:

- HSE

  Communication relates to the forwarding of the application to the following relevant Departments within the HSE;

  - Emergency Planning;
  - Estates;
  - Assistant National Director for Health Protection;
  - CHO.

1.4 Structure and Content of the EIAR

1.4.1 Legislation & Guidance

Article 5 on Directive 2014/52/EU has stipulated the following in relation to an EIAR;

'*Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least:*

- *a description of the project comprising information on the site, design, size and other relevant features of the project;*
- *a description of the likely significant effects of the project on the environment;*
- *a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment; 25.4.2014*
- *L 124/9 Official Journal of the European Union EN*
- *a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;*
- *a non-technical summary of the information referred to in points (a) to (d); and (f) any additional information specified in Annex IV relevant to the specific characteristics'*

These requirements, in conjunction with relevant guidance as detailed below will be used to inform this EIAR.

- EPA "Guidelines on the Information to be contained in Environmental Impact Assessment Reports-Draft, August 2017"
- EPA "Guidelines on the Information to be contained in Environmental Impact Statements- Draft, September 2015
- EPA "Advice Notes for Preparing Environmental Impact Statements- Draft, September 2015"
- Environment, Community and Local Government, "Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment", March 2013
- European Commission, Guidance on EIA Screening, June 2001

1.4.2 EIAR

The EIAR will be structured in three volumes; -

Volume I Non-Technical Summary

The Non-Technical Summary, is a summary document which aims to provide an overview of the results of the Environmental Impact Statement in a non-technical manner which will be easily comprehended by the non-professional lay person. It is a stand-alone summary document which allows the reader to understand the manner in which the EIS was undertaken and focuses on the significant impacts identified and mitigation measures recommended for the proposed development.

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1.4.3 Project Team

Axis Environmental Services Ltd. have structured, coordinated and developed this EIAR report in conjunction with a team of multidisciplinary experts. A summary of the personnel involved in the development of this report has been compiled in table 1.5.3 below. Further information in relation to the individual's expertise and competence is detailed below.

Table 1-4 Summary of EIAR Generation & Expertise

Area	Consultant	Responsible Person	EIAR Detail
General	Axis Environmental Services Ltd.	Niamh Mc Mahon	Introduction Non-Technical Summary Overview, Management & Generation of EIAR
Population and Human Health	Axis Environmental Services Ltd. CLV Consulting	Mark Mc Garry	Collation of chapter Air modelling Noise & Vibration Modelling Seveso III Assessment
Biodiversity	Axis Environmental Services Ltd. Axis Environmental Services Ltd. Ash Ecology	Niamh Mc Mahon Mark Mc Garry Aisling Walsh	Collation of chapter Appropriate Assessment/ Natura Impact Statement Ecological Assessment
Land & Soils	Axis Environmental Services Ltd.	Mark Mc Garry	Hydrology & Hydrogeology
Water	Axis Environmental Services	Mark Mc Garry	Hydrology Report
Noise & Vibration	Axis Environmental Services Ltd.	Mark Mc Garry	Noise Modelling Noise & Vibration Chapter
Air, Climate & Odour	Axis Environmental Services Ltd	Mark Mc Garry	Air Modelling & Chapter Climate Odour
Material Assets & Landscape	Axis Environmental Services Ltd.	Niamh Mc Mahon	Roads & Traffic Management Visual impact & Amenity Site Design & Layout Collation of chapter on Material Assets
Cultural Heritage	Axis Environmental Services Ltd.	Niamh Mc Mahon	Archaeological, Architectural & Cultural Heritage Chapter
Interactions	Axis Environmental Services Ltd.	Niamh Mc Mahon	Overview of Interactions

Axis Environmental Services Ltd. Mark Mc Garry (BSc Env. Science & Technology) (HDip)

Mark Mc Garry has over 20 years working in the field of environmental consultancy and field measurement. Mark began his career in an environmental laboratory and consultancy on the east coast where he developed his foundation in environmental monitoring and field work before moving on and opening his own consultancy, Axis Environmental Services Ltd., in 2008. Mark is also a Director of Air Scientific Ltd., which is an ISO 17025 accredited organisation for air emission monitoring and IAS Laboratories, an ISO 17025 accredited Laboratory for Soil and Water Analysis in Carlow. Mark has acted as lead environmental consultant on many projects, liaising with management, EPA, and Planning authorities to investigate and report on environmental issues.

Axis Environmental Services Ltd. Niamh Mc Mahon (BSc in Environmental Science & Technology)

Niamh Mc Mahon has over 20 years' experience in the environmental sector. Following completion of her BSc. In Environmental Science and Technology in the Institute of Technology Sligo, Niamh began her industrial experience as an Environmental Officer in a Dairy Manufacturing Plant. Niamh went on to further her experience in a range of Environmental roles which focussed on environmental compliance through work in a Packaging Compliance Scheme and a number of Pharmaceutical plants. Niamh began working in Axis Environmental Services Ltd. in 2010 where she has continued her role of compliance through the implementation of ISO 17025 for a sister company Air Scientific Ltd. and the completion of licensing reports for Industry. Niamh has acted as lead environmental consultant on many projects ranging from EIAR's, ISO 14001 certification, planning queries and EPA licenced reports.

Aisling Walsh, Managing Director of Ash Ecology, is a Professional Ecologist & Full Member of the Chartered Institute of Ecology & Environmental Management (CIEEM). She has accumulated over 10 years' experience in this profession.

In addition to Ecological Consultancy, she also has worked as a Research Assistant in Botanical Biodiversity of Semi-Natural & Plantation Woodlands, and spent three years teaching third level students in the Department of Life Sciences, University of Limerick.

1.5 Difficulties Encountered

This Environmental Impact Assessment Report was compiled on the basis of published regional and local data and site-specific field surveys. No difficulties were encountered in compiling the required information.

1.6 Viewing of the EIAR

A copy of the EIAR will be available for viewing on the EPA website. The EIAR is to be submitted to the EPA as part of a licence review for P0802-03. This is available for review at the EPA offices in Johnstown Castle, Co Wexford or on the EPA website.

1.7 Key Alternatives Considered

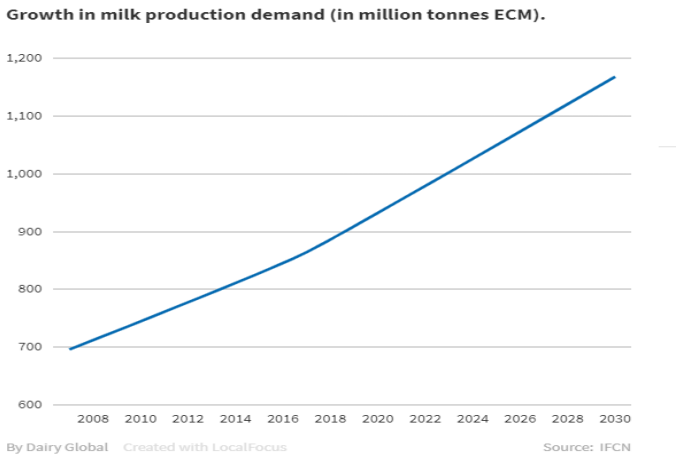
Aurivo Ireland Ltd. has been in operation at the site since 1972. The proposed new development is within the site boundary of the existing plant. The new development is necessary to allow for the planned growth of the business and to allow for the processing capacity of milk supplies from 1070 farmers and employment of over 75 full time staff. The proposed new drier installation will be gas fired which will deliver significant energy savings in the order of 15% as well as improving the environmental compliance performance in terms of carbon emissions to atmosphere. The new development is in line with zoning in the area, which is marked 'Industrial Uses'. There is no feasible alternative that could be considered. The "Do Nothing" scenario would mean that both energy and carbon emissions would be at higher levels.

1.8 Planning and Policy Context

With the abolishment of milk quotas in 2015 the milk supply from farmers has expanded in the region of 25%. The reasons behind the removal of the quota was the increase in demand for milk products especially on the world market. The expansion of these markets is projected to keep increasing in the future and the increased production capacity of the new drier will allow Aurivo to target and expand into these areas thus ensuring the viability of the company as well as its employees and suppliers. The export figures for Aurivo are estimated at growing from 288 million litres in 2017 to 400 million litres in 2022.

1.9 Do- Nothing Scenario

It was reported by the Dairy Research Network Report 2018 that between now and 2030 worldwide demand for growth for milk and milk products will be three times the level of current US milk production. *The increase of demand is not only due to more people living in the world, but also the per capita consumption will increase, due to growing prosperity and worldwide investments in dairy product development*. While demand continues to increase supply has started to slow with climate anomalies in New Zealand, the EU and Argentina and a challenging economic situation for dairy farmers in the United States. A 'Do Nothing' scenario in the context of the development and improvement of the Aurivo milk processing plant could result in loss of sales for Aurivo which in turn could have a knock on effect on their suppliers and employees. Aurivo have markets in the Middle East, Africa and South America and the processing of the increased supply is necessary for continued trade and expansion in these markets. The new development is also more effective in terms of energy usage and produces less emissions than the previous installation.



2.0 Project Description

2.1 General Introduction

Aurivo (Ireland) Ltd. has operated in Ballaghaderreen, Co. Roscommon since its inception in 1972 and at the same address under EPA licence P0802 from 2008.

The existing permitted development covers an area of approximately c. 12 acres. The proposed expansion within the site boundary of Aurivo will grow its operational output while simultaneously reduce inputs/resources such as water and energy and reduce/control emission values.

Fig 2.1 Site Location

2.2 Description of Existing Premises & Plant

2.2.1 Introduction

Aurivo Dairy Ingredients Ltd (ADIL) has operated in Ballaghaderreen, Co, Roscommon since its inception in 1972. It is an integral part of the community both in terms of direct employment and milk purchasing. The facility is integrated into the Ballaghaderreen Local Area Plan (reference Vol III, Appendix 3.0) as part of the continued development of the town as a means of providing employment and a sales point for local farmers.

2.2.2 Description of Existing and Proposed Development

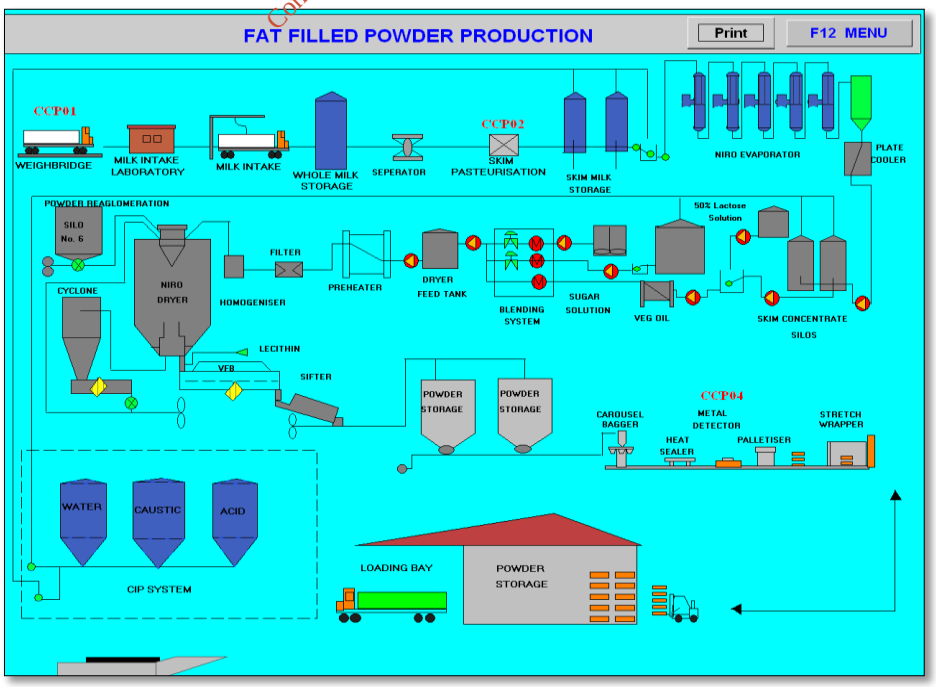
The milk processing activities carried out at the site include, whole milk intake, separation, pasteurisation, evaporation, butter making, drying, laboratory analysis, and product export for further treatment.

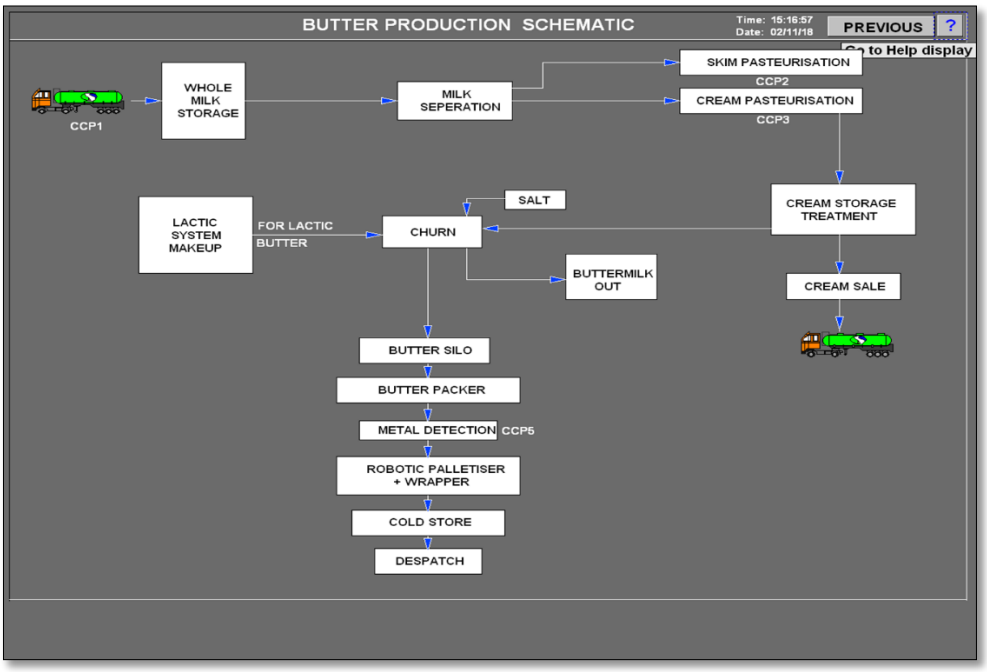
The Aurivo Dairy Ingredients facility in Ballaghaderreen receives c. 400 million litres of whole milk or evaporated skim equivalent to site each year and produces milk powder products, butter and cream. These products are produced entirely for export through the Irish Dairy marketing company Ornua. The products produced consist of 45,000 tonnes of Enriched Milk Powder (EMP), 300 tonnes of yoghurt powder, 10,000 tonnes of butter (lactic and salted), and 11 million lires of cream.

The process for producing EMP or Fat Filled milk powder is illustrated in Fig 2.1. Whole milk is offloaded into silos and pumped through the separation and pasteurisation process where the skim and cream are separated. At this point the cream is sent for butter production either in house or at the ORNUA facility off site. The skim is sent for evaporation in one of two evaporators. This process increases the milk solids level from 8% to 38% by evaporating out the water from the skim milk. Following evaporation the evaporation concentrate is sent to one of two existing spray dryers. The concentrate is then blended with vegetable oil, lactose, sugar and vitamins before being sprayed into the chamber of the dryer and hot air blown in contraflow evaporates out most of the remaining water. The final milk powder has a moisture content of approximately 3%. The powder produced is transferred to an automatic bagging line and packed into 25Kgs bags. A small amount of powder is packed into 1 tonne bags for certain specific customers. The packed powder and butter is then loaded onto trucks from the storage warehouses for despatch.

The two existing dryers at the plant have production capacities of 6 tonne per hour and 3 tonne per hour. The new dryer will have a drying capacity of 5 tonne per hour. It will also be capable of producing types of powder which the existing dryers cannot. This will open the possibility of producing many new products for supply to new markets

Fig 2.1 The Production Process





2.3 EPA Compliance Overview

The site currently holds an industrial emissions (IE) licence, P0802-02 and a Greenhouse Gas Permit IE-GHG154-10423-2, copies of both the licence and permit are attached in Vol III, Appendix 1.0 & 1.1 of this report. The EPA has conducted a number of environmental audits and monitoring on the company's site since it was granted an EPA licence in 2008. Table 2.1 summarises the results of investigations and Table 2.2 summarises the results of incidents log for the last 5 years.

Table 2.1 Compliance Investigation Log Summary

Reg. No	Case Number	Title	Status	Response Level	Date Raised
P0802-02	CI001686	Biomass Boiler - Air emissions	Open	Medium	24/09/2018
P0802-02	CI001632	Incident Notification	Closed	Medium	20/03/2018
P0802-02	CI001631	Air Emissions Monitoring	Closed	Medium	20/03/2018
P0802-02	CI001629	Wastewater Treatment Plant malfunction, incident reporting and compliance monitoring	Open	Low	15/03/2018
P0802-02	CI001441	P0802-02, Incident relating to fire on-site, 17.02.2017	Closed	Low	23/02/2017

Table 2.2 Incident Log Summary

Incident No.	Reg. No.	Receptor	Incident Nature	Category	Incident Date	Status
INCI015033	P0802-02	Air	Breach of ELV	1. Minor	25/07/2018	Open
INCI014659	P0802-02	Air	Breach of ELV	1. Minor	8/5/2018	Closed
INCI014045	P0802-02	Water	Uncontrolled Release	2. Limited	3/3/2018	Closed
INCI013484	P0802-02	Air	Breach of ELV	1. Minor	16/11/2017	Closed
INCI013455	P0802-02	Water	Breach of ELV	1. Minor	1/10/2017	Closed
INCI012778	P0802-02	-	Fire	1. Minor	31/08/2017	Closed
INCI012095	P0802-02	Air	Breach of ELV	1. Minor	29/03/2017	Closed
INCI011669	P0802-02	-	Fire	2. Limited	17/02/2017	Closed
INCI010724	P0802-02	Air	Breach of ELV	1. Minor	10/8/2016	Closed

Table 2.3 Review of Complaints

Complaint Number	Regarding	Issue	Occurred On	Status	Resolution
COM007117	P0802-02	Water Quality	22/02/2018	Closed	No verifiable evidence provided by complainant.
COM006240	P0802-02	Water Quality	24/05/2017	Closed	Mitigation measures put in place.
COM003097	P0802-02	Air Quality	02/04/2015	Closed	Dust Bag Repair & Installation Bergerhoff gauges.

2.4 Emergency Incidents

There was a fire incident at the plant on the 17/02/2017. The fire was contained within one of the sprayer dryers. The fire caused the explosion relied doors to blow out and relieve the pressure in the chamber. Some fire damage was caused to the bag filter house for this dryer and to electrical equipment on top of the dryer itself. Five units of the fire brigade attended and extinguished the fire. The fire was extinguished using water which drained to the wastewater treatment plant WWTP. There was no uncontrolled release to receptors or any recorded environmental impact.

On the 31st August 2018 there was a fire incident within the bag house of the biomass boiler. The fire was doused with local fire hoses and the fire brigade was called. Two units of the Ballaghaderreen brigade attended. The fire was contained to within the bag house. Approximately 5-10 metres cubed of water was used which was discharged to the wastewater treatment plant. There was no damage to the house frames or enclosure. All the fire water went to the Waste Water Treatment plant which is part of the environmental emergency procedure to prevent waters entering local streams or rivers. There was no uncontrolled release to receptors or any recorded environmental impact.

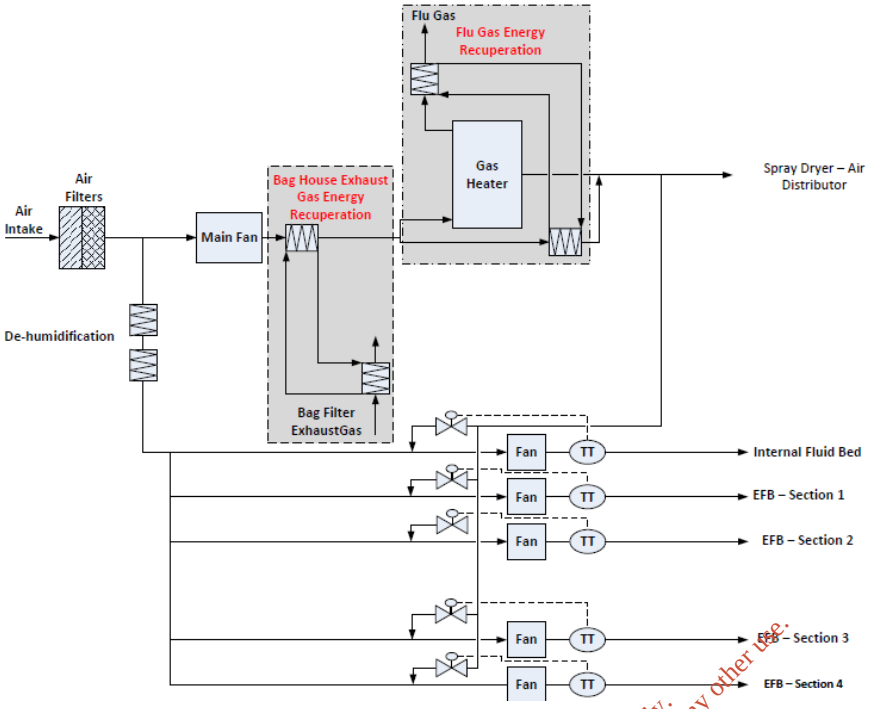
2.5 Description of the Existing and Proposed Dryers

The milk dryers are the most energy intensive process elements within the factory, consuming almost 60GWh of energy on an annual basis. AIDL have been continuously striving to improve the operational efficiencies of these dryers, bringing the Anhydro dryer from a design throughput of 2.5tph to 3.2tph and the Niro dryer from a design throughout of 5tph to 6tph. This has yielded significant gains to the organisation however there are now limitations on the output of the factory. The current options available to ADIL include the upgrade of the Anhydro dryer at a cost of €5.2 or the replacement of this dryer which it is expected will give far greater value and long term security to the facility. The replacement of the Anhydro dryer will not only allow the business to increase annual production from 390 million litres to 500 million litres, but also gives a significant opportunity to improve the energy efficiency of the plant. This new dryer will also have the capability to produce higher value products such as coffee stable powders, life stage powders, GUM's which is not possible due to the current condition of the Anhydro dryer. It is essential to be able to produce these added value milk powders in order to remain competitive in the market place and open opportunities for increased sales for the business.

2.6 Process Flow

The flow chart below illustrates the thermal generation element of the project which will replace the requirement to connect the steam system to the dryer. If following the process flow from left to right it can be seen that air is taken into the system and then filtered. This air is then preheated using the exhaust air and then heated further through heat recovery on the burner flue gas and through the gas heater. This air is then sent to both the spray dryer and to the fluid bed airstream in order to preheat the secondary air. The secondary air stream is dehumidified in order to reduce the moisture in the air and therefore improve the ability of this air to dry the product.

Fig 2.2 Thermal Energy Element Flow Diagram



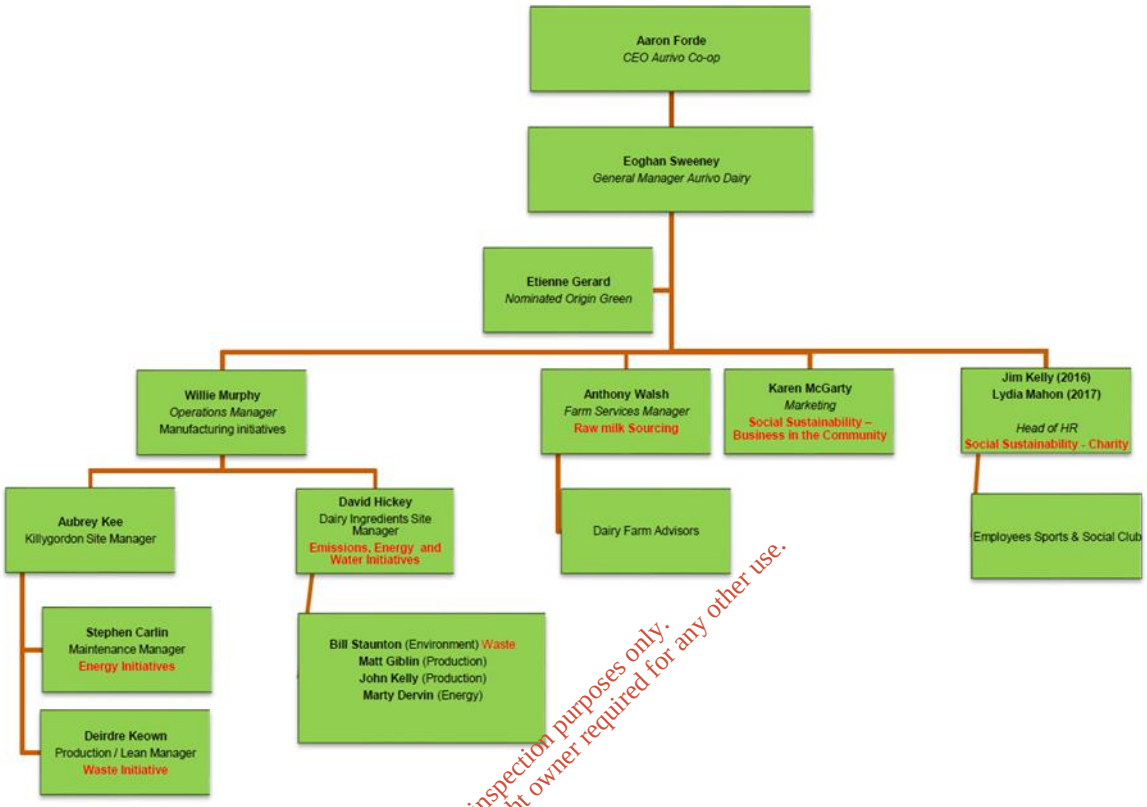
2.7 Reduction in Stack Emissions

It is in ADIL's best interest to ensure that there are minimal losses of product throughout each stage of the process. The installation of a new dryer has now opened up the possibility of improving yield performance within the drying process. At present there is a requirement to maintain stack particulate losses to 50 mg/m^3 from the existing spray dryer, 20 mg/m^3 from the Niro Dryer. These are compliant with Best Available Techniques (BAT) for the dairy industry. However, the new proposed dryer will be installed with abatement that will limit emissions to below 10 mg/m^3 which is well below that allowable under BAT.

During the review of suppliers, the question was posed as to whether this stack loss could be challenged, while also ensuring optimal performance of the dryer. It was determined that the chosen supplier could offer the best solution which would reduce the stack loss limit from a maximum of 20 mg/m^3 to a maximum of 10 mg/m^3. Given that alternative suppliers would only guarantee the performance of their system to be below 20mg/m^3 there is a significant environmental and cost benefit of the chosen system.

2.8 Aurivo Group Organisation

Fig 2.3 Group Organisation Chart



The two key members of the Aurivo Environmental Management team are as follows:

William Murphy, Operations Manager, ADIL

William Murphy has been with ADIL since 1985 and has overseen the environmental operations at the plant from decision making, implementation and compliance. William acquired the necessary permits, permissions, licence, hired appropriate technical staff and maintained communications with the Council, EPA and local community on environmental performance and aspects of the site.

Bill Staunton, EHS Manager, ADIL

Bill has worked with Aurivo for seven years. Bill's background is maintenance which he managed in ADIL for five years prior to becoming the Environmental Manager for Aurivo Dairy Ingredients Limited. Bill has a thorough understanding of the licence, its conditions, permeations and upkeep. Bill has implemented ISO 14001 into the company which is certified. Bill holds B.Eng. (Hons) and M.Sc in engineering and has previously implemented and managed an ISO14001 accredited environmental management system on an alternative manufacturing site. Bill has also completed a course on WWTP management from IT Sligo.

2.9 Waste Management

There are three sources of waste generation from the facility, they are:

- Office / canteen waste;
- Production waste;
- Hazardous Waste.

Office and canteen waste is sent off-site to an approved contractor for material recovery. The waste is mainly paper based and non-hazardous.

Production waste is in the form of waste water from the production process. This waste is treated on site in the Waste Water Treatment Plant where the finished product is monitored continually and released into the nearby River Lung under strict licence conditions. These emissions are detailed in the EPA licence P0802-02.

A by-product of the WWTP, an organic sludge, is recycled by spreading on agricultural lands in agreement with the EPA. This process recycles the nutrient from activated sludge to the soil which acts as a fertiliser. The product is beneficial to agricultural land by returning organic matter and nutrients, thus displacing or reducing the requirement for chemical fertilisers on farms.

When the waste is to be land spread, ADIL only spread on pre-agreed lands and spread in accordance with S.I. No. 101 of 2009 European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2009. All land spreading activities are carried out in such a manner as to avoid contamination of surface waters and groundwater's, and using methods to minimise odour nuisance.

Other waste types that are collected from the production process and segregated in line with legislative requirements for recycling include:

- Cardboard;
- Wood;
- Plastic;
- Metal;
- Biomass ash.

Items that are non-hazardous but cannot be recycled as there are no outlets for the waste or the waste stream is deemed contaminated with products and therefore not suitable for recycling are disposed of by landfill. Fully licensed and permitted contractors are used for all aspects of waste management.

Hazardous waste on-site consists of waste laboratory chemicals, waste oils and fluorescent tubes. These are all collected separately and collected by Hazardous waste contractors for subsequent treatment and recovery or disposal.

ADIL at all times employ the most favoured options in the waste hierarchy.

Fig 2.4 Waste Hierarchy Approach

2.10 Nuisance and Operational Control

ADIL operates in the community and are not subject to nuisance complaints from neighbours. There have been no complaints relating to any of the following; litter, dust, odour, vermin, flies, birds, pests etc.

ADIL have a complaints procedure for operation of the facility in line with the EPA Licence and Environmental Management System requirements. In the event of any complaint been made, it will be thoroughly investigated and action will be taken to prevent a reoccurrence.

Operation and development at the plant requires a number of environmental controls to eliminate or minimise the potential nuisance to the public. The relevant environmental control measures are outlined below:

2.10.1 Vermin Control:

Aurivo have a contract with Ecolab, specialists in vermin control, to maintain an integrated approach to pest management.

2.10.2 Odour Control:

As part is their Environmental Management System, Aurivo have in place an Odour Monitoring Procedure and Plan. Testing is recorded on a daily basis at various site locations as well as the nearest residential area and the town itself.

Fire Control: As part of their Emergency Preparedness and Response Plan, Aurivo have incorporated a detailed protocol for action in the event of a fire. The plan covers first response measures, emergency contact information and fire water retention measures.

2.10.3 Hazardous Material Controls:

The class of activity of the site is “Food and Drink”. The main purpose of any chemical storage is for cleaning and water treatment. All chemicals stored at the site are stored in suitably certified tanks within areas bunded to a capacity of 110% of the tank. In the unlikely event of a chemical spill the Emergency Response and Preparedness Protocol has measures for dealing with spills. Spill kits are at chemical storage locations around the site and any hazardous materials cleaned up will be disposed of by a specialist contractor.

2.10.4 Traffic Control:

Roads and Transportation, Roscommon County Council were contacted as part of the new planning application. The report concluded ‘The proposed works are within the site and will not have any significant impact on traffic movements.

2.10.5 Surface Water and Groundwater Management:

The receiving water for all emissions to surface water is ultimately the River Lung. All surface water from non-process and process areas of the site is sent to the WWTP for treatment prior to discharge to the River Lung. The system of collection and treatment of storm water drainage in the on-site WWTP has been employed by ADIL to prevent any contaminated run-off storm water from the site entering the River Lung.

The only emissions to ground from the installation relates to the historic use of the lagoon/wetland. This is now decommissioned as agreed with the agency.

2.10.6 Dust Generation and Control:

There are limited sources for dust from operations at the installation. The primary source of dust would be from stack process emissions which are controlled under the current IE licence.

2.10.7 Noise Generation and Control:

The sources of noise located within the planning application area are primarily related to machinery/plant operation. As part of IE licence P0802 Aurivo are required to carry out an annual noise survey to demonstrate compliance with predefined environmental noise limits at noise sensitive locations.

The annual survey monitors noise at predetermined locations and assesses the sites compliance against Schedule B.5 limits. The most recent survey conducted in October 2018. The relevant noise sensitive area which is located in close proximity to a residential area was shown to be compliant for both day and night time monitoring requirements.

2.11 Existing Environmental Monitoring

2.11.1 General

The site has an established environmental monitoring programme and emission limits are set under IE Licence P0802. The licence sets Emission limit Values (ELV's) for emissions to air, water including storm water and noise. There are also measures to monitor intake and receiving water and land used for spreading.

2.11.2 Air

Under licence ADIL is required to monitor its emissions from all five existing emission points which include three process stacks emitting milk powder and two combustion emission stacks from the biomass boiler and main boiler. An application has been made to the EPA to include a new emission point for the new dryer, reintroduction of an existing standby boiler and the introduction of a new LPG boiler designated for the proposed dryer. An air dispersion model was complete for all emission points and deemed the site in compliance with the requirements of the appropriate European Directive 2008/50/EC. The proposed licence will incorporate a full list of limits to be applied to each emission point and also requirements for operation, control and monitoring frequencies.

Table 2.4: Existing and Proposed Air Emissions Limits

Parameter	Units	A1-1 Main Boiler	A1-2 Biomass Boiler	A1-3 Auxiliary Boiler	A1-4 Burner
Co-Ordinates	-	162760E, 294375N	162767E, 294403N	162756E, 294389N	162605E, 294415N
Oxides of Nitrogen	mg/m^3	1,000	600	1000	200
Sulphur Dioxide	mg/m^3	1,700	700	1,700	-
Exit flow rate	Nm^3/hr	30,000	23,100	18,000	8,000
Parameter	**Units**	**A1-2 Biomass**	**A2-1 Spray Dryer**	**A2-3 Spray Dryer**	**A2-4 Spray Dryer**
Co-Ordinates	-	162767E, 294403N	162726E, 294445N	162632E, 294430N	162611E, 294411N
Total Particulate	mg/m^3	30	50	20	10
Exit flow rate	Nm^3/hr	23,100	179,325	150,000	135,000

2.11.3 Odour

ADIL has an extensive odour management programme for this site due to the type of operation and the potential for generation of odours if the plant is not operating efficiently. The primary source of odour could be from the wastewater treatment plant, especially during hotter summer months. With the levels of controls implemented at the WWTP and experience of treating wastewater since the site commenced production in 1972, odours are contained and minimalised at the plant. There are daily odour checks and both onsite and offsite assessments carried out which outline that the site is operating without generating an odour nuisance. The proposed dryer will not add any different operation, product or materials that would differ from what is already on site, therefore odours are not anticipated to be a nuisance post commission of this process.

2.11.4 Noise

At all stages of design at ADIL, noise generated by process and equipment is assessed for its potential to impact on the local community. The existing IE licence has strict day and night time limits applied for noise levels not to be exceeded at any noise sensitive location. The site has carried out annual noise surveys since the licence was issued in 2008 and there have not been any issues identified associated with Aurivo in relation to noise. The installation of a new dryer was assessed as part of the noise chapter of this report and that was confirmed that noise will not be an issue from this process either. Details on the noise assessments completed as part of this project can be found in Vol III, Appendix 4.0 of this report.

Table 2.5: Existing Noise Limits

Daytime dB(A) L_{Aeq} (30 minutes)	Night time dB(A) L_{Aeq} (30 minutes)
55 Note 1	45 Note 1

Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity of any noise-sensitive location.

2.11.5 Water

The Lung River flows adjacent to ADIL which receives both storm water and treated effluent from the site wastewater treatment plant. All discharges to the river are controlled by routine monitoring as listed in the existing IE licence. There are strict controls, equipment, monitoring and management of all water streams from this site prior to joining the River Lung. The wastewater treatment plant is fitted with both continuous monitors for performance management, and composite samples are taken on a daily basis to ensure the plant is operating within the confines of the licence conditions. The plant has historically operated within compliance of the said licence requirements. Table 2.5 summarises the limits applied in the current and proposed IE Licence.

Table 2.5: Existing Water Emission Limits

Parameter	Emission Limit Value	Units
Wastewater Treatment Plant		
Volume	2,100	m^3/day
Temperature	25	^OC
pH	6 – 9	Units
Toxicity	1	TU
BOD	10	mg/l
COD	150	mg/l
Suspended solids	30	mg/l
Total Nitrogen	15	mg/l
Ammonia (as N)	0.5	mg/l
Total Phosphorous (as P)	1.6	mg/l
Orthophosphate	0.8	mg/l
Oils, Fats and Greases	10	mg/l
Cooling Water		
Volume	6,000	m^3/day
Temperature	27	^OC
pH	6 – 9	Units
Toxicity	1	TU
BOD	8	mg/l
COD	50	mg/l
Suspended solids	30	mg/l
Nitrates	5	mg/l
Ammonia (as N)	0.2	mg/l
Total Phosphorous (as P)	0.8	mg/l
Orthophosphate	0.15	mg/l
Oils, Fats and Greases	10	mg/l

2.11.6 Security

Security at the site is managed by a 2 m fence around the entire boundary of the installation. The site is fitted with security camera systems. As the company operates 24/7 there are always employees and contractors present at the installation. There is restricted access to the site entrance with large barrier gates.

2.12 Safety and Hazard Control

Safety is a key concern for the organisation to prevent accident or incident to any employee, contractor or visitor on site. The company is managed through a robust safety management system which is operated by the EHS manager and externally audited by health and safety consultants. The key aspects of the system include:

- Maintenance and inspection plans;
- Staff emergency planning and training;
- Safety audits and risk assessments;
- Explosion protection study and fire risk assessments;
- Firewater retention plan;
- Pre-emergency planning and emergency response procedures;
- Environmental liability risk assessment;
- Closure management plan.

3.0 Population and Human Health

3.1 Introduction

This chapter of the EIAR examines the potential effects of the continued operation and proposed increased capacity of the development on Population and Human Health.

Directive 2014/52/EU amended the title of this Chapter from "Human Beings" (2011/92/EU) to "Population and Human Health". The Directive does not provide any specific guidance on the meaning and content to be discussed under this chapter, however the EU Commissions SEA implementation Guidance from 2003[5] does give an indication of how 'human health' should be considered in terms of environmental assessment;

"The notion of human health should be considered in the context of the other issues mentioned [in the list of factors to be identified, described and assessed] and thus environmentally related health issues such as exposure to traffic noise or air pollution are obvious aspects of study" (para 5.26)

EPA Guidance issued in August 2017, meanwhile states that;

"The evaluation of effects on these pathways is carried out by reference to accepted standards (usually international) of safety in dose, exposure or risk. Those standards are in turn based upon medical and scientific investigation of the direct effects on health of the individual substance, effect or risk. This practice of reliance upon limits, doses and thresholds for environmental pathways, such as air, water or soil, provides robust and reliable health protectors (protection criteria) for analysis relating to the environment" and furthermore;

"The legislation does not generally require assessment of land use planning, demographic issues or detailed socio-economic analysis. Coverage of these can be provided in a separate Planning Application Report to accompany an application for planning permission. This should be avoided in an EIAR".

3.1.1 Study Methodology

This section of the EIAR was prepared in line with the following guidance;

- EPA, Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Draft August 2017;
- EPA, Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- EPA, Advice Notes on Current Practice (in preparation of Environmental Impact Statements), September 2003;
- EPA, Guidelines on the information to be contained in Environmental Impact Statements, March 2002;
- Environment, Community and Local Government, Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment, March 2013;
- Ballaghaderreen Local Area Plan, 2017 – 2023; (reference Vol III, Appendix 3.0)

The assessment of impact will be based on the EPA guidance;

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

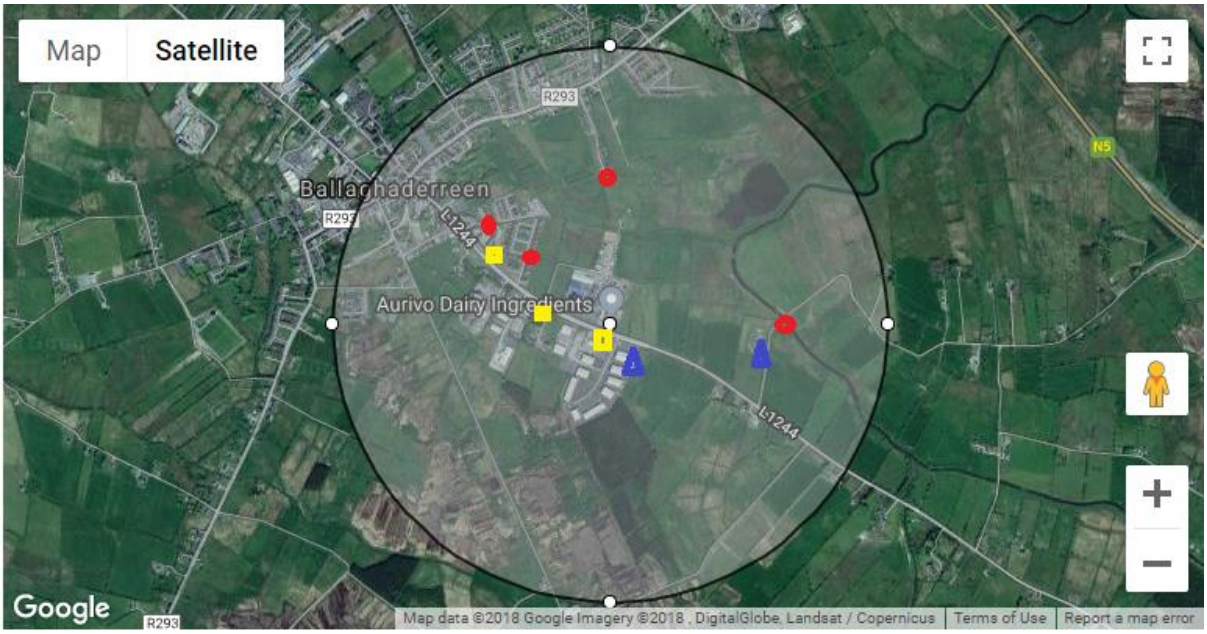
[5] http://ec.europa.eu/environment/archives/eia/pdf/030923_sea_guidance.pdf

Describing the Significance of Effects ''Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance* below.).	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics

Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it

The study relates to the vicinity of the application site and to those dwellings and buildings on the roads surrounding the application site. Initially a desk top scoping exercise was completed in order to identify the likely receptors and the associated significant impacts from the proposed development, using a distance of 1km from the site boundary. This was followed up by a visit to the proposed development site and locality to review the building uses. Professional judgement was applied to assign a level of sensitivity to receptors (low, medium or high), and to determine the nature of the foreseen impact (beneficial, negligible or adverse).

Fig. 3-1 Location of Sensitive Receptors



A site visit was undertaken to assess the impact of the proposed development on local receptors. A review of the surrounding area was undertaken with specific focus on land use and sensitive receptors. A sensitive receptor can be defined as any living thing which can be adversely affected by contaminants and pollution. They may include hospitals, child care facilities, elderly housing, convalescent facilities, drinking water sources and animal and plant species. In this context, a review of the most likely sensitive receptors was determined within the catchment of 1km. Receptors were categorised according to their sensitivity in the following format;

Table 3-1: Proximate Receptors

Key	Assessment Theme	Receptor	Location
	Highly Sensitive Receptors	Residential Developments	Borders site The Meadows c. 350m Fortlands c. 450m Gleann Ard c. 500m
		River Lung	River c. 500m
	Medium Sensitive Receptors	Commercial Business units	Nearest c. 100m
		Ballaghaderreen Fire Station	Fire Station 350m
	Low sensitive Receptors	Wastewater Treatment Plant	c. 600m east
		Vacant Buildings	Several Surrounding units

The approach to assessing the impact on potential receptors is described as follows:

Land Use

The assessment considers the existing and future land use at the site and environs of the proposed development.

Employment

The assessment of employment was based on the anticipated workforce, the construction project and indirect employment that would be generated by the proposed facility.

Amenities and Recreation

The assessment considers the potential impact on amenities of a recreational nature in the immediate vicinity of the proposed development. This includes the ability of the local community to enjoy the general character of the surrounding area.

Human Health

The human health impacts are primarily addressed under Chapter 7 Air Quality, Odour and Climate, Chapter 8 Noise and vibration and Chapter 6 for Water as these would be the potential sources of impact on the local community. The Air Quality, Odour and Climate assessment includes a quantitative assessment of the potential air quality impacts of the proposed development and benchmarking the results against guidelines formulated for the protection of human health.

Unplanned Events

According to the EPA guidelines, unplanned events, such as accidents, can include ''spill from traffic accidents, floods or land-slides affecting the site, fire, collapse or equipment failure on the site''. The 2014 EIA directive refers to ''major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes)''. Unplanned events in relation to the proposed development could potentially relate to: spills, collisions, fire or equipment failure on the site.

3.2 Receiving Environment

3.2.1 Sources of Information

Baseline information was obtained from the following sources:

- Roscommon County Council Planning Publications;
- Ballaghaderreen Local Area Plan 2017-2023; (reference Vol III, Appendix 0.0)
- The environmental topic chapters of this EIAR;
- OSI Maps;
- Aerial Photographs;
- Openstreetmap.org;
- Live Register Statistics;
- Census 2016;
- Historic Environment Viewer (http://webgis.archaeology.ie/historicenvironment/).

3.2.2 Land Use

At present the land used for the development is zoned 'Industrial Uses' and the operation has been at this site since 1972. The proposed new building is within the site boundary on a gravel pad without grass or trees.

The surrounding land predominantly consists of agricultural land (open farmland and pastures) as well as residential dwellings and industrial buildings. There are no land designations located on or near the proposed development. The nearest Special Area of Conservation is Tullaghanrock Bog SAC which is approximately 2.6 km south west of the development.

3.2.3 Employment

It has been established from the 2016 Census that there was very little growth in the population <1% from 2010 figure of 64,065 to 2016 figure of 64,544. The total population of Ballaghaderreen recorded a decrease from 1,822 in 2010 to 1,808 in 2016.

Table 3-1 Age Range Population Ballaghaderreen

Age	Population by age	% of population
0 – 18 years	438	24.5
19 – 34 years	398	22
35 – 64 years	661	36.5
65 years and over	311	17
	1,808	100

The unemployment rate in Roscommon is 13% according to 2016 census figures. Ballaghaderreen has three times the national unemployment rate which currently stands at approximately 6%.

Table 3-2 Population of Ballaghaderreen by Occupation

Occupation	*Male*	*Female*	*Total*
Managers, Directors and Senior Officials	*36*	*13*	*49*
Professional Occupations	*33*	*40*	*73*
Associate Professional and Technical Occupations	*26*	*18*	*44*
Administrative and Secretarial Occupations	*9*	*37*	*46*
Skilled Trades Occupations	*112*	*16*	*128*
Caring, Leisure and Other Service Occupations	*11*	*49*	*60*
Sales and Customer Service Occupations	*24*	*39*	*63*
Process, Plant and Machine Operatives	*76*	*21*	*97*
Elementary Occupations	*41*	*29*	*70*
Not stated	*94*	*73*	*167*
Total	*462*	*335*	*797*

3.2.4 Amenities and Recreation

Open space in the town is made up of greenbelt areas, agricultural areas on the periphery and smaller spaces between built up areas including parks, playing fields and gardens. Sporting facilities in the town include the GAA pitch and clubhouse, the tennis courts, Ballaghaderreen Community Park and astroturf pitches, the playing fields and soccer pitches at St. Nathy's College and Ballaghaderreen Golf Club.

3.2.5 Economy and Tourism

Tourist resources, facilities and infrastructure in and around the town include historic buildings such as St. Nathy's Cathedral, Ballaghaderreen Library (Dillon House) and St. Mary's Convent at Friarshill. Local festivals

such as the Secret Village Festival attracts a number of visitors while local produce is available at Ballaghaderreen Local Farmers Market. Amenities in the wider area include the Lung River and Lough Gara.[6]

3.2.6 Human Health

The primary residential and commercial receptors are discussed in Chapter 7 Air Quality, Odour and Climate sections of this report. The baseline conditions were measured and activities at the proposed development will not impact on human health. Chapter 8 of the report discusses the impact of noise and vibration. Chapters 4, 5 and 6 review the potential impact on Biodiversity, land, soils and water respectively.

3.2.7 Unplanned Events

Aurivo operates under IE licence which requires specific detail on Accident Prevention and Emergency Response Procedures, training and activities, (reference Vol III, Appendix 8.0).

The IE Licence also requires the following documents to be generated;

Environmental Liability Risk Assessment (ELRA) which involves a fully costed risk assessment given past and present liabilities of an accident or incident occurring on-site. A subsequent insurance policy has been put in place to cover any liability that could occur;

Closure Plan (CP) that relates to a costed assessment relating to the closure of the company to include any aftercare programmes as a result of any potential contamination etc. Financial provisions are put in place to cover the amount as dictated in the assessment;

The Ballaghaderreen Fire station is approximately 450 metres from the plant in the event of an emergency.

3.2.8 Environmental and Heritage Designations

3.2.8.1 Architectural and Archaeological Heritage

Ballaghaderreen has 24 structures listed on the Record of Protected Structures as well as one Architectural Conservation Area at Market Square. There are 5 structures listed for protection in the Record of Monuments and Places, reference Vol III, Appendix 5.0 for Maps with Protected Structures in the vicinity of the proposed development.

3.2.8.2 Natural Heritage

There are several designated sites within 15km of the town, including Special Areas of Conservation (SAC's), Special Protection Areas (SPAs0, Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHA). The town also falls within two local Landscape Areas, LCA 22: Cloona Lough and Lung River Bogland Basin and LCA 23: Ballaghaderreen and Brockagh Hill Uplands. Both are of moderate landscape value reflecting the high nature value and low lying scenery of the river and lake and the spatial relief provided from Brockagh Hill.

3.3 Potential Impacts

The main potential impacts on the community, local residences and businesses associated with the existing and proposed development will be in relation to air quality, noise, odour and water. The potential impact of each of these associated with their aspects are discussed in their individual chapters along with the proposed mitigation measures associated with each one. A summary of the impacts associated with this proposed development are in Table 3-3

Table 3-3: Summary of Impacts to Population and Human Health

Air Quality, Odour, Climate	
Potential Sources	• Dust emissions as result of construction related activities; • Milk powder emissions from process stacks; • Release of odour from wastewater treatment plant.
Proposed Impact	• Dust from construction will be minimal off site based on the fact that the building is pre cast concrete. A large part of the installation will also be contained within a temporary construction shelter during the term of the

[6] Ballaghaderreen Local Area Plan

	construction. The remaining dust emissions will be typical of well managed building sites; • Aurivo has been operating under an EPA licence since 2008 and as such the release of any compounds from the production process are monitored. Based on the emission rates and existing/ proposed abatement, it is not anticipated there will be any significant human health impact from air quality as outlined in the air dispersion model; • There is no odour predicted from activities at the milk processing installation, therefore no impact from the proposed development; • Odours from the wastewater treatment plant are controlled and managed under an odour control programme implemented at the installation; • Climate impact from the proposed site would be negligible in the context of national emissions.

Noise and Vibration	
Potential Sources	• Construction related noise during the allowed periods of operation; • Delivery trucks, fork truck and employee traffic and machinery; • Equipment such as fans, compressors, motors and other equipment associated with process operations;
Proposed Impact	• Construction noise is minimised with the use of a temporary construction shelter. Construction periods all reduced with the use of pre cast concrete slabs. However, predicted levels will be within appropriate limits; • Sources of noise and vibration will not impact human health or the local community during the operational phase of the proposed activity as outlined in Chapter 8 of this report; • The existing site does not contravene the noise emission limits as applied in the exiting EPA IE licence as demonstrated on an annual basis via monitoring records and reports.

Hydrology	
Potential Sources	• Storm water management during construction phase and operational phase. • Storm water management during operational phase; • Wastewater management during operational phase.
Proposed Impact	• There will be minimal impact on local hydrogeology or hydrology from construction activities due to the low volumes of pollutants, restricted pathways during this phase and good construction practices; • Waste water from operational processes is collected and treated onsite at the WWTP. The plant has a treatment capacity of 5,000kg BOD. Existing and proposed discharges will equate to approx. 3,219kg per day meaning there is surplus capacity at the treatment plant for all aqueous emissions. All emissions are monitored under the IE licence prior to discharging to the River Lung. • The new extension and altered car park increases the impermeable yard area by 740 sqm. Assuming a max rainfall intensity of 50mm/hr which equates to a run-off of 0.01l/s. This is a negligible water volume increase and will not have any impact on the capacity of the existing storm drainage system.

3.4 Mitigation and Monitoring Measures

3.4.1 Land Use

The appointed contractor to the construction phase of the proposed development will prepare a Construction Environmental Management Plan. The plan shall contain all the mitigation measures which were proposed in the relevant Chapters of this EIAR to minimise the impact of this proposed development on the surrounding lands.

3.4.2 Employment

The proposed development will have a positive impact on the local community in terms of employment. There will be construction jobs for the duration of the proposed development, and the facility will produce an additional 10 full

time positions between administration, site and operational staff bringing the total employment figures from 75 to 85 within a 5 year period. There will also be indirect jobs created at farm level, supply chain, farm services and product distribution. There will be no negative impact on employment in the local community for the proposed development.

3.4.3 Amenities and Recreation

The proposed development will not have a negative impact on local amenities or recreational facilities during either the construction or operational phase of operation. The mitigation measures proposed and detailed in Chapter 7 for Air Quality, Odour and Climate, Chapter 8 for Noise and Vibration will be implemented to ensure the activity has a minimal impact.

3.4.4 Economy and Tourism

The proposed development will have a positive impact on the economy through construction and direct employment. There will not be any negative impact on the local economy or tourism aspects from either the construction or operational phase of this development. The mitigation measures proposed and detailed in Chapter 7 for Air Quality, Odour and Climate, Chapter 8 for Noise and Vibration will be implemented to ensure the activity has a minimal impact.

3.4.5 Human Health

The mitigation measures proposed and detailed in Chapter 7 for Air Quality, Odour and Climate, Chapter 8 for Noise and Vibration will be implemented to ensure the activity has a minimal impact. There are no additional measures proposed.

3.4.6 Unplanned Events

Chapter 7 notes that spillages of fuels or chemicals during site activities could happen without proper control and supervision. Discharged water off-site could potentially breach water quality limits without monitoring. Appropriate mitigation measures and monitoring have been proposed to ensure that there are no potential impacts on the water environment as a result of unplanned events on the site.

3.5 Residual Effects

The residual impact of the on each of the associated areas are as follows:

3.5.1 Land Use

There will be a slight residual impact on land use either on or off site, however the effect is expected to be in the short term during the construction phase of the development. The new dryer building is being constructed on an existing tar and chip hard area and the proposed site will be permanent; therefore, land take will be required on site. The design of the building has been approved to use materials and colours that are not visually obtrusive and blend into the existing site layout.

3.5.2 Employment

There will be positive effects for employment in the local community during both the construction and operational phases of the proposed project. There will be both direct and indirect employment by the proposed activity.

3.5.3 Amenities and Recreation

The residual impacts on local amenities or recreation in the community is neutral in the long-term.

3.5.4 Economy and Tourism

There is the potential for positive economic stimulation in the area brought by the construction workers, direct and indirect employment. Given the mitigation measures proposed in the subsequent chapters, there is no residual impact or a neutral effect expected on tourism as a result of the proposed development.

3.5.5 Human Health

A significant review has been undertaken on the potential impacts on human health in the following chapters of this EIAR. While there are some insignificant negative short-term impacts as a result of the construction and subsequent development of the site, the overall impact from an operational assessment, illustrated that air, noise and water will result in a neutral effect once the mitigation measures recommended are implemented.

3.5.6 Unplanned Events

In the event of an emergency due to an unplanned event there is an Emergency Response Protocol in place as part of the IE licence which will be followed to minimise any environmental consequence.

4.0 Biodiversity

4.1 Introduction

This Chapter presents the factual biodiversity information gathered during the desk study and field study as a description of the existing environment at the Aurivo Dairy site. 'Biological diversity' or biodiversity is, according to the UN Convention on Biological Diversity (BCD) defined as being the '*variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.'*

Article 3 of the EIA Directive 2014/52/EU states that the environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

(b) biodiversity, with particular attention to species and habitats protected under Directive 32/43/EEC and Directive 2009/147/EC.

The actual and potential impacts (direct, indirect and cumulative) of the facility on biodiversity present within the site and surroundings are qualitatively assessed in this section. Figures referred to in this chapter are provided within Vol III, Appendix 9.

This chapter of the EIAR assessed the potential impact of the proposed works on the flora and fauna on-site and in the local vicinity.

4.1.1 Competent Expertise

This Chapter of the EIAR has been prepared by Ash Ecology & Environmental Ltd (AEE) whose managing director and leading ecologist is Aisling Walsh who is a full member of the Chartered Institute of Ecological & Environmental Management (CIEEM) and whose qualifications include MSc in Biodiversity and Conservation (TCD) and B.Sc. (Hons) Zoology (NUIG). Aisling has over 10 years of experience providing environmental consultancy and environmental assessment services. Aisling has written numerous Ecological Impact Assessments (EcIA), Screening for Appropriate Assessment Stage I and Stage II Natura Impact Statement, Environmental Impact Assessments/Statements, Badger Surveys, Bat Surveys, Habitat Surveys. She has also provided input and reviewed Ecological and Environmental assessments for several EIS and EIARs.

4.1.2 Desktop Assessment

A desktop study was used to identify features of ecological value occurring within the site and those occurring in close proximity to it. A desktop review also allows the key ecological issues to be identified early in the appraisal process and facilitates the planning of appropriate surveys. Sources of information utilised for this report include the following:

- EPA, Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Draft August 2017;
- EPA, Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- EPA, Advice Notes on Current Practice (in preparation of Environmental Impact Statements), September 2003;
- EPA, Guidelines on the information to be contained in Environmental Impact Statements, March 2002;
- Environment, Community and Local Government, Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, March 2013;
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, (Department of Environment, Heritage and Local Government, 2010);
- Appropriate Assessment Under Article 6 of the Habitats Directive: Guidance for Planning authorities;
- Assessment of Plans and Projects Significantly Affecting Natural 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC Environment Directorate-General, 2000).
- CIEEM (2017) Guidelines for Preliminary Ecological Appraisal, 2nd edition.
- Chartered Institute of Ecology and Environmental Management, Winchester
- CIEEM (2017) Guidelines on Ecological Report Writing. Chartered Institute of
- Ecology and Environmental Management, Winchester.
- CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland:
- Terrestrial, Freshwater and Coastal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester
- Flora (Protection) Order 2015;

- Red Data Books & NPWS Red Lists;
- The Water Framework Directive (2000/60/EC);
- NRA (2008) Management of Noxious Weeds and Non-Native Plant Species on National Road Schemes
- NRA (2009, Rev 2) Guidelines for the Assessment of the Ecological Impacts of National Road Schemes
- NRA (2005) Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes
- NRA (2006) Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes
- NRA (2006) Guidelines for the Treatment of Bats during the Construction of National Road Schemes
- IFI (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters

The following sites have been consulted in the preparation and development of this chapter of the EIAR;

- National Parks and Wildlife Service (NWPS) on line data (www.npws.ie);
- Status of EU Protected Habitats in Ireland – Backing Documents (NWPS);
- Status of EU Protected Habitats in Ireland (NWPS, 2008);
- Ordinance Survey Ireland Maps and Ariel Photography (www.heritagemaps.ie);
- Data in relation to water quality in the area from the EPA (www.epa.ie);
- EPA Biodiversity Plan http://www.epa.ie/pubs/reports/biodiversity/
- National Biodiversity Data Centre (www.biodiversityireland.ie);
- Birdwatch Ireland (www.birdwatchireland.ie);
- River Basin Management District 2018-2021
- Roscommon County Development Plan 2014 – 2020
- Roscommon Heritage Plan 2017-2021
- Ballaghaderreen Local Area Plan 2017-2023 (reference Vol III, Appendix 3.0)
- Appropriate Assessment Screening Statement For The Ballaghaderreen local Area Plan 2017 - 2023
- EPA Maps: https://gis.epa.ie/EPAMaps/
- Water Framework Ireland website: http://www.wfdireland.ie/maps.html
- National Biodiversity Data Centre: www.NBDC.ie
- Heritage Maps www.hertiagemaps.ie
- Bing Maps and Google Earth
- Teagasc soil area maps;

Reference were also made to the following key legislation and documents:

European

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (The Habitats Directive);
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (codified version of Directive 79/409/EEC as amended) (The Birds Directive);
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (The Water Framework Directive);
- Directive 2006/44/EC of the European Parliament and of the Council of 6 September 2006 on the quality of fresh waters needing protection or improvement in order to support fish life (The Fish Directive (consolidated)).

Republic of Ireland

- The Wildlife Act 1976 as amended by the Wildlife Act 1976 (Protection of Wild Animals) Regulations, 1980, the Wildlife (Amendment) Act 2000, the Wildlife (Amendment) Act 2010, European Communities (Wildlife Act, 1976) (Amendment) Regulations 2017. (The Wildlife Act);
- European Communities (Conservation of Wild Birds) Regulations 1985 (S.I. 291/1985) as amended by S.I. 31/1995;
- European Communities (Natural Habitats) Regulations, S.I. 94/1997 as amended by S.I. 233/1998 & S.I. 378/2005 (The Habitats Regulations);
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011);
- The Flora (Protection) Order, 1999 (S.I. No. 94/1999);
- National Biodiversity Action Plan 2017-2021;
- Threat Response Plan: Otter 2009-2011 (DEHLG, 2009).

4.2 Study Methodology

This section of the EIAR was prepared in line with the following guidance;

4.2.1 Assessment of Significance

An ecological assessment of the site was completed by Aisling Walsh MSc MCIEEM of Ash Ecology & Environmental Ltd. The assessment of significance is based on guidance from the NRA and CIEEM 2016 which compares the results of the habitat and fauna surveys to the importance scale, which ranges from

International → national → county → local

'*The local scale is approximately equivalent to one 10 km square. Because most sites will fall within the local scale, this is sub-divided into high local importance and low local importance*.'

The results of the surveys are then assessed against the following criteria;

Table 4-1 Criteria used in Assessing the Ecological Importance of Sites

ECOLOGICAL VALUATION SCHEME
International Importance:
• 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. • Proposed Special Protection Area (pSPA). • Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). • Features essential to maintaining the coherence of the Natura 2000 Network. • Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). • World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). • Biosphere Reserve (UNESCO Man & the Biosphere Programme). • Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats,1979). • Biogenetic Reserve under the Council of Europe. • European Diploma Site under the Council of Europe. • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
County Importance: • Area of Special Amenity. • Area subject to a Tree Preservation Order. • Area of High Amenity, or equivalent, designated under the County Development Plan. • Resident or regularly occurring populations (assessed to be important at County level) of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. • Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. • County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP • Sites containing semi-natural habitat types with high biodiversity in a county • Context and a high degree of naturalness, or populations of species that are uncommon within the county. • Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value): • Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; • Resident or regularly occurring populations (assessed to be important at the Local level) of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; • Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; • Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (lower value): • Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; • Sites or features containing non-native species that have some importance in maintaining habitat links.

SAC = Special Area of Conservation; SPA = Special Protection Area; NHA = Natural Heritage Area

BAP = Biodiversity Action Plan (these have been published for many local authority areas)

Table 4-2 Criteria for Assessing Impact Type

Impact type	Criteria
Positive Impact	A change is likely to improve the ecological feature in terms of its ecological value.
Neutral	No effect.
Negative Impact:	The change is likely to adversely affect the ecological value of the feature.

Table 4-3 Criteria for Assessing Impact Magnitude

Impact magnitude	Definition
No change:	No discernible change in the ecology of the affected feature.
Imperceptible Impact:	A change in the ecology of the affected site, the consequences of which are strictly limited to within the development boundaries.
Minor Impact:	A change in the ecology of the affected site which has noticeable ecological consequences outside the development boundary, but these consequences are not considered to significantly affect the distribution or abundance of species or habitats of conservation Importance.
Moderate Impact:	A change in the ecology of the affected site which has noticeable Ecological consequences outside the development boundary. These consequences are considered to significantly affect the distribution and/or abundance of species or habitats of conservation importance.
Substantial Impact:	A change in the ecology of the affected site which has noticeable Ecological consequences outside the development boundary. These consequences are considered to significantly affect species or habitats of high conservation importance and to potentially affect the overall viability of those species or habitats in the wider area.
Major Impact:	A change in the ecology of the affected site which has noticeable Ecological consequences outside the development boundary. These consequences are considered to be such that the overall viability of species or habitats of high conservation importance in the wider area 2 is under a very high degree of threat (negative impact) or is likely to increase markedly (positive impact).

4.2.2 Duration of Impact;

Unless otherwise noted in the individual sections of this EcIA the following duration of impacts apply:

- Temporary Impact - Impact lasting for one year or less.
- Short term Impact - Impact lasting one to seven years.
- Medium Term Impact - Impact lasting seven to fifteen years.
- Long Term Impact - Impact lasting fifteen to sixty years.
- Permanent Impact - Impact lasting over sixty years.

4.3 Receiving Environment

4.3.1 Site Visit

The site is located at Aurivo Dairy Ingredients Facility at Ballaghaderreen, Co. Roscommon. The site is industrial, with residential and commercial use predominant in Ballaghaderreen, Co. Roscommon. A survey was carried out at the site in 1st of November 2018. The likelihood of additional ecological impacts occurring, which have not been identified in this EIAR, is considered remote. The following surveys were carried out.

Habitats were classified according to the classification scheme outlined in the Heritage Council Publication A Guide to Habitats in Ireland (Fossitt, 2000). Habitats were cross referenced with Habitats Directive Annex 1 habitats.

The facility was surveyed for invasive species and rare floral species.

All bird species recorded during the walkover survey and habitat survey were recorded.

A general mammal survey was carried out in conjunction with the habitat survey.

All aquatic habitats were visually assessed.

4.3.2 Designated Conservation Areas

Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites. Natural Heritage Areas (NHAs/pNHAs) are national designations under the Wildlife Act 1976, as amended. A Natural Heritage Area (NHA) is designated for its wildlife value and receives statutory protection. A list of proposed NHAs (pNHAs) was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated. Consultation with the NPWS is still required if any development is likely to impact on a pNHA.

There are no environmental designations pertaining to the study area. Thus, the site of the proposed works does not form part of any Natural Heritage Area (NHA), Special Protection Area (SPA), Special Area of Conservation (SAC), candidate Special Area of Conservation (cSAC), Nature Reserve, or National Park.

Potential impacts on designated Natura 2000 sites (SAC/cSAC/SPA) were specifically addressed in a Screening for Appropriate Assessment done by Roscommon County Council as part of the Planning Application 18/6 and they found a Stage 2 Natura Impact Statement was not required given the nature of the planning application and no potential impact on designated sites were identified. A copy of this screening report is attached in Vol III, Appendix 3.1 of this report. In addition, the Local Area plan (LAP) for Ballaghaderreen concluded the following:

"the LAP is not foreseen to give rise to any significant adverse effects on designated European sites, alone or in combination with other plans or projects. This evaluation is made in view of the conservation objectives of the habitats or species for which these sites have been designated. Consequently, a Stage 2 – Natura Impact Report is not required for the LAP."

The EPA have requested an AA as part of the licence application which was complete. The 16 Natura 2000 (14 SAC and 2 SPA) within the 15km radius of the site location are given in Table 4.4. A total of 19 pNHA and 3 NHA sites also occur within 15km, see Table 4.5, of these 22 NHAs/pNHAs a total of 13 overlap these SACs and SPAs leaving 9 additional NHA sites that do not overlap the SACs and are as follows:

Bella Bridge Bog NHA (Code 000591), *Cornaveagh Bog NHA* (Code 000603), *Tullaghan Bog (Roscommon) NHA* (Code 001652), *Lough Glinn pNHA* (Code 001644), *Derrynabrock Bog pNHA* (Code 000457), *Gowlaun Bog pNHA* (Code 000502), *Lough Gower pNHA* (Code 000523), *Ardagh Bog pNHA* (Code 001222) and *Lough O'Flynn pNHA* (Code 001645).

The site of the proposed works is located within 15km of a number of designated sites which are listed in Table 4.4. Natura 2000 sites are shown in as Vol III, Appendix 9, Figure 4.1 (SACs), Figure 4.2 (SPAs) and Figure 4.3 (NHA and pNHAs). The most relevant and closest Natura 2000 site is the Tullaghanrock Bog SAC/pNHA (Site Codes 002354/002013) and Lough Gara SPA/pNHA (Site Codes 004048/000587) as the Ballaghaderreen Stream which runs behind the existing site flows into the River Lung which becomes part of the Tullaghanrock Bog SAC/pNHA approx. 1.9km away and the River Lung ultimately discharges in Lough Gara SPA/pNHA approx. 5km from the site. A further 9 NHAs and pNHAs were reviewed in line with the proposed works that occurs within the 15km buffer zone, the closest approximately 7.4km away from the existing site, see Table 4.5

Table 4-4 Assessment of SAC's/SPA's and overlapping NHAs/pNHAs within 15km of the Proposed Site

Special Areas of Conservation (SAC)			
Site Name	**Site Code**	Approx. Distance from Proposed Site	**Also NHA/pNHA**
Callow Bog	000595	2.8km NE	
Tullaghanrock Bog	002354	1.9 km NE	pNHA
River Moy	002298	7.9km NW	
Derrinea Bog	000604	9.6km SW	pNHA
Bellanagare Bog	000592	10.1km SE	pNHA
Drumalough Bog	002338	10.8km S	pNHA
Flughany Bog	000497	11.4km NE	pNHA
Cloonakillina Lough	001899	11.7km NW	pNHA
Urlar Lakes	001571	11.8km SW	pNHA
Cloonshanville Bog	000614	11.8km E	pNHA
Carrowbehy/Caher Bog	000597	11.9km SW	pNHA
Errit Lough	000607	12.4km SW	pNHA
Cloonchambers Bog	000600	13.6km S	pNHA
Doocastle Turlough	002192	14.4km NW	pNHA
Special Protection Areas of Conservation			
Lough Gara	004048	5km NE	pNHA
Bellanagare Bog	004105	10.4km SE	pNHA

Table 4-5 Assessment of NHA's/pNHA's within 15km of the Proposed Site

Site Name	**Site Code**	**Approx. Distance (km)**	**Potential pathway for Impact**
Lough Glinn pNHA	001644	7.4 S	No evidence of pathway from the existing site to the pNHA
Derrynabrock Bog pNHA	000457	9.5 NW	No evidence of pathway from the existing site to the pNHA
Gowlaun Bog pNHA	000502	9.7 NW	No evidence of pathway from the existing site to the pNHA
Bella Bridge Bog NHA	000591	12 E	No evidence of pathway from the existing site to the NHA
Cornaveagh Bog NHA	000603	12.1 E	No evidence of pathway from the existing site to the NHA
Lough Gower pNHA	000523	13.4 W	No evidence of pathway from the existing site to the pNHA
Ardagh Bog pNHA	001222	13.4 E	No evidence of pathway from the existing site to the pNHA
Lough O'Flynn pNHA	001645	14.4 S	No evidence of pathway from the existing site to the pNHA
Tullaghan Bog (Roscommon) NHA	001652	14.6 E	No evidence of pathway from the existing site to the NHA

A review of the SAC's and the SPA's identified was undertaken in the context of impact from a hydrological perspective from the proposed works and is detailed in the **Table 4.6** below.

Table 4-6 Assessment of Potentially Affected Sites

Special Areas of Conservation (SAC)		Distance from Proposed Site	Potential pathway for Impact
Site Name	**Site Code**		
Callow Bog SAC	000595	2.8km NE	No evidence of pathway from the existing site to the SAC
Tullaghanrock Bog SAC/pNHA	002354/002013	1.9 km NE	Evidence of pathway from Ballaghaderreen Stream which flows along northern boundary of site and flows into Lung River 468m fluvial distance which becomes part of this SAC approx. 1.9km from site.
River Moy SAC	002298	7.9km NW	No evidence of pathway from the existing site to the SAC
Derrinea Bog SAC/pNHA	000604	9.6km SW	No evidence of pathway from the existing site to the SAC
Bellanagare Bog SAC/pNHA	000592	10.1km SE	No evidence of pathway from the existing site to the SAC
Drumalough Bog SAC/pNHA	002338/001632	10.8km S	No evidence of pathway from the existing site to the SAC
Flughany Bog SAC/pNHA	000497	11.4km NE	No evidence of pathway from the existing site to the SAC
Cloonakillina Lough SAC/pNHA	001899	11.7km NW	No evidence of pathway from the existing site to the SAC
Urlar Lakes SAC/pNHA	001571	11.8km SW	No evidence of pathway from the existing site to the SAC
Cloonshanville Bog SAC/pNHA	000614	11.8km E	No evidence of pathway from the existing site to the SAC
Carrowbehy/Caher Bog SAC/pNHA	000597	11.9km SW	No evidence of pathway from the existing site to the SAC
Errit Lough SAC/pNHA	000607	12.4km SW	No evidence of pathway from the existing site to the SAC
Cloonchambers Bog SAC/pNHA	000600	13.6km S	No evidence of pathway from the existing site to the SAC
Doocastle Turlough SAC/pNHA	002192/000492	14.4km NW	No evidence of pathway from the existing site to the SAC
Lough Gara SPA/pNHA	004048/000587	5km NE	Evidence of pathway from Ballaghaderreen Stream which flows along northern boundary of site and flows into Lung River 468m fluvial distance which becomes part of this SPA approx. 5km from site.
Bellanagare Bog SPA/pNHA	004105/000592	10.4km SE	No evidence of pathway from the existing site to the SAC

4.3.3 Characteristics of Designated Sites Potentially Affected

The following sections describe the Conservation Objectives and Qualifying Interests of the Natura 2000 sites which may be affected by the project. The qualifying interests of the sites potentially affected in **Table 4.6** are identified in **Table 4.7.**

Table 4-7 Qualifying Interests of Tullaghanrock Bog SAC/pNHA and Lough Gara SPA/pNHA

Code	Habitat / Species
Tullaghanrock Bog SAC/pNHA (Code 002354/002013)	
7110	Active raised bogs [7110]
7210	Degraded raised bogs still capable of natural regeneration [7120]
7150	Depressions on peat substrates of the Rhynchosporion [7150]
Lough Gara SPA/pNHA (Code 004048/000587)	
A038	Whooper Swan (Cygnus cygnus) [A038]

A395	Greenland White-fronted Goose (Anser albifrons flavirostris) [A395]

Site Synopsis of Tullaghanrock Bog SAC (002354)

"Tullaghanrock Bog is situated approximately 5 km east of Ballaghaderreen, Co. Roscommon, and is located in the townlands of Tullaghan Rock and Creggan. The site comprises a raised bog that includes both areas of high bog and cutover bog. The southern and eastern margins are bounded by the River Lung and the old Ballaghaderreen railway line adjoins the north-west margin. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (= priority; numbers in brackets are Natura 2000 codes)*

*[7110] Raised Bog (Active)**

[7120] Degraded Raised Bog

[7150] Rhynchosporion Vegetation

Active raised bog comprises areas of high bog that are wet and actively peatforming, where the percentage cover of bog mosses (Sphagnum spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, Sphagnum lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (Rhynchospora alba) and/or Brown Beak-sedge (R. fusca), and at least some of the following associated species, Bog Asphodel (Narthecium ossifragum), sundews (Drosera spp.), Deergrass (Scirpus cespitosus) and Carnation Sedge (Carex panicea). This bog has developed between a ridge and a river, and has a domed surface with an undulating pattern of hummocks and pools. There is a small plantation to the south-east of the high bog. To the south and east there is a semi-natural margin between the high bog and the River Lung. Cutover bog occurs around the remaining margins of the high bog, and in particular on the northern margin where it grades into agricultural land. Much of the high bog has vegetation typical of the Western Raised Bog type, consisting of Heather (Calluna vulgaris), Common Cottongrass (Eriophorum angustifolium), Deergrass, Carnation Sedge and the bog moss Sphagnum magellanicum. The pools contain the bog mosses Sphagnum cuspidatum and S. auriculatum, with White Beak-sedge, Bogbean (Menyanthes trifoliata) and Great Sundew (Drosera anglica). The hummocks are formed by bog mosses such as S. magellanicum, S.papillosum and S. capillifolium, Heather, Cross-leaved Heath (Erica tetralix) and Deergrass. The hummocks also contain support Crowberry (Empetrum nigrum), Cranberry (Vaccinium oxycoccos) and Round-leaved Sundew (Drosera rotundifolia). Where the Lung River forms a natural southern boundary to Tullaghanrock Bog, a strip of wet grassland habitat runs between the bog and the river. Common species found here include Tufted Hair-grass (Deschampsia cespitosa), Creeping Bent (Agrostis stolonifera), Meadow Foxtail (Alopecurus pratensis), Meadowsweet (Filipendula ulmaria) and Wild Angelica (Angelica sylvestris). In the south-west there is active regeneration of cutover, with extensive patches of Sphagnum cuspidatum and Common Cottongrass occurring here. Other areas of old cutover bog now support Purple Moor-grass (Molinia caerulea) and Gorse (Ulex europaeus). Current land use on the site consists of a small forestry plantation on the southeastern high bog and another on the western margin. Areas of cutover have been reclaimed for agricultural grassland on the west and north-west margins and agricultural grazing occurs on the southern boundary. Peat-cutting no longer occurs on this site. While most of the drains are old and infilling, there are new deep drains around the forestry. Tullaghanrock Bog is a site of considerable conservation significance as it comprises a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, pools, flushes and regenerating cutover. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the total E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level."

Site Synopsis of Lough Gara SPA (004048)

"Lough Gara is located on the Co. Sligo/Roscommon border south-west of the Curlew Mountains and between the towns of Boyle and Ballaghaderreen. Most of the lake is in Co. Sligo, but two sections in the south and north-east lie within Co. Roscommon. It is a shallow (maximum depth 16 m), medium-sized lake, which overlies Carboniferous limestones and shales, and Devonian sandstone. The main inflowing river is the River Lung while the main outflow is the Boyle River. There are two main sections to the lake, a larger northern basin and a smaller southern basin, joined by a narrow channel. The shoreline is convoluted and has receded substantially from its original level due to various drainage schemes since the mid-19th century. The site includes several low-lying islands. The shallow lake margins support extensive reed swamps dominated by Common Reed (Phragmites australis) and Bottle

Sedge (Carex rostrata), with occasional Bulrush (Typha latifolia). In the southernmost part of the lake, clumps of Common Club-rush (Scirpus lacustris) are particularly abundant. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan and Greenland Whitefronted Goose. Lough Gara is used regularly by an internationally important population of Greenland White-fronted Goose (mean peak of 510 individuals over the five winters 1995/96 to 1999/2000). An internationally important population of Whooper Swan also uses the site (mean peak of 321 for the 5 year period 1994/95 to 1998/99), with high numbers present in the winter of 1996/97 (peak of 654). A range of other species occurs, including Great Crested Grebe (16), Mute Swan (38), Wigeon (593), Teal (44), Mallard (157), Shoveler (18), Pochard (41), Tufted Duck (49), Goldeneye (20), Golden Plover (270), Lapwing (75) and Lesser Black-backed Gull (172) - all figures are mean peaks for the two winters 1995/96 to 1996/97. Lough Gara SPA is of high ornithological importance principally on account of the internationally important populations of Greenland White-fronted Goose and Whooper Swan that are associated with the lake. The occurrence of these species, along with Golden Plover, is of particular note as they are listed on Annex I of the E.U. Birds Directive. Lough Gara is a Ramsar Convention site and a Wildfowl Sanctuary. "

The River Lung Catchment

"The source of the River Lung (246 km^2) lies west of Ballaghaderreen. Here the river is known as the Black River and is joined by the Anaderryboy to become the River Lung downstream of Cloonagh Lake. The River Lung meanders for approximately 40km in an overall north east direction to Lough Gara. The River Lung and Breedoge are tributaries of the River Boyle which in turn is a tributary of the River Shannon. Downstream of Lough Gara the river is known as the Boyle River. This flows for approximately 11 kilometres to Lough Key in a south west – north east direction to Lough Key where it joins the River Shannon. The Lung River has 6 major connecting lakes, which vary in size from 500 - 2000 acres. The Lung Valley is an angler's paradise, offering some of the best coarse fishing waters in Ireland with an extensive variety of fish including perch, roach, pike, brean, rudd, tench, eel and trout."

4.3.4 EPA Biological Monitoring

The Environmental Protection Agency carries out a biological assessment of most river channels in the country on a regular basis. The assessments are used to derive Q values, indicators of the biological quality of the water. The biological health of a watercourse provides an indication of long term water quality.

The intermediate ratings Q1-2, Q2-3, Q3-4 and Q4-5 are used to denote transitional conditions, while ratings within parenthesis indicate borderline values. Great importance is attached to the EPA biotic indices, and consequently it is these data that are generally used to form the basis of water quality management plans for river catchments.

The EPA has no monitoring points for the Ballaghaderreen Stream however a representative value is assigned from Q values assessed at points above and below where the stream joins the river.

The stations upstream and downstream of the Ballaghaderreen Stream confluence are shown in **Table 4.8** and **Vol III, Appendix 9, Figure 4.4**. The River Lung downstream of Ballaghaderreen Stream has maintained moderate to good Q values since 2000.

"The Lung was in satisfactory condition at all four stations monitored in 2017. An improvement was *noted for the upper reaches at Figh (0100) and Crunaun Bridge (0200) with an exceptionally high diversity of sensitive taxa recorded in these formerly drained river channels. A slight decline to Good from the previous High ecological quality was apparent at (0350) owing to a reduction in the density of sensitive Ephemeroptera. Station (0400) at Edmundstown bridge was unchanged relative to the most recent surveys, with some minor signs of enrichment noted there."*

Table 4-8 EPA Data for the River Lung (1994-2017)

Station Name	Station No.	2000	2002	2005	2008	2011	2014	2017
Bridge W of Banada (u/s of site)	0350	-	-	4	4	4-5	4-5	4
Edmundstown bridge/bridge u/s L Gara (d/s of site)	0400	4	4	3	4	4	4	4

The EPA have defined the area in which the River Lung eventually flows into as the 'Lung, Tributary of Lung'. Transitional waters can be assigned a classification of; High, Good, Moderate, Poor or Bad. The former three are considered to be acceptable, while the latter two water quality ratings are considered as unsatisfactory. Results indicate that water quality of 'Lung, Trib of Lung', is classified as 'Good' and Lough Gara which the River Lung flows into, is classified as Moderate, see **Vol III, Appendix 9, Figure 4.5.**

4.3.5 Water Framework Directive – River Lung

The Water Framework Directive (WFD) is a key initiative aimed at improving water quality throughout the EU. It applies to rivers, lakes, groundwater, coastal & transitional waters. The Directive requires an integrated approach to managing water quality on a river basin basis; with the aim of maintaining and improving water quality. The Directive requires that management plans be prepared on a river basin basis and specifies a structured approach to developing those plans. It requires that a programme of measures for improving water quality be brought into effect.

Specifically, the WFD aims to protect/enhance all waters (surface, ground and coastal waters), achieve "good status" for all waters, manage water bodies based on river basins (or catchments), involve the public and streamline legislation.

A) The Water Frameworks Directive assesses the water quality of rivers and coastal waters and ranks their status as follows: High, Good, Moderate, Poor, Bad, Yet to be determined. The status of the River Lung, was assessed as Good, based on the following parameters.

Table 4-9 Parameters

Status Element Description	Entity Name - Lung_050
General physico-chemical status	Good
Overall ecological status	Good
Monitored water body	Yes

B) The Water Framework Directive also determines the "Risk" level of river and coastal waters as follows: 1a – At risk of not achieving Good Status, 1b – Probably at risk of not archiving Good Status, 2a – Expected to achieve Good Status, 2b – strongly expected to achieve Good Status. The Lung, Tributary of Lung was assessed as Not at Risk. According to the most recent data available the River Lung is not subject to any environmental pressures which include abstraction, agriculture, anthropogenic, atmospheric, extractive industry, hydromorphology, industry, waste or water treatment pressures.

4.3.6 Site Surveys

4.3.6.1 Habitats

A site inspection was carried out on the 1st of November 2018. The terrestrial and aquatic habitats within or adjacent to the Aurivo site were classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex 1 Habitats where required. No rare species were noted were noted during the site inspection.

Most of the Aurivo facility is composed of buildings and artificial surfaces (BL3) with low species diversity and minimal ecological value. There are also several areas of disturbed ground (ED2) which are of low ecological value. A small area of amenity grassland (GA2) occurs to the front of site at the entrance carpark, which is of low species. To the southeast of the site, outside the site boundary of this EIAR is an area of improved agricultural grassland (GA1)/wet grassland (GS4) mosaic which is species poor and dominated in soft rush (*Juncus effusus).* Another area which was formally wet grassland occurs to the west of the site is now best described as disturbed bare ground as it is the construction area, see Vol III, Appendix 9, Figure 4.6 (Habitat Map) & Plates.

A drainage ditch (FW4) runs to the northwest of site and flows into the Ballaghaderreen Stream (FW1) which in turn flows to the River Lung (FW1) which is of high ecological value. As the drainage ditch on the boundary of the site within the site was previously modified, riparian vegetation is not well developed with a mixture of grass, herbaceous species and scrub. Species noted include Willow (*Salix spp*.), Gorse (*Ulex europaeus*), Alder (*Alnus glutinosa*) and Bramble (*Rubus fruticosus agg*). In the northern section of the site, where the Ballaghaderreen stream flows briefly along the boundary, the riparian vegetation is more complex.

A series of hawthorn hedgerows (WL1) and ash treelines (WL2) are scattered around the site boundary, which will be all retained. A

The ecological value of habitats has defined by utilising the classification scheme outlined in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009). It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. The habitats present and their ecological value are described below in Table 4.11**.**

Table 4-11 Habitats Present within the Aurivo Site Area and their Relative Value

Habitat	Comments	Ecological value (NRA guidelines)
Buildings and artificial surfaces (BL3)/ Spoil and bare ground (ED2)	Highly modified and/or disturbed ground habitats, with low species diversity and of minimal ecological value,	Local importance (Lower value)
Amenity Grassland (GA2)	Low species diversity grassland.	Local importance (Lower value)
Improved Agricultural Grassland (GA1) / Wet Grassland (GS4)	Low species diversity wet grassland dominated by soft rush.	Local importance (Lower value)
Hedgerow (WL1)	The hedgerows recorded within the site are composed of native species, hawthorn.	Local importance (Lower value)
Treelines (WL2)	Treelines can provide important habitats for local wildlife such as birds, insects and possibly bats. In general, these habitats are somewhat fragmented from the wider landscape but add to the diversity in a local context.	Local importance (Lower value)
Eroding Upland rivers (FW1)	The riverine habitats of the Ballaghaderreen Steam provide important habitats for local wildlife including fish, birds, insects, mammals. It can also act as an important commuting route and linking corridor between other local habitat patches. Ultimately discharges to the River Lung.	Local importance (Higher value)
Drainage ditch (FW4)	Low value habitat.	Local importance (Lower value)

4.3.6.2 Flora

The Aurivo Dairy Facility lies within Ordnance Survey National Grid 10km square M69. The National Biodiversity Data Centre (NBDC) online database provides data on the distribution of mammals, birds, and invertebrates within 10km grid squares. Some 450 vascular plants are listed by the NBDC as present in the grid square M69. No threatened flora species are listed for the 10km grid square. No rare species were recorded during the site survey, nor are they expected to occur given that the habitats within the study area are relatively common.

4.3.6.3 Salmonids & White Clawed Crayfish

During the site survey in November 2018, the Ballaghaderreen Stream which runs along the northern boundary of the site was deemed unsuitable for salmonids such as Atlantic Salmon and White Clawed Crayfish, protected under Annex II of the Habitats Directive. Furthermore the proposed works would not affect the watercourses onsite.

The report concluded that any impact on the Lung River into which the Ballaghaderreen Stream ultimately discharges is likely to have been negligible in the past and given the level of treatment provided by the existing facility no significant impacts were predicted to occur in the future.

4.3.6.4. Otter

Otters, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Directive which is transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I 94 of 1997), as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered species (CITES).

Although rare in parts of Europe they are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus, surveys for otters rely on detecting

signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey items. Spraints are of particular value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges. In addition, they are relatively straightforward to identify.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting placing or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reed beds where depressions in the vegetation called “couches” are formed. Generally, holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season.

It is noted that otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of otters in the centre of Cork and Limerick City. Thus, otters are able to adapt to increased noise and activity levels; however, breeding holts are generally located in areas where disturbance is lower.

A review of existing records within a 10km radius of the study site (Grid Square M69) showed that otter or signs of otter have been recorded on 7 occasions, the most recent being in December 2012. A survey for otter was carried out to within 100m of the facility along the Ballaghaderreen Stream. No Otter spraint, tracks, runs, holts or resting areas (couches) were recorded.

4.3.6.5 Bats

In Ireland, nine species of bat are currently known to be resident in Ireland. These are classified into two Families: the Rhinolophidae (Horseshoe bats) and the Vespertilionidae (Common bats). The lesser horseshoe bat *Rhinolophus hipposideros* is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species: common *Pipistrellus*, soprano *P. pygmaeus* and Nathusius’ *P. nathusii*, four *Myotids*: Natterer’s *Myotis nattereri*, Daubenton’s *M. daubentonii*, whiskered *M. mystacinus*, Brandt’s *M. brandtii*, the brown long-eared *Plecotus auritus* and Leisler’s *Nyctalus leisleri* bats.

A review of existing bat records within a 10km radius of the study site (sourced from NDBC records) showed that the bat species listed in Table 4.12 have been recorded locally. It is noted that other species which have not been included within this database may also occur.

Table 4-12 Presence of Irish Bat Species for 10km Grid Square M69

Common name	Scientific name
Lesser Noctule	*Nyctalus leisleri*
Pipistrelle	*Pipistrellus sensu lato*
Soprano Pipistrelle	*Pipistrellus pygmaeus*
Daubenton’s Bat	*Myotis daubentonii*

All bat species are protected under the Wildlife Acts (1976 & 2000) which make it an offence to wilfully interfere with or destroy the breeding or resting place of all species; however, the Acts permit limited exemptions for certain kinds of development. All species of bats in Ireland are listed in Schedule 5 of the 1976 Act and are therefore subject to the provisions of Section 23 which make it an offence to:

- Intentionally kill, injure or take a bat
- Possess or control any live or dead specimen or anything derived from a bat
- Wilfully interfere with any structure or place used for breeding or resting by a bat
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.

In addition to domestic legislation bats are also protected under the EU Habitats Directive (92/43/EEC) with all bat species are listed in Annex IV of the Directive. The Irish government is also a signatory to the 1979 Bonn convention (Convention on the conservation of migratory species of wild animals) and the 1982 Bern convention (The convention on the conservation of European wildlife and natural habitats) and has a commitment to the 1991 Eurobats agreement (Agreement on the conservation of bats in Europe).

Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains and dead/alive bats. Indicators that potential roost locations and access points are likely to be inactive include the presence of cobwebs and general detritus within the apertures. Bats generally make use of large mature trees that contain natural holes, cracks/splits in major limbs, loose bark, hollows/cavities, dense epicormic growth (bats may roost within it) and bird and bat boxes. The importance of trees to bats varies with species, season and foraging behaviour. Evidence indicating bat presence, includes dark stains running below holes or cracks, bat droppings, odours, or scratch marks.

Bats also often use features such as rivers, hedgerows, treelines and woodland edges as commuting pathways between roosts and foraging areas. Sheltering vegetation, such as treelines and woodland, not only acts as cover from potential predators and the weather, but also provides structure for acoustic orientation and navigation. Sheltered areas also allow insects to gather and therefore support bat forging. Activities which affect these bat flyways are likely to have consequences for bats.

The hedgerows, treelines and Ballaghaderreen Stream provide potential foraging habitat for bats. As linear features within the wider landscape, bats may also use the hedgerows, treelines and Ballaghaderreen Stream as a commuting route. The existing buildings within the site are of modern construction (i.e. concrete, corrugated iron etc.) and are very unlikely to be utilised as bat roosts. Likewise, there are no mature trees within the site boundary which have the potential to provide significant bat roosts. No signs of bats were recorded such as staining, droppings and prey discards during the site survey.

4.2.4.6 Other Protected Terrestrial Mammals

Ten other species of terrestrial mammal have been recorded within 10km grid square M69, six of which are protected under the Irish Wildlife Act; Badger, Hedgehog, Irish Hare, Pine Martin, Red Squirrel and Pygmy Shrew.

4.3.6.6.1 Badger (*Meles meles*) and their setts are protected under the provisions of the Wildlife Act 1976, as amended, and it is an offence to intentionally, knowingly or unknowingly kill or injure a protected species, or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. Badger setts are formed by a complex group of interlinked tunnels, and therefore, works in proximity to setts can potentially cause damage a protected species. Badgers are also protected under Appendix III of the Berne. No signs of badger, setts or otherwise, were recorded during the site visit.

4.3.6.6.2 Hedgehog (*Erinaceus europaeus*), also listed on Appendix III of the Berne Convention can be found throughout Ireland, with male hedgehogs having an annual range of around 56 hectares. A number of factors are thought to influence the distribution of hedgehogs in a habitat, with nest sites, food availability and the presence of predators believed to be major contributory factors. Due to the habitats recorded within the site, it is possible that hedgehog could occur.

4.3.6.6.3 The Irish hare (*Lepus timidus hibernicus*) is one of three lagomorphs found on the Island of Ireland and the only native lagomorph. It is listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC) and as an internationally important species in the Irish Red Data Book. While Irish hare have been recorded within the wider landscape (NBDC), it is considered unlikely that Irish hare occurs within the Aurivo Dairy site.

4.3.6.6.4 Red Squirrel (*Sciurus vulgaris*) also listed on Appendix III of the Berne Convention can be found throughout Ireland. They are found in all types of habitat but typically are in higher densities in mature mixed broadleaved forests. They can also survive in monoculture coniferous woodland. Red Squirrel is unlikely to occur within the site due to lack of habitat.

4.3.6.6.5 Pygmy Shrew (*Sorex minutus*) is common throughout mainland Ireland and has a preference for habitats such as hedgerows, woodlands and grasslands. This species could potentially occur.

4.3.6.6.6 Pine Marten (*Martes martes*) is listed Annex V of the EU Habitats Directive 1992 and Appendix III of the Bern Convention 1979, are habitat specialists, requiring forest or scrub habitat to exist in an area. Pine martin is unlikely to occur within the site due to lack of habitat.

4.3.6.7 Amphibians and Reptiles

According to records held by the NBDC, Common Frog (*Rana temporaria)* and Smooth Newt (*Lissotriton vulgaris*) are the only amphibians recorded in grid square M69. Both species could potentially occur in the vicinity of the Ballaghaderreen Stream. The Common Lizard (*Zootoca vivipara*) is Ireland's only native terrestrial reptile and is so protected under the Wildlife Act. It is recorded in Grid Square M69 but unlikely to occur within the site.

4.3.6.8 Birds

The National Biodiversity Centre online database lists 105 species of bird from within grid square M69. Of these 105 species, 9 are listed under Annex I of the Birds Directive, namely, Common Kingfisher (Alcedo atthis), Common Tern (Sterna hirundo), Corn Crake (Crex crex), European Golden Plover (Pluvialis apricaria), Greater White-fronted Goose (Anser albifrons), Hen Harrier (Circus cyaneus), Merlin (Falco columbarius), Peregrine Falcon (Falco peregrinus) and Whooper Swan (Cygnus cygnus).

During surveys of the site and surrounding landscape by Ash Ecology and Environmental in 2018 the species listed in **Table 4.13** were recorded. Overall, the study area is of local value for a range of terrestrial bird species that are relatively common in the Irish countryside.

Table 4-13 Bird Species Recorded onsite in November 2018

Species		**Birds Directive Annex**			**BOCCI**	
		I	**II**	**III**	**Red List**	**Amber List**
Erithacus rubecula	Robin					X
Turdus merula	Blackbird					
Prunella modularis	Dunnock					
Troglodytes	Wren					
Corvus frugilegus	Rook					
Corvus monedula	Jackdaw					
Pica	Magpie					
Fringilla coelebs	Chaffinch					
Corvus cornix	Hooded Crow					
Parus caeruleus	Blue Tit					
Motacilla alba yarrellii	Pied Wagtail					
Parus major	Great Tit					
Turdus philomelos	Song Thrush					
Symbol	**Description**					
I	**Annex 1**: species and sub-species are particularly threatened. Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species.					
II	**Annex 2**: bird species can be hunted. However, the hunting periods are limited and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks.					
III	**Annex 3**: overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States can allow some of these activities for species listed here.					

4.3.6.9 Invasive Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality.

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 make it an offence to plant, disperse, allow dispersal or cause the spread of certain species e.g. Japanese knotweed and Himalayan balsam, keep the plant in possession for purpose of sale, breeding, reproduction, propagation, distribution, introduction or release, keep anything from which the plant can be reproduced or propagated from the species, without a granted licence and keep any vector material for the purposes of breeding, distribution, introduction or release. The Wildlife (Amendment) Act 2000 states that anyone who plants or otherwise causes to grow in a wild state in any place in the State any species of (exotic) flora, or the flowers, roots, seeds or spores of (exotic) flora shall be guilty of an offence.

The NBDC lists a number of both aquatic and terrestrial high impact invasive species which have been recorded within grid square M69 (**Table 4.14**). However, no high risk invasive species were recorded within the Aurivo Dairy site.

Table 4-14 NBDC Highly Invasive Species recorded in Grid Square M69

Flowering plant Species	Latin Name
Canadian Waterweed	Elodea canadensis
Cherry Laurel	Prunus laurocerasus
Japanese Knotweed	Fallopia japonica
Rhododendron ponticum	Rhododendron ponticum
Zebra Mussel	Dreissena polymorpha
American Mink	Mustela vison

4.3.6.10 Other Species

The National Biodiversity Centre online database lists a range of other species from within grid square M69. **Table 4.15** lists other species recorded within the 10km grid square M69, along with any species considered under threat and provided with legal protection.

Table 4-15 Species Recorded within the 10km Grid Square M69

Species Group	Named species
Other Mammals	Wood Mouse, Rabbit, Red Fox
Annelid	1 species recorded. not protected
Harvestman (Opiliones)	5 species recorded. Not protected.
Beetle (Coleoptera)	10 species recorded. None protected.
Butterflies	17 species recorded. Grayling, Gatekeeper listed as Near Threatened. Large Heath listed as Vulnerable.
Caddis fly (Trichoptera)	11 species recorded. None protected.
Dragonfly (Odonata)	10 species recorded. None protected
Hymenopteran	10 species recorded. None protected.
Mayfly (Ephemeroptera)	13 species recorded. Not protected.
Moths	14 species recorded. None protected.
Hemiptera	13 species recorded. None protected.
True fly (Diptera)	7 species recorded. None protected.
Liverwort	14 species recorded. None protected
Millipede	1 species recorded. None protected.
Mollusc	48 species recorded. Common Whorl Snail (Vertigo (Vertigo) pygmaea) and Prickly Snail (Acanthinula aculeata) listed as Near Threatened. English Chrysalis Snail (Leiostyla (Leiostyla) anglica), Marsh Whorl Snail (Vertigo (Vertigo) antivertigo), Pisidium lilljeborgii, Smooth Grass Snail (Vallonia pulchella), Swan Mussel (Anodonta (Anodonta) cygnea), Whirlpool Ramshorn (Anisus (Disculifer) vortex) listed as Vulnerable.
Moss	53 species recorded. River Bristle-moss listed as Near Threatened
Slime Moulds	2 species recorded. None protected.
Stonewort	1 species recorded. None protected.

4.4 Potential Impacts

4.4.1 Introduction

- The potential impacts of the proposed project are detailed below which have been obtained as part of this planning application via a site visit by Ash Ecology and Environmental Ltd to the existing site to assess the potential impacts due to the:
- Construction of an extension to the existing spray dryer facility to contain a new replacement spray dryer plant;
- Alterations to the existing car park to accommodate the new extension;
- Associated local underground drainage and miscellaneous site works.

During the proposed works, potential impacts could arise from increased noise and disturbance from site activities which could result in the disturbance/displacement of birds and mammals.

4.4.2 Impacts to Natura 2000 Sites

Potential impacts on designated Natura 2000 sites (SAC/cSAC/SPA) are specifically addressed in a Screening for Appropriate Assessment carried out by Roscommon County Council and also in Section 4.2.2. The Screening Report concluded that the proposed works operation would not have an adverse effect on the integrity of Natura 2000 sites. An AA report was carried out as part of the assessment for submission to the EPA which concluded there was no impact on Natura 2000 sites.

4.4.3 Impacts on Habitats

Overall, the habitats within the site are relatively common and no Annex 1 habitats or rare or uncommon habitats or floral species will be directly affected by the proposed works. No hedgerows or treelines for example will be removed. Therefore no mitigation is required.

4.4.4 Impacts on Protected Mammals

Signs of otter were not recorded along the Ballaghaderreen Stream within the facility boundary. Otter, if passing by the site via the Ballaghaderreen Stream, are largely nocturnal have therefore habitualised to background noise and disturbance generated by the facility. In the absence of any significant impacts on water quality or significant increases in noise and disturbance no additional impact on otter will occur and therefore no mitigation is required.

Treelines and hedgerow habitat provides potential feeding/commuting habitat for bats. The proposed works will not impact on these habitats and therefore the impact is negligible with no mitigation required.

Other mammal species which are protected under the Irish Wildlife Act 1976, as amended, such as Pygmy Shrew, Hedgehog, etc. could potentially occur within the site, although no signs of these species were recorded. The impact on this species from the proposed works is negligible.

4.4.5 Impacts on Birds

The terrestrial bird species recorded during bird surveys are typical of the types of habitat noted on site and are generally common. No rare or uncommon species or species of high conservation value were recorded.

Sections of treeline and hedgerow along the site boundary have some potential to provide suitable nesting and feeding resources for these species. Disturbance can cause sensitive species to deviate from their normal, preferred behaviour, resulting in stress, increased energy expenditure and, in some cases, species mortality. However, as the facility has been operational for some time, the levels of activity will have stabilised and birds in the surrounding landscape will have habitualised to the noise and disturbance factors created by the day to day operations of the facility. The impact on terrestrial birds in habitats within and adjoining the site is therefore predicted to be negligible with no mitigation required.

4.4.6 Impacts on other Fauna

No signs of amphibians or reptiles were recorded. The site is only likely to support common invertebrate species. Given that the habitats which are within the facilities boundaries are relatively common in the surrounding landscape, any impact on these species as a result of the proposed works are negligible and no mitigation is required.

4.4.7 Impacts on Water Quality

Potential impacts on aquatic habitats are not envisaged due to the nature of the project.

The report Q-value assessment of Lung River assessed the results of biological monitoring at two points upstream and downstream respectively from the confluence of the Ballaghaderreen Stream, see Section 4.3.2. The report concluded that the Q-value rating of 4 assigned to both sites were similar to previous assessments showing that there has been no significant deterioration within the river.

Based on the above there is no indication at present that discharges of surface water or treated waste water from the site are having a significant negative impact on water quality. In the absence of impacts on water quality, the impacts on aquatic ecology will be localised and minor to negligible.

4.5 Mitigation & Monitoring

As there are no predicted impacts to habitats or species on site there are no specific mitigation measures are required for protected flora and fauna.

4.6 Residual Impacts

Any residual impacts on the habitats and species that occur on the site due to the proposed project is considered to be neutral in the long-term and the predicted residual impact on flora and fauna will be insignificant.

4.7 Cumulative Impacts

No impact from noise or disturbance is predicted. As Aurivo is not predicted to significantly increase long term noise and disturbance levels within the area, no significant cumulative impacts in respect of noise and disturbance have been identified. Water quality data indicates that the Ballaghaderreen Stream is not being affected by the current discharge. In this context no cumulative impacts on water quality have been identified.

4.8 Conclusion

The Aurivo site supports a range of relatively low value habitats which are common in the wider landscape. The habitat of greatest ecological value is the Ballaghaderreen Stream which runs along the northern boundary and forms a link to the River Lung. A range of common countryside birds occur within the site. There are no indications that the discharges from the site are currently impacting significantly on water quality within the Ballaghaderreen Stream. Fauna, including various bird species have habituated to ongoing noise and activity at the site. Overall therefore the impact on ecology from the proposed works is considered minor to negligible.

5.0 Land, Soils and Geology

5.1 Introduction

This chapter of the EIAR, assesses the impact of the existing and proposed development on the land, soils and geology in the local vicinity.

The proposed development is located within the site boundary of the existing ADIL processing plant which has been located at the site since 1972. The site is zoned 'Industrial' in accordance with the Ballaghaderreen Local Area Development Plan[7].

Axis Environmental have undertaken an assessment of the existing geological characteristics of the site and surrounding environs as well as an assessment of the potential impacts associated with the activities and proposed developments previously outlined. The study will also entail a description and development of proposed mitigation measures to minimise any potential impacts.

The assessment included both a desk-based study which involved reviewing available geological and information held by publicly available online resources on the site and surrounding lands and a number of site visits. The operation area currently comprises c.12 acres and the proposed new development will take place within the current operation area.

5.1.1 Study Methodology

This section of the EIAR was prepared in line with the following guidance;

- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statement, April 2013;
- Institute of Geologists Guidance Note 2002;
- EPA, Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Draft August 2017;
- EPA, Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- EPA, Advice Notes on Current Practice (in preparation of Environmental Impact Statements), September 2003;
- EPA, Guidelines on the information to be contained in Environmental Impact Statements, March 2002;
- Environment, Community and Local Government, Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment, March 2013.
-

The primary legislative drivers that relate to Land, Soils and geology at the site in this EIAR are:

5.1.1.1 EU Directives

- Environmental Impact Assessment Directive (2014/52/EU);
- Environmental Liability Directive (2004/35/EC)

The EU EIA Directive regulates the information impact assessment process and information in this EIAR.

The management of Waste Directive and the Environmental Liability Directive regulates the activities at the site

5.1.1.2 Irish Legislation

The following legislation relating to Land, Soils and geology at the site in this EIAR:

- S.I. No. 349 of 1989, European Communities (Environmental Impact Assessment) Regulations, and subsequent amendments (S.I. No. 84 of 1994, S.I. No. 352 of 1998, S.I. No.; 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001);
- S.I. No. 473 of 2011, European Union (Environmental Impact Assessment and Habitats) Regulations 2011;
- S.I. No. 584 of 2011, European Union (Environmental Impact Assessment and Habitats) (No.2).

[7] Ballaghaderreen Local Area Plan 2017-2023.

5.1.1.3 Regulations 2011;

- The Planning and Development Acts, 2000 to 2009; and
- The Planning and Development (Amendment) Act 2010, S.I. 600 of 2001 Planning and Development Regulations and subsequent amendments including, S.I. No. 364 of 2005 and S.I. No. 685 of 2006.

The above legislation regulates the information contained in an EIAR and planning at the site.

The assessment of impact was based on the EPA guidance;

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects ''Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance* below.).	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.

5.2 Receiving Environment

5.2.1 Study Area

The study area for this Land, Soils and Geology section of the EIAR comprises the existing site (c.12 acres) and surrounding lands.

Existing information on the regional soils, superficial deposits and bedrock geology of the Ballaghaderreen area was collated and evaluated. Subsequent to this data compilation and review, site visits and inspections were undertaken to review the superficial deposits and bedrock geology at ADIL and in the surrounding area.

The following sites have been consulted in the preparation and development of this chapter of the EIAR;

- Geological Survey of Ireland maps; https://www.gsi.ie;
- EPA Radon Map of Ireland; http://www.epa.ie/radiation/radonmap;
- National Parks and Wildlife Service (NWPS) on line data (www.npws.ie);
- Status of EU Protected Habitats in Ireland – Backing Documents (NWPS);
- Status of EU Protected Habitats in Ireland (NWPS, 2008);
- Ordinance Survey Ireland Maps and Ariel Photography (www.osi.ie);
- Data in relation to water quality in the area from the EPA (www.epa.ie);
- Information on the South Eastern River Basin District (www.wfdireland.ie);
- Teagasc soil area maps; https://www.teagasc.ie/environment/soil/soil-maps/
- Water Framework Directive maps; http://wfdireland.ie/maps.html;
- EPS GIS Maps; http://gis.epa.ie/;
- OSI Flood maps and data.

This report provides an overview of the soil classifications, underlying drift deposits and solid bedrock geology in and around site, for both a regional and local context. The assessment considers the potential future impact from the proposed installation upon the soils and geology. A site walk through was completed in October 2018.

5.2.2 Existing Environment

The existing development has been in operation since 1972. The site has been in operation as an Industrial Zone within the catchment of the Ballaghaderreen Local Area Plan[8]. The proposed extension to the installation is also within the boundary of the site.

A small stream (Segment Code: 26_2752) runs c. 250m to the north east of the site. The stream then runs for c. 430 metres before entering the River Lung which eventually makes its way to Lough Gara.

[8] http://www.roscommoncoco.ie/en/Services/Planning/Roscommon-County-Council-Planning-Publications/Roscommon-County-Council-Planning-Publications/Local-Area-Plans/Current-Plans/Ballaghaderreen-LAP-2017-%E2%80%93-2023/

Table 5-1 Bedrock Geology

Unit Name	Boyle Sandstone Formation
Stratigraphic Code	BO
Description	Sandstone, Siltstone, black mudstone
Sheet Number	12
SHAPE	
Formation	Boyle Sandstone Formation
Definition	The formation was originally named the Boyle Sandstone group by Caldwell (1959) and was redefined by Philcox et al (1992), who included the basal sequence up to the highest red mudstone in a new Formation, the Kilcoo Sandstone Formation. MacDermot et al
Type Section	GSI Borehole GSI-85-4
Lithology Description	Poorly bedded conglomerates, associated with red-purple pebbly grits and coarse sandstones, grades upwards into a cyclic sequence with pale grey, sometimes pink, sandstones capped by intervals of red, green and grey mudrock. This is overlain by the Lough,
Rock Type	Sandstones and red green conglomerates
Thickness	130m
System	Carboniferous
Series	Dinantian
Stage	Courceyan
Rock Type	Sandstones and red green conglomerates
Thickness	130m
System	Carboniferous
Series	Dinantian
Stage	Courceyan

Fig 5-1 Underlying Geology

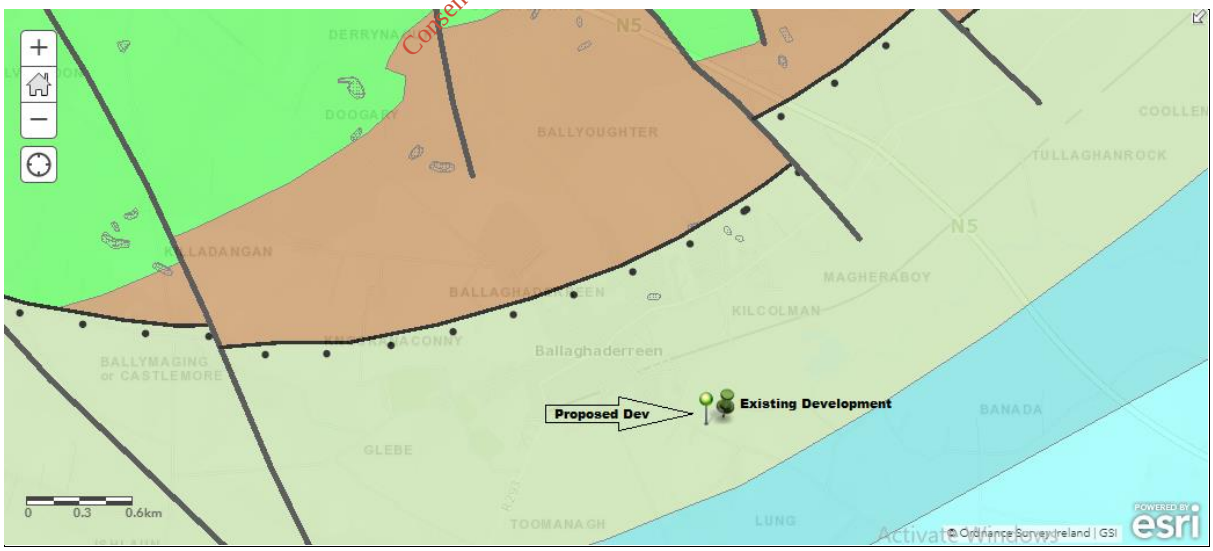


Table 5-2 Subsoil Classification

Category	Till Type
Description	Sandstone till (Devonian)
Texture	Sandy
Class	Tills (diamictons)
County	Roscommon

Fig 5-2 Subsoil Classification

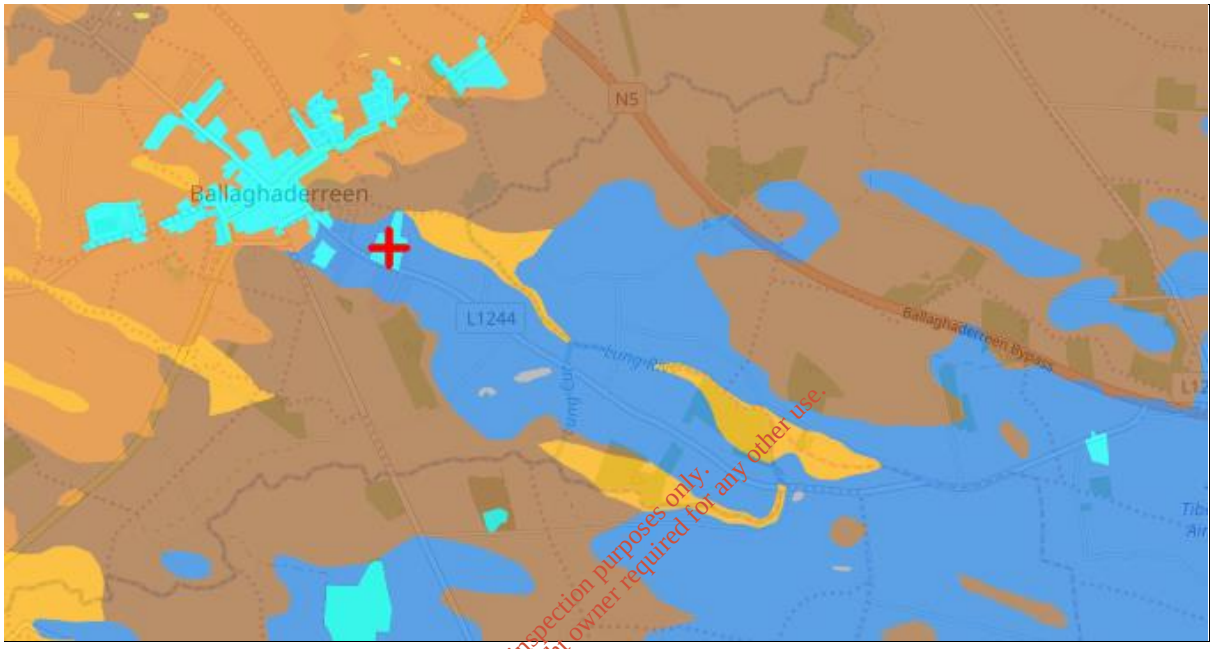
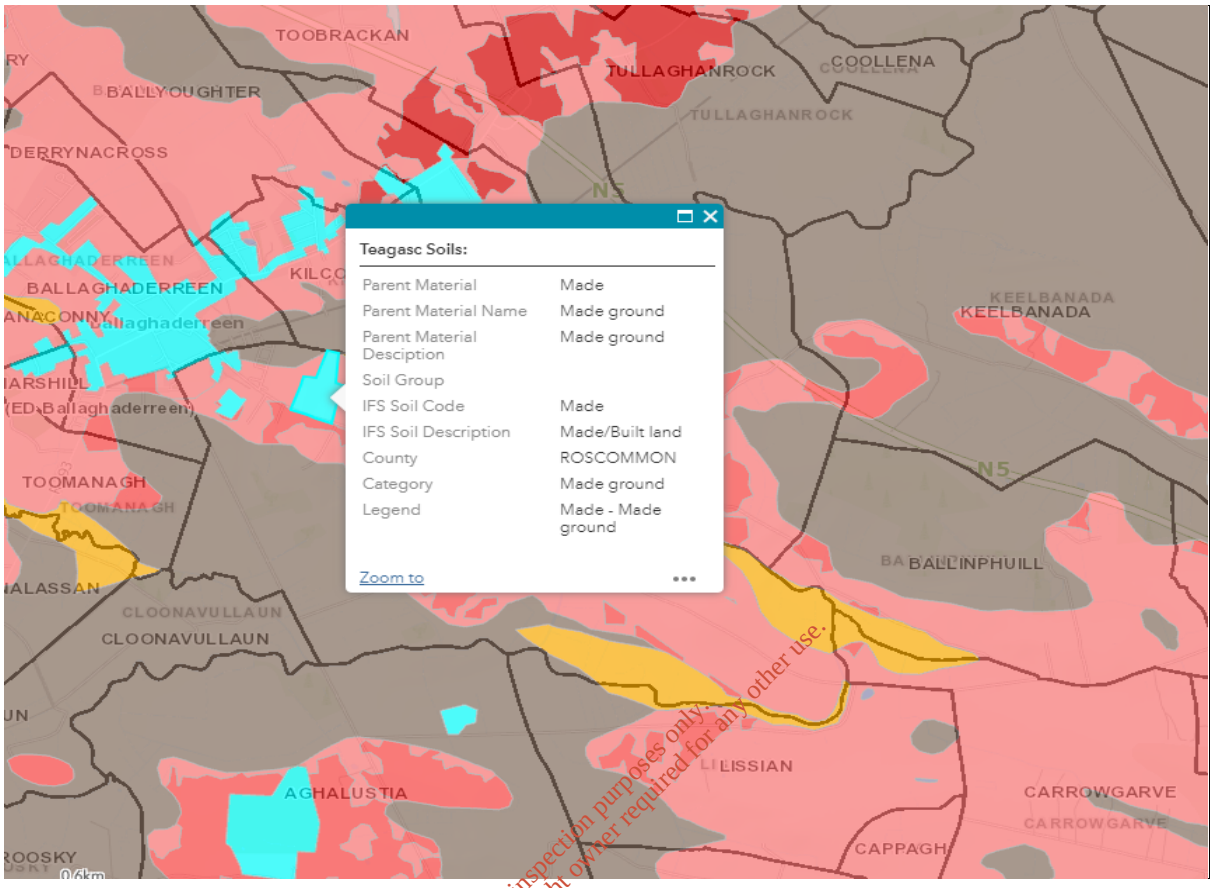


Table 5-3 Soil Classification

Soil Type	Made
Soil Drainage	Made
Subsoil Permeability	Low
Groundwater Vulnerability	Low
Vulnerability	L
Peat Area (in SG Aquifer)	0.00

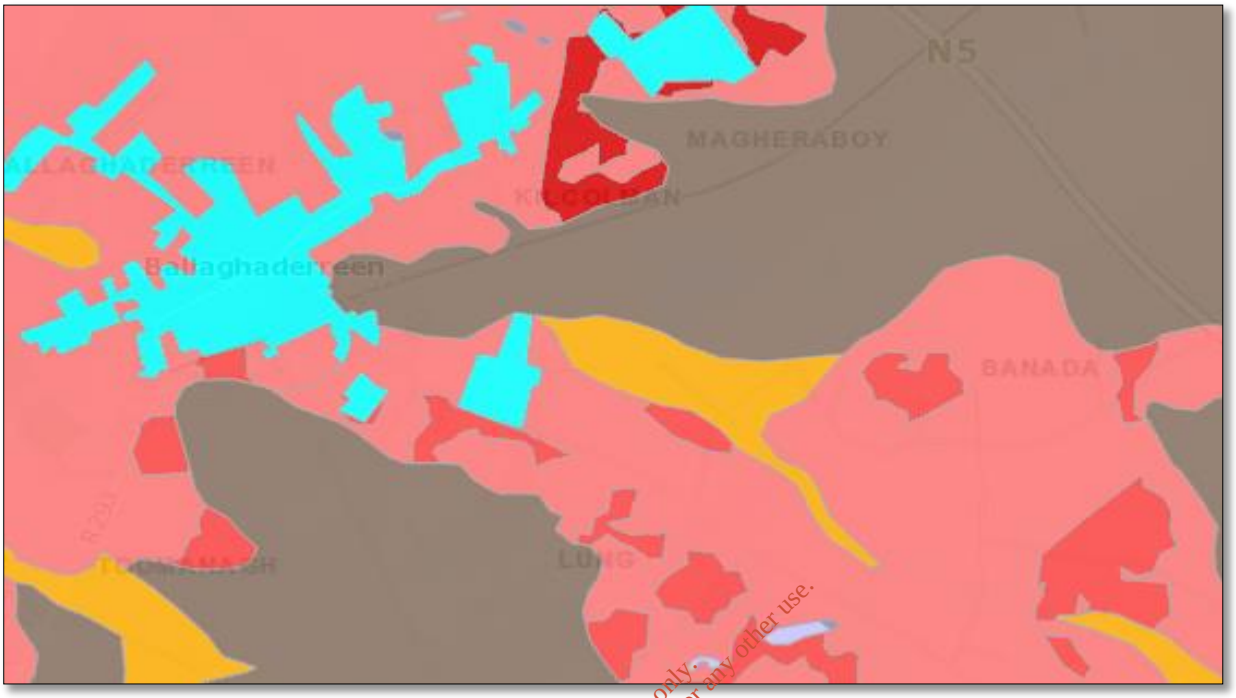
Fig 5-3 Soil Classification



The Teagasc soil mapping, reproduced in figure 5.3, shows that the lands that form part of the application are made soils with low permeability and vulnerability.

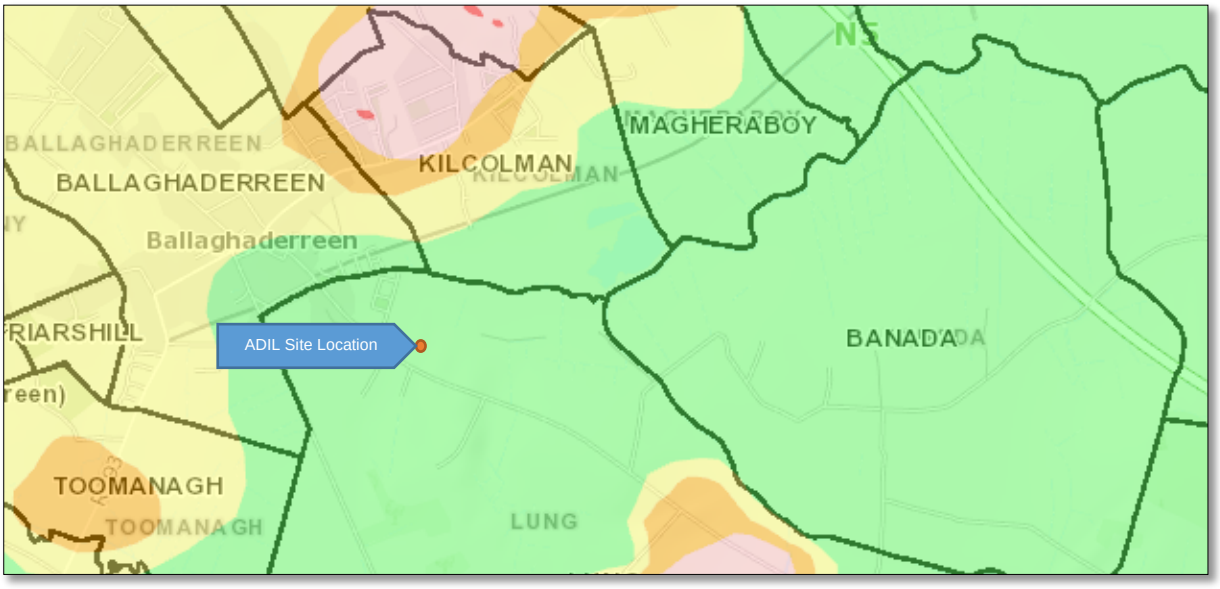
Teagasc soil mapping reproduced in Figure 5.4, shows adjacent areas with a mixture of Alluvial (mineral), Cut (Cutover/cutaway peat) and poorly drained acidic soils. [9]

Fig 5-4 Regional Soil Classification



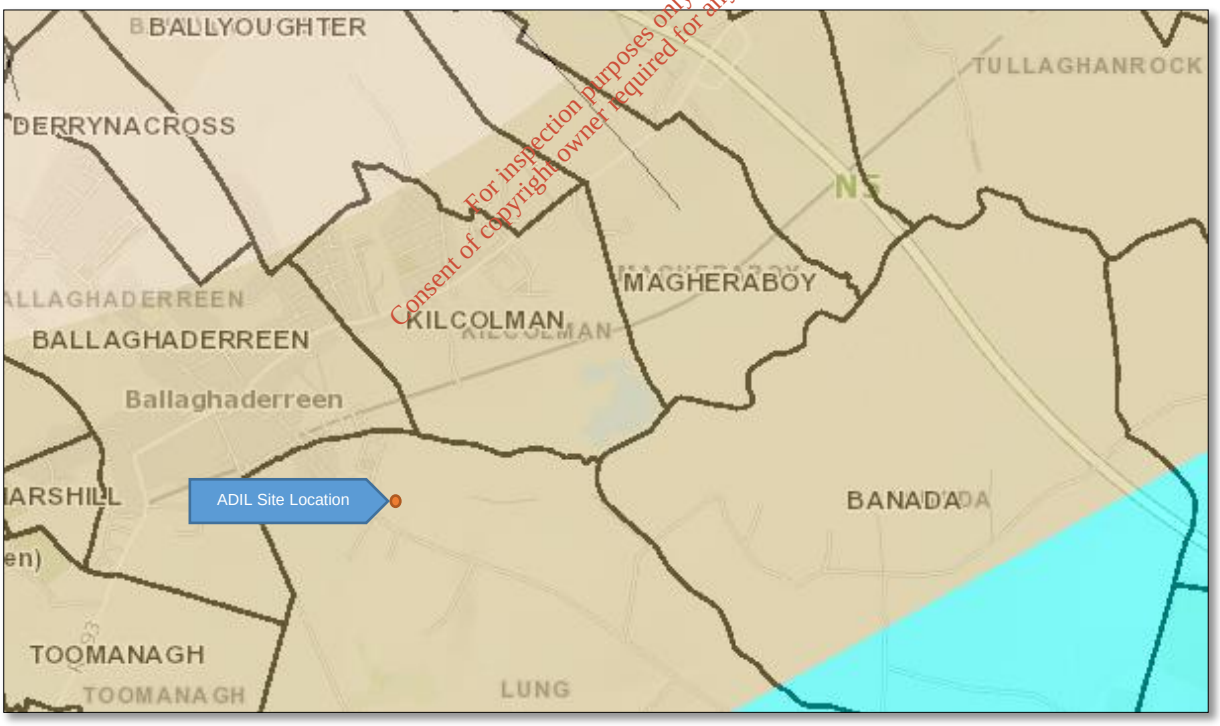
[9] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=ebaf90ff2d554522b438ff313b0c197a&scale=0

Fig 5-5 Groundwater Vulnerability



ADIL is located on groundwater of low vulnerability. The bedrock is classified as locally important, bedrock which is moderately productive only in local zones.

Fig 5-6 Bedrock Aquifer Vulnerability



The groundwater body is named the Curlew Mountains and is located within the EU Code IE_SH_G_073. It is classified as poorly productive bedrock within the Shannon basin district. There are no drinking water protected areas in the vicinity of ADIL. There is one groundwater well within the boundary of the installation which is used to provide clean water for use within the production facility.

5.2.3 Flood Risk

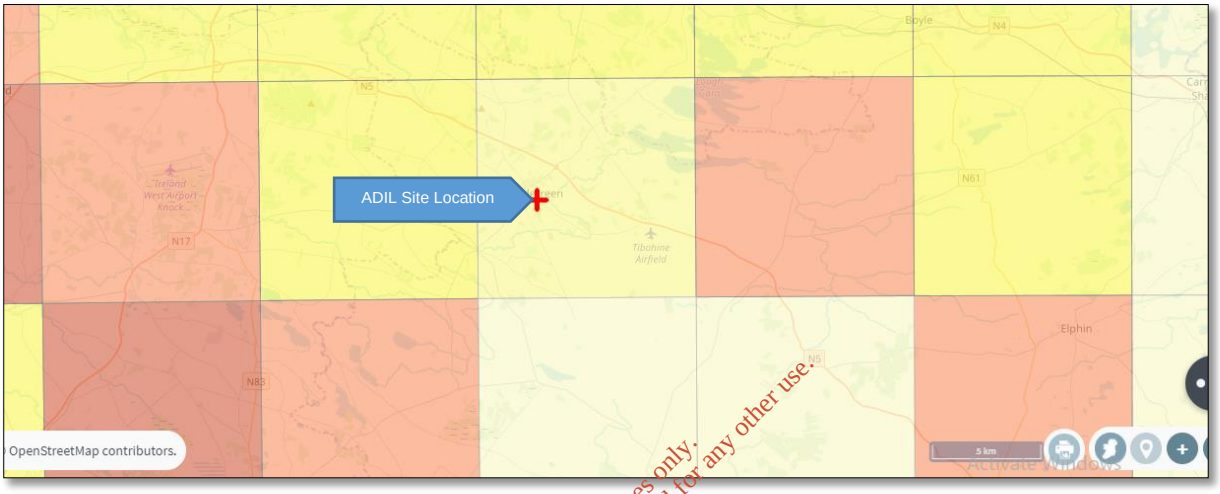
According to the office of Public Works and historical data obtained from local residents and employees the site is not subject to flooding. There was no evidence of flooding with the OPW since records began. A copy of the LAP Map has been included in Vol III, Appendix 7.0. The latter suggests that the Wastewater Treatment Plant to the

North of the Plant is subject to flooding however local knowledge would not support this view. There has never been any flooding incidents recorded within the boundary of the site since operations commenced in 1972.

5.2.4 Radon

Radon is a radioactive gas which is naturally produced in the ground from uranium present in small quantities in all rocks and soils. Radon gas rises through porous layers of soil and rock and when it reaches air it disperses into the atmosphere. It can seep into buildings through cracks in the floor, wall slab joints, pipe fittings and drains. When radon enters an enclosed space, it can accumulate to very high levels, which potentially could put people at risk of lung cancer depending on how much radon they have been exposed to and for how long.

Fig 5-5 Radon Maps



The installation is located in a low radon area which between one and five per cent of the homes in the 10km grid square are estimated to be above the reference level. The development as exists and all proposed changes to it will not have any impact on radon levels in the community.

5.2.4 Groundwater Extractions

Examination of Ordnance Survey maps and a site walkover were undertaken to assess any shallow groundwater abstraction sources such as wells or springs within close proximity of the installation. There are no public supplies or source protection zones within 10km of the site. Use of wells in the area would not be common as the site is located within the Ballaghaderreen public water supplies. ADIL does have its own well installed on site to supply additional water for production. The wells are metered and monitored for water quality on a routine basis.

5.2.5 Groundwater Discharges

There are no existing or proposed discharges to groundwater from ADIL of any sort. Wastewater and storm waters are discharged to the River Lung, controlled and monitored in line with the current IE licence requirements.

5.3 Potential Impacts

The evaluation of impacts of the proposed development is based on a methodology outlined in 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements published by the IGI (2013). The potential impacts of the proposed project are detailed below under the construction and operational phases.

5.3.1 Construction Phase

The construction phase is restricted to within the existing boundary of the Aurivo plant. Soils and superficial deposits have already been significantly stripped from the footprint of the development area. The area is primarily chip and tar. The excavated material from the construction area will be reused onsite. Contamination of the site is not expected given its existing use within the boundary.

There will be use of diesel generators and other chemicals during civils work. Diesel used for generators/mobile lighting etc. can cause a risk when filling/during use if leaking. All chemicals/fuels should be notified to site management prior to use on-site and will be stored and used as per site procedures in line with requirements of the IE licence.

5.3.2 Operational Phase

The most significant risk to groundwater on site would be from accidental spills or loss of control during unloading. Further details can be reviewed in section 5.4.2 on mitigation and control measures.

The primary risk to water stems from an emergency situation such as an accidental spill or loss of control on site (e.g. fire). Significant investment, training and procedures have been installed on site to cope with any potential emergency. This was demonstrated during the recent fire in 2017 during which no loss of material or contaminated water occurred during the emergency situation.

5.4 Mitigation and Monitoring

5.4.1 Construction Phase

The local environment will be protected from any potential adverse effects from the existing and proposed development by the implementation of robust policies and procedures to cover all potential impacts during construction and operation. A summary of the controls to be introduced are included below;

A Construction Plan is to be generated in line with Inland Fisheries Guidelines on Protection of Fisheries during construction works[10] and CIRIA Guidelines, Good Practice On-site. It will be compiled before site works begins and will include an overview of environmental requirements of the project;

- Environmental responsibilities to form part of contract negotiations;
- Site management including environmental responsibilities to be clearly stipulated as part of contract negotiations;
- All contractors to be informed of site rules and requirements in relation to environmental protection measures;
- Relevant signage put up through the site, illustrating environmental areas of concern;
- Structured site layout, completed in line with CIRIA, Good Practice Guidelines;
- Reporting procedures to be put in place;
- Security measures to be put in place;
- Waste management facilities to be put in place;
- Daily checks to be completed on local drains, stock piles, overall house-keeping etc.;
- Emergency response procedures to be put in place for spills etc. to include notification procedures for regulatory authorities;
- All chemicals/ fuels to be used on-site should be approved for use, be appropriately bunded (where possible in an enclosed bund to prevent rainwater entry), hold minimum quantities and have a relevant safety data sheet;
- Regular site audits and checks implemented by Aurivo's site management;

[10] http://www.fisheriesireland.ie/documents/624-guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters/file.html

- No concrete wash-out on site;
- Specified areas for refuelling with relevant controls for groundwater;
- Spill trays to be used under all diesel generators;
- Notification & Approval of chemicals and fuels before being brought on-site;
- Bunding and Safety Data Sheets to be available for all chemicals and fuels on-site;
- Spill procedure and kit to be maintained on site;
- Stockpiling and storage on-site is to be kept to a minimum;
- Samples of soil and groundwater to be taken for analysis before removal off-site.

5.4.2 Operational Phase

ADIL does intend to continue using groundwater for its process operations at the facility. The sites emissions will be controlled during the operational phase by an Industrial Emissions (IE) Licence as issued by the EPA which will likely include limits for ground water and soil monitoring. Further than that the supply of groundwater for process operations would be at risk if contamination of the area was to be experienced. Therefore it is in the company's best interest to maintain strict procedures and practices in place to ensure contamination of any sort does not occur.

ADIL has operated at its current location in since 1972 without any incidents that would give rise to groundwater or soil contamination. Flooding has never occurred on the site.

Control measures incorporated into the installation activities for the protection of groundwater include;

- All materials on site are stored as per IE licence requirements and in line with the EPA guidance for Storage and Transfer of Materials for Scheduled Activities;
- All storage areas holding environmentally damaging materials are appropriately bunded to provide secondary containment;
- These storage areas are certified and integrity tested in line with IE licence requirements;
- All production and process areas from the site entry to storage of chemicals are hardstand to prevent contamination of groundwater in the event of a spill;
- The delivery yard is hardstand and leads to the wastewater treatment plant in the event of spillage, fire water etc.
- Procedures are in place for spill notification, management and control of waters on storm water lines;
- Emergency spill kits and emergency response procedures are developed and personnel are trained in their existence and execution; further details are available in chapter 6 of this EIAR. Procedures have also been attached in Vol III, Appendix 8.0 of this report
- All spent liquid wastes are stored in the dedicated bunded waste stores with regular disposal to ensure there is no large-scale bulk storage;
- Spillage materials for localised spills are established inside the facility buildings and outside at areas where spills are more likely to occur;
- Loading and unloading operations are supervised and located on hardstanding ground in the event of spillage;
- The installation operates under an IE licence which is subject to the rigorous controls applied by the EPA;
- The site operates an environmental management system;
- All technicians are fully trained in operations and activities at the installation and also in Emergency Response procedures, reference copies of procedures attached- Vol III, Appendix 8.0

Given the above mitigation and control measures, the residual impact of the proposed development on land, soils and geology is minimal in the long term.

6.0 Water

6.1 Introduction

This chapter of the EIAR, assesses the potential impact of the existing and proposed development on the ground and surface water in the vicinity of Aurivo Dairy Ingredients Limited.

The installation incorporates a milk processing dairy site with the capacity to process in excess of 50 million gallons of milk equivalent per year. The existing production plant capacity is to be extended in 2018 – 2019 with the addition of a new dryer and associated infrastructure.

The factory is located in an area zoned 'Industrial Uses' according to the Ballaghaderreen Local Area Plan 2017 – 2023, reference Vol III, Appendix 6.1 for Zoning information. ADIL is currently operating under Industrial Emissions (IE) licence P0802-02 which oversees the entire environmental management operations of the installation.

Water quality being discharge to the Lung River is monitored regularly and routinely in accordance with EPA conditions of operation for the installation.

The discussion also incorporates the submissions made in conjunction with planning application 186, namely the Waldron & Associates, Planning and Civil Works Report.

6.1.1 Study Methodology

This section of the EIAR was prepared in line with the following guidance;

- EPA, Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Draft August 2017;
- EPA, Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- EPA, Advice Notes on Current Practice (in preparation of Environmental Impact Statements), September 2003;
- EPA, Guidelines on the information to be contained in Environmental Impact Statements, March 2002;
- Environment, Community and Local Government, Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment, March 2013;
- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association;
- CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association;
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statement, April 2013;
- Ballaghaderreen Local Area Plan 2017 – 2023.

6.1.2 Legislation

The primary legislative drivers for the protection of water in Ireland include;

- Water Framework Directive, Directive 2000/60/EC, which was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters and includes heavily modified and artificial waterbodies. Its objectives are to prevent further deterioration of and to protect, enhance and restore the status of all bodies of water with the aim of achieving at least good status by 2015. This legislation also allowed for the establishment of River Basin Management Plans (RBMP);
- Surface Waters Regulations (S.I. No. 272 of 2009-2015), set environmental standards for surface waters;
- European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2010-2016;
- S.I. 722 of 2003, European Communities (Water Policy) Regulations, as amended;
- S.I. 350 of 2014, European Union (Water Policy) Regulations 2014;
- The EU Floods Directive 2007/60/EC;
- S.I. 122 of 2010, European Communities (Assessment and Management of Flood Risks) Regulations;
- S.I. 81 of 1988, European Community Environmental (Quality of Surface Water Intended for Human Consumption) Regulations 1984 as amended.

6.1.3 Resources

The following sites have been consulted in the preparation and development of this chapter of the EIAR;

- National Parks and Wildlife Service (NWPS) on line data (www.npws.ie);
- Status of EU Protected Habitats in Ireland – Backing Documents (NWPS);
- Status of EU Protected Habitats in Ireland (NWPS, 2008);
- Ordinance Survey Ireland Maps and Ariel Photography (www.osi.ie);
- Data in relation to water quality in the area from the EPA (www.epa.ie);
- Information on the South Eastern River Basin District (www.wfdireland.ie);
- Teagasc soil area maps; https://www.teagasc.ie/environment/soil/soil-maps/
- The Planning Partnership;
- ORS planning maps
- Geological Survey of Ireland maps; https://www.gsi.ie
- Water Framework Directive maps; http://wfdireland.ie/maps.html
- EPA GIS Maps; http://gis.epa.ie/
- OSI Flood maps and data.

This section describes the local and regional regimes operating in and around the site, along with baseline surface and groundwater conditions in line with legislated environmental quality objectives.

A site walk through was carried out to assess the location of environmental sensitive receptors such as the Lung River and associated land drains. Process water, cooling water, surface and storm water drainage systems at the installation were also assessed for location, distribution network, controls and management and analytical results.

The remainder of the study relies on a desktop approach and includes a review of historical monitoring data from the EPA well as information from the aforementioned resources.

The assessment of any impacts will be based on EPA guidance;

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects ''Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance* below.).	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.

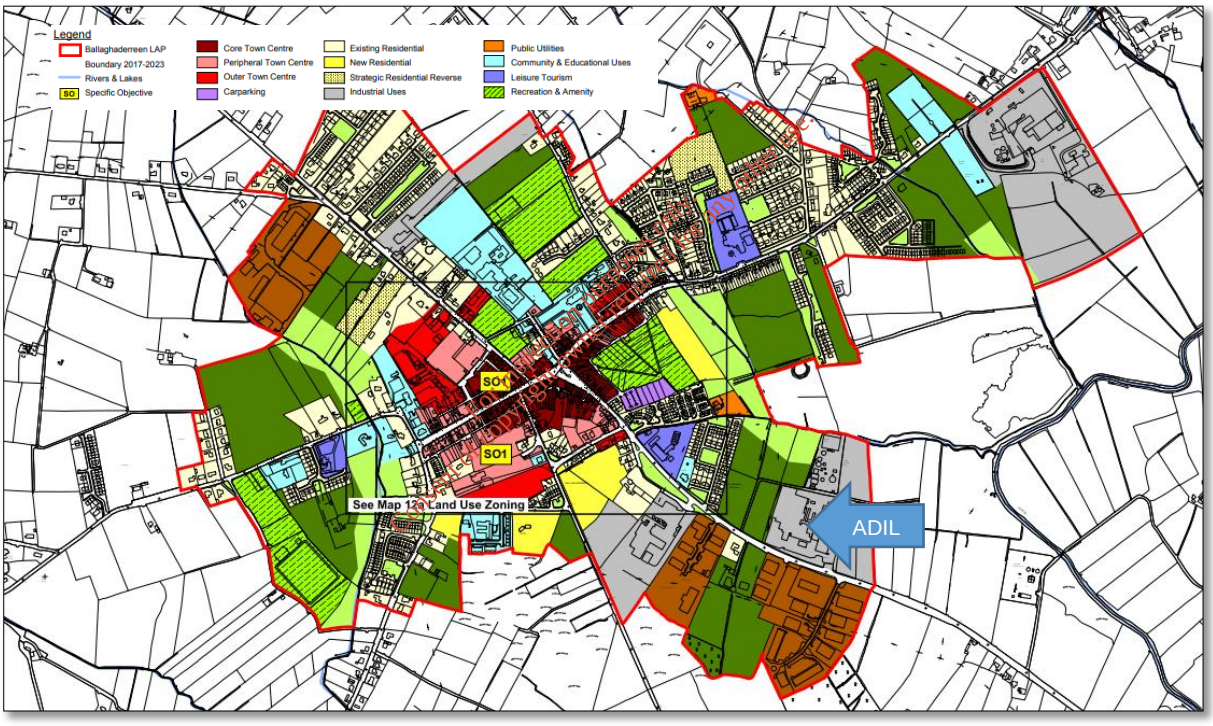
	Profound Effects An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it

6.2 Receiving Environment

6.2.1 Introduction

The existing and proposed development at Aurivo Dairy Ingredients Limited (ADIL) is located within lands zoned 'Industrial Uses' on the perimeter of the town of Ballaghaderreen. The study area comprises the development site, the adjacent River Lung, land drains and surrounding farmland.

Fig 6-1 Ballaghaderreen Local Area Plan



The methodology used for the baseline study follows the guidelines and advice notes provided by the Environmental Protection Agency on Environmental impact Assessments (May 2017), and the Institute of Geologists of Irelands guidelines for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (2013).

A combination of desk study and field study was used to establish the baseline conditions at the site. A wide range of water issues was considered under a number of headings including context, character, significance and sensitivities.

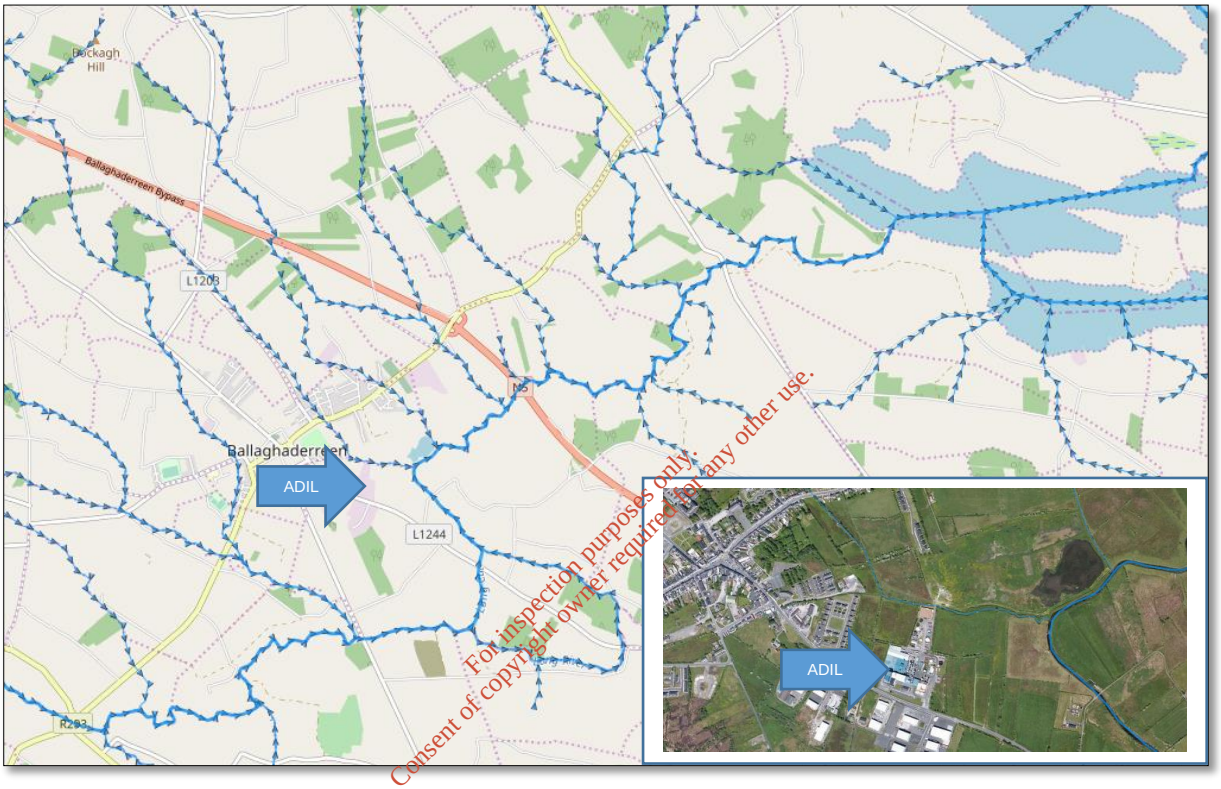
Establishing baseline conditions is necessary to place the proposed development and its likely impact within the context of the local/regional water environment. The description includes all relevant information about the existing water environment which could be impacted by the existing and proposed development, information such as surface water bodies, groundwater bodies, surface water and groundwater flow direction and relative magnitude of flow, water abstractions, areas at risk of flooding, known discharges to surface water / groundwater and habitat designations.

6.2.2 Existing Environment

6.2.2.1 Surface water

The site is bound on the northern side by a tributary of the Lung River, known as the Ballaghaderreen Stream. There are no process treated effluent discharges from Aurivo's wastewater treatment plant to this waterbody however there are clean storm waters and surface waters from uncontaminated parts of the plant's hardstanding areas joining this waterbody.

Fig 6-2 Local Surface Water Network



The surrounding area is within the Upper Shannon (Boyle) catchment area HA26B. The Upper Shannon catchment covers an area of 674Km². It is characterised by uplands running along the northern catchment boundary, which is comprised mainly of red sandstone, and a lowland area in the southern part of the catchment, which is underlain by limestones, some of which are karstified.

The River Lung_050 in which ADIL is situated is a tributary of Lough Gara. This section of the Lung River has been rated of "high" ecological status under the Water Framework Directive. Further downstream the Lung River flows into Lough Gara, which subsequently connects to the Boyle River. The WFD aims to protect and enhance all water systems (surface, ground and coastal waters), achieve "good status" for all waters, manage water bodies based on river basins or catchments. The current Water Framework Risk status for this River is 'Not at Risk'.

Table 6.1 summarises the main characteristics of the River Lung_050, the catchment in which ADIL is situated and discharges its waters. The results for cycle 1 of the River Basin Management Plan are listed in Table 6.2. Results from this assessment outlined the ecological, biological and invertebrate status of the Lung_050 to be "good".

There are two EPA monitoring stations either side of ADIL where the Ballaghaderreen stream joins the Lung River. These stations are used by the EPA to derive Q values which denote the biological quality of the water. The biological health of a watercourse provides an indication of long term water quality as opposed to general "grab" samples for water chemical quality.

The station at Edmundstown Bridge has recorded a Q value of Q4 over the periods 2008, 2011, 2014 and 2017. The downstream station at Bridge of Banada recorded values of Q4 in 2008, Q4-5 in 2011, Q4-5 in 2014 and Q4 in 2017. This would indicate that the catchment is not under significant pressure from pollution sources and the water quality up and downstream of ADIL is of similar status.

Fig 6-3: EPA Monitoring Stations

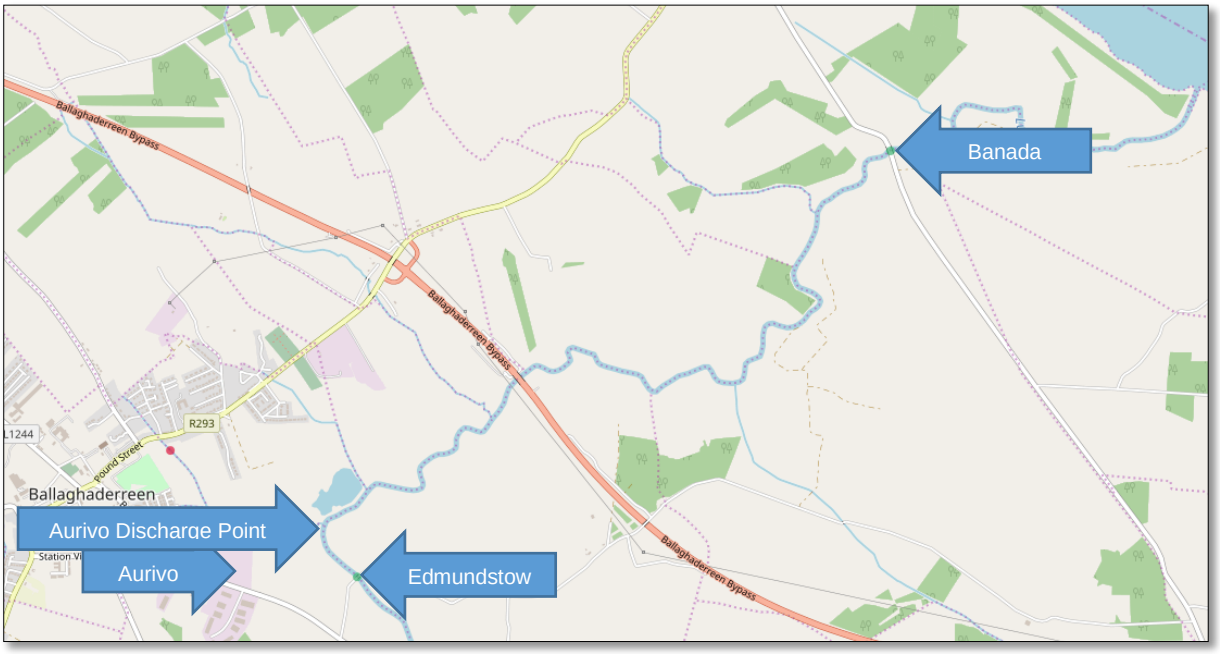


Table 6-1 summarises the main considerations in relation to the receiving water:

Table 6-1 River Lung_050 Characteristic Description

Lung River Data	
Code:	IE_SH_26L030400
Name:	LUNG_050
Status:	Good
Local Authority	Roscommon County Council
Waterbody Category	River
Cycle 1 RBD	Shannon
Protected Area	Yes
Length km	29.99
Period for WFD Status	2010-2015
WFD Risk Projection	Not At Risk

According to the most recent data available the Lung River is not subject to any environmental pressures which include abstraction, agriculture, anthropogenic, atmospheric, extractive industry, hydromorphology, industry, waste or water treatment pressures.

Fig 6-4 Lung River_050 Catchment Assessment

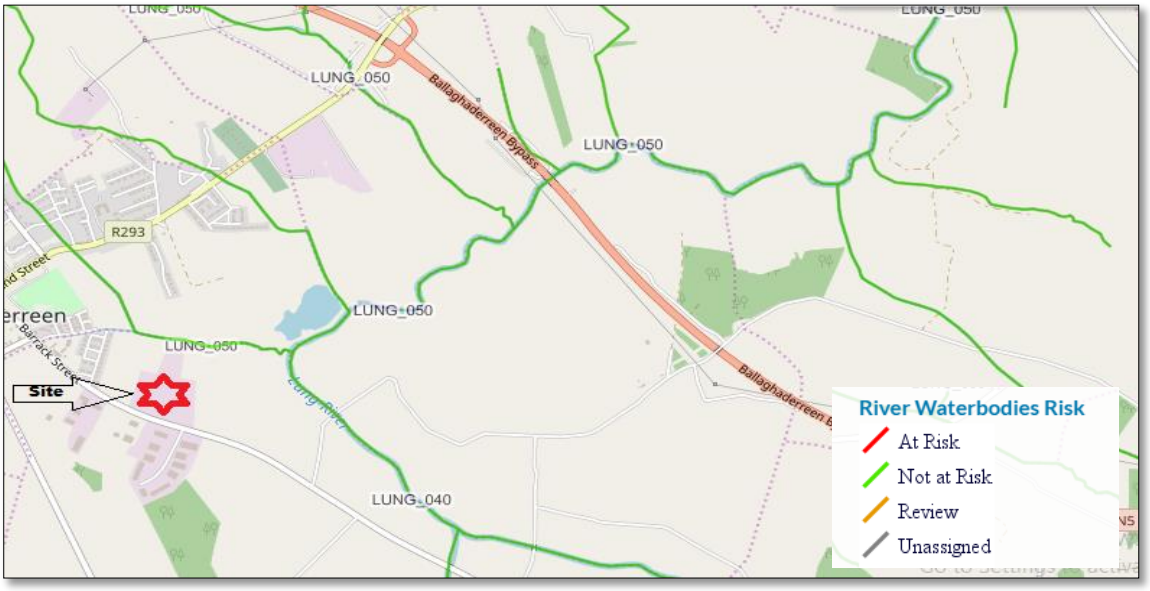


Table 6.2 Lung River Characteristic Description

Closest Water Body	Lung River (IE_SH_26L030400)	ADIL discharges treated effluent, cooling water, clean uncontaminated surface water into the River Lung.
Drinking water abstractions within 10km downstream	None	N/a
EPA Monitoring Stations and Biological quality ratings	RS26L030350 Upstream RS26Y020060 downstream	0.3 km u/s Q4 (2017) 3.4km d/s Q4 (2017)
Water Framework Directive (WFD) Status	Good	-
WFD Risk Category	Not at risk	-
Potentially Impacted Special Area of Conservations (Within 10km)	Tullghanrock Bog SAC Callow Bog SAC	Lung River flows between these SACs
Potentially Impacted National Heritage Areas (Within 10km)	000587 Lough Gara	Proposed NHA - Lung River flows into the lake
Potentially Impacted Special Protection Areas (Within 10km)	Lough Gara	Lung River flows into the lake

Based on Table 6-2 above it is noted that the Lung River is “not at risk” from either point or diffuse sources. The survey noted that the river was deemed not at risk from EPA licensed facilities which would have included ADIL’s presence in the catchment at the time of assessment and classification.

By “risk” it is meant that the waterbody would not achieve good ecological or good chemical status/ potential by 2015. It was therefore given an exemption and extended target date of 2021. The overall objective of the WFD is to protect inland waterways such as the River Lung.

Some 6km north east of the Aurivo site the Lung River flows into Lough Gara. The current status of Lough Gara is “At risk”. Table 6.4 highlights some of the characteristics of the lake. The lake is considered ‘At Risk’ of deteriorating or being at less than good status in the future.

Table 6-3 Lough Gara Characteristic Description

Code:	**IE_SH_26_728**
Name:	Lough Gara
Status:	Moderate
Local Authority	Roscommon County Council
Waterbody Category	Lake
Cycle 1 RBD	Shannon
Protected Area	Yes
Period for WFD Status	2010-2015
WFD Risk Projection	At Risk
Biological Status	Moderate
Invertebrate Status	Moderate

The lake is categorised as being susceptible to environmental pressures including from sources including agricultural and invasive species. There is a major drinking water abstraction source from Lough Gara which serves approximately 6,500 people in a large area surrounding Ballaghaderreen. There is an extraction rate of 470 m^3/hr for 18 hours per day producing clean water via filtration plant to produce c. 7000 m^3/day of drinking water for the distribution network.

6.2.3 Hydrogeology

The geology of the site is recorded in detail in Chapter 5 of this report. In summary, the site bedrock is sandstone overlain with limestone and made ground which has low permeability. Subsoils comprise predominantly peat and low to moderate permeability glacial tills over limestone and sandstone bedrock. Glacial sands and gravels occur within the till to the south west of Ballaghaderreen and form a locally important gravel aquifer. Sandstone bedrock underlies the catchment east of a major fault line running between Mohill and Roscommon and forms the higher ground around Lough Allen to the north, the sandstone is both a poor and a locally important bedrock aquifer. Basic intrusive rocks occur west of Ballaghaderreen and form isolated surface outcrops.

The remainder of the catchment is underlain by limestone bedrock which is predominantly a regionally important karstified aquifer containing many karstic features, particularly north of Roscommon. The bedrock aquifer at the location is mapped by the GSI as a locally important aquifer.

The vulnerability of groundwater to potential contamination from surface activities is related to the ease with which water moves vertically down from the surface to either the water table or top of the rock. The vulnerability is this area is classed as low.

Recharge calculations were developed by the GSI on a regional scale by calculating the effective rainfall (minus evapotranspiration) and then applying a recharge coefficient to indicate the proportion of the effective rainfall that recharges groundwater. Recharge is therefore closely linked to vulnerability. The recharge classification is determined as ‘low’.

Fig 6-5 Groundwater Vulnerability

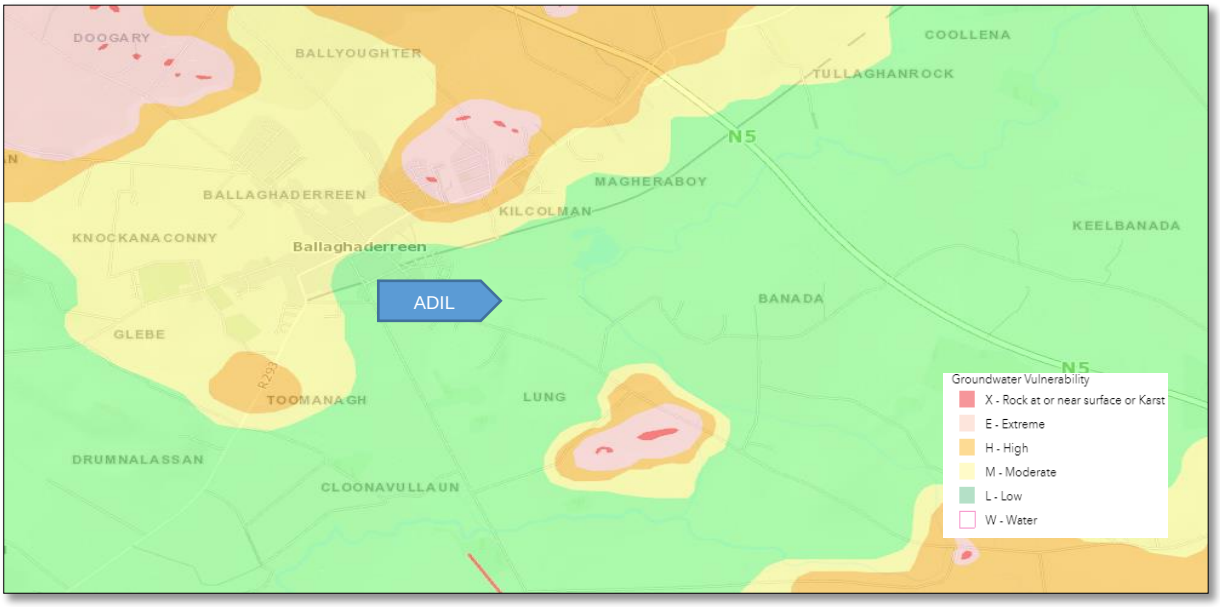
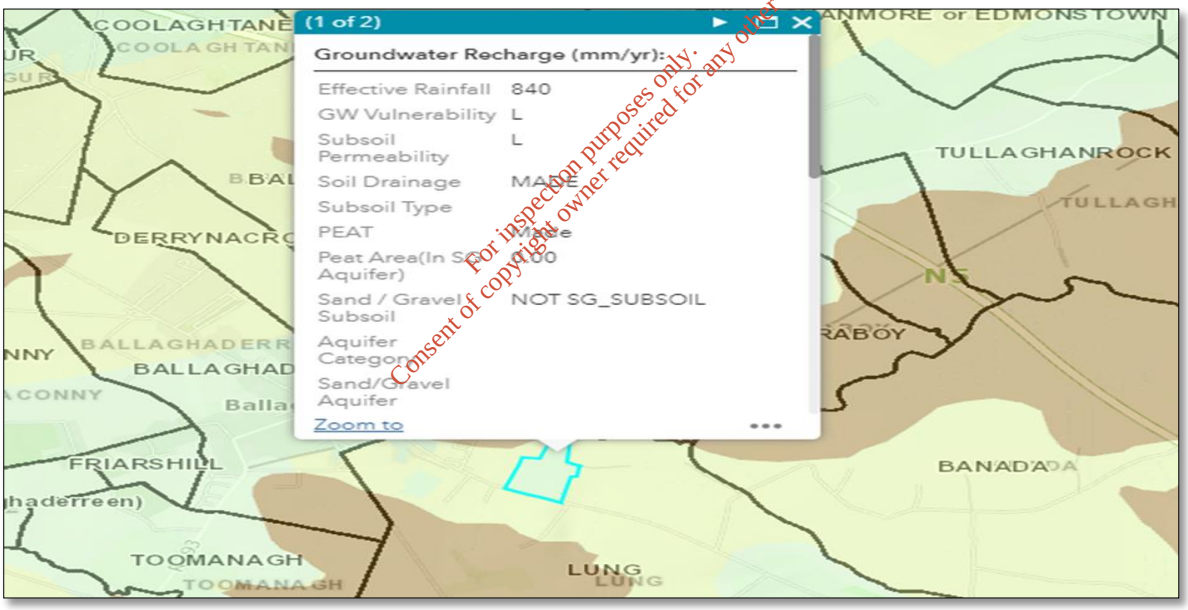


Fig 6-6 Groundwater Recharge

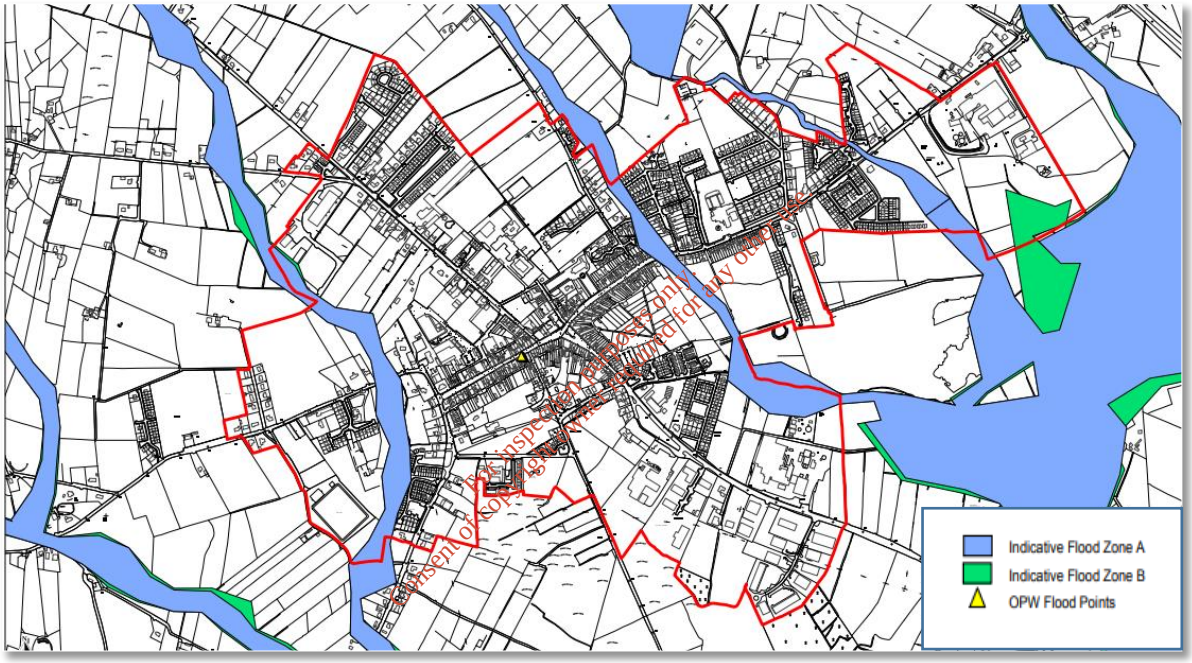


6.2.4 Flooding

According to the Office of Public Works (OPW) flood maps, no flood has been recorded at the subject site since records began. The nearest flood record is close to the town centre at the junction of the N5 and R293 during periods of high intensity rain. From review of local knowledge, flooding is not a major issue in Ballaghaderreen and only occurs after periods of excessively heavy rain and is generally of short duration[11].

Part of the Aurivo site is seen as benefiting land from OPW land drainage works between 1986 and 1990. According to the Ballaghaderreen Local Area Plan 2017-2023 this portion of the site lies in Flood Zone A (Fig 6-7). A copy of this map is also available in Vol III, Appendix 7. The processing area of the facility and the planned extension are in neither Flood Zone A or B. These maps are by design rough estimation of local flood plain based on models and calculations. Local knowledge is of far greater accuracy and it was discussed with operatives on site. There has never been a flood within the boundary of the installation since the plant opened. According to the latest flood mapping data from the Office of Public Works there is no probability of river flooding in the area.

Fig 6-7 Flood Map



[11]https://s3-eu-west.amazonaws.com/floodmaps.floodinfo.ie/Reports/F310%20Data%20Collection/028%20Roscommon%20County%20Council/004%20Minutes%20Verbal%20Report/rcc_mm_ab_0000000599.pdf

6.2.5 Sensitive Receptors

6.2.5.1 Drinking Waters

The Lung River has been classified as Drinking Water River. Water from this river may be used for abstraction of drinking water;

The lung river flows into Lough Gara which is a substantial Drinking Water Lake;

There are 12 abstractions in the Upper Shannon (Boyle) Catchment comprising four public water supplies and five private supplies;

6.2.5.2 Bathing Waters

There are no designated bathing waters in the Upper Shannon (Boyle) catchment.

6.2.5.3 Shellfish Areas

There are no designated shellfish areas in the Upper Shannon (Boyle) catchment.

6.2.5.4 Nutrient Sensitive Areas

There are no designated nutrient sensitive areas in the Upper Shannon (Boyle) catchment.

6.2.5.5 Natura 2000 Sites

There are 16 Natura 2000 (14 SAC and 2 SPA) within the 15km radius of the site location. A total of 19 pNHA and 3 NHA sites also occur within 15km, of these 22 NHAs/pNHAs a total of 13 overlap these SACs and SPAs leaving 9 additional NHA sites that do not overlap the SACs. Reference chapter 4 and Vol III. Appendix 9 for more details of Natura 2000 sites.

6.3 Potential Impacts

The impacts on the local surface and groundwater environment from the existing and proposed development are assessed in this section. The methodology applied here is a qualitative risk assessment methodology in which the probability of an impact occurring and the magnitude of the impact, if it were to occur, are considered.

This approach provides a mechanism for identifying the areas where mitigation measures are required, and for identifying mitigation measures appropriate to the risk presented by the development. This approach also allows effort to be focused on reducing risk where the greatest benefit may result.

The potential impacts of the existing and proposed project are detailed below.

6.3.1 Proposed Development

6.3.1.1 Storm/Surface water

The new extension will be located on existing hard standing (concrete and tar/chip yard) which is drained via the existing drainage network at the facility. The storm drainage associated with the proposed extension has been designed using the Micro Drainage's Windes Drainage design software. The proposed building will increase the impermeable surfaces by 520sqm while the proposed alterations to the car parking will result in an increase to the impermeable yard area of 220sqm. Therefore the total increase to the impermeable yard area is 740sqm.

Assuming a max rainfall intensity of 50mm/hr the additional run-off equates to 0.01l/s. This would be considered a negligible water volume increase and when connected to the existing storm drainage system will not have any impact on the capacity of the system or final receiving River.

All surface water discharges to the Lung River are passing through open channels and the water's quality is regularly tested in accordance with the facilities IE licence P0802. If the mitigation measures and controls as outlined in the EPA licence are not strictly applied to the construction area, there is potential for the storm water lines to become contaminated with soil or construction colloids that would eventually discharge to the River Lung.

6.3.1.2 Process water

The process drainage system associated with the extension has been designed accordance with the specific requirements of the new dryer plant. There will be wastewater for treatment at the wastewater treatment plant, however the quality and characteristics will be similar to that already produced at the existing production plant. The main source of wastewater will be generated from cleaning operations in the dryers, distribution lines, storage silos

and delivery vehicles, called CIP or clean in place. This contaminated water will be diverted to the existing wastewater treatment plant.

Process effluent that is generated from the facility is treated in a purpose built biological wastewater treatment plant located at the rear of the installation. The existing treatment plant has a capacity of 5,000 Kg BOD (Biological Oxygen Demand) per day. The table below outlines the current sources and total existing and proposed volumes of effluent being discharged from the facility.

Table 6-4 Effluent Treatment Capacity

Facility Processes	Existing B.O.D Kgs/day	Proposed/Envisaged B.O.D Kgs/day
Milk Intake	203	254 (25% increase in milk production)
Separation	306	306 (No additional milk separators are proposed as part of the works)
CIP (Clean in place)	596	596 (No change as the proposed dryer will replace the existing an-hydro dryer)
Evaporation	1,050	1,050 (No additional evaporators are proposed as part of the works)
Milk Dryers	21	21 (The proposed dryer will not increase the BOD discharge)
Tanker Wash	27	34 (25% increase in the volume of milk delivered via larger tankers)
Truck Wash	705	881 (Larger tankers and trucks to accommodate the 25% increase)
Total	**2,881 Kgs/Day**	**3,219 Kgs/Day**

As identified in the above table the proposed 3,219 Kgs/Day of BOD is below the maximum capacity of the treatment plant (5,000Kgs/Day). The existing wastewater treatment plant has the capacity to receive and treat the proposed loading, providing treated effluent within the IE licence limits allowable under P0802.

The new building will not contain any welfare facilities therefore there will be no additional foul water discharge.

6.3.1.3 Groundwater

There is no proposal for groundwater use in the proposed development during the construction stage. There will be no discharges to ground from the new process either during the construction or operation stage. Groundwater is currently used at the installation to supplement potable water used in the process. There are no existing discharges to groundwater at the installation.

6.3.2 Existing Development

All storm water emissions are diverted towards the River Lung via the Ballaghaderreen river. Storm water consists of rain water run-off from clean hardstand and non-process areas. Rain water run-off from areas used for the storage of waste or run-off from process areas likely to be contaminated is all collected and diverted to the wastewater treatment plant for processing.

The existing surface water discharges from site are discharged to the Lung River via emission point SW2 and are monitored in accordance with IE licence number P0802-02. The source of water for this emission point is cooling water mixed with condensate from the milk production process. Regularly published Annual Environmental Reports since the site received a licence in 2008 publishes the daily and monthly monitoring results for surface water discharges. The results are in compliance with the licence conditions and emission limit values.

Wastewater from process operations could have the greatest potential impact given the volumes generated daily and its high organic loading that could impact on the River Lung. All contaminated water at the installation is collected and diverted under gravity flow to the existing treatment plant. This plant consists of a two stage biological treatment, two Bio towers followed by an activated sludge stage. The options used within the plant include both chemical and biological treatments.

Potential impacts such as loss of control of the wastewater treatment plant, flooding or contamination of the plant are all potential impacts that are currently addressed via standard procedures under the environmental management system and compliance conditions under the IE licence.

All foul water from the welfare facilities including staff toilets, canteen and changing rooms is discharged via the existing Ballaghaderreen public foul sewer. There is low potential for any impact from this source.

6.4 Mitigation and Monitoring

6.4.1 Construction Phase

The Lung River will be protected from any potential adverse effects from the proposed development by the implementation of robust policies and procedures to cover all potential impacts during construction and operation. A summary of the controls to be introduced are included below;

A Construction Plan is to be generated in line with Inland Fisheries Guidelines on Protection of Fisheries during construction works[12]. It will be compiled before site works begins and will include an overview of environmental requirements of the project;

Environmental responsibilities to form part of contract negotiations;

Site management including environmental responsibilities to be clearly stipulated;

- All contractors to be informed of site rules and requirements in relation to environmental protection measures;
- Structured site layout, completed in line with CIRIA, Good Practice Guidelines;
- Spill trays to be used under all diesel generators if required;
- Spill procedure and kit to be maintained on site;
- Reporting procedures to be put in place;
- Silt traps to prevent sediment getting into drains;
- The extension will cause a negligible increase in rainfall run-off onsite and so will not have any significant impact on the capacity of the systems currently in place.
- All surface waters discharges are stringently monitored to ensure compliance with IE licence conditions.

6.4.2 Operational Phase

The wastewater treatment plant is closely monitored at the installation directly as its manned full time during working hours seven days a week or remotely via in line monitors that alarm to alert management of a potential issue at the plant.

The treatment in the plant is achieved by micro-organism assimilation of food from wastewater, hence producing treated effluent and a sludge by-product. These micro-organisms require oxygen to assimilate the organic matter which is provided mechanical aeration. This process takes place in the Bio towers and aeration tank.

Effluent flows by gravity from all areas of the installation to balance tank no. 1. It is then pumped into balance tank no. 2 as a holding tank if required or pumped directly to balance tank 3 for treatment. A level sensor on balance tank 1 controls the flow into balance tank 2. It then flows from the bottom of balance tank 2 through a throttle pipe to the drain feeding balance tank 3. The level in balance tank 2 is controlled by the throttle valve and the level changes in line with inflow. A level indicator is located in the control room.

In the event of a large spillage within the facility, balance tank 2 is used for holding purposes and its contents are then gradually released back into the treatment system. The 3 no. tanks are aerated to avoid septicity and to keep solids in suspension.

The balance tank capacities are as follows:

- Tank no. 1: 220m^3
- Tank no. 2: 1,200m^3
- Tank no. 3: 400m^3

There is a facility at balance tank 3 to adjust the pH as required so that the effluent been pumped to the bio towers is maintained between 7-10 pH units.

[12]http://www.fisheriesireland.ie/documents/624-guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters/file.html

The effluent is initially pumped from balance tank 3 to the dissolved air flotation unit (DAF). This unit is aerated by means of a small compressor combined with a re-circulation pump and runs continuously to remove fat, before the bio towers, to reduce the organic load to the towers and also reduce the risk of clogging the towers.

There are two bio-towers at the treatment plant. Bio tower no. 1 has a 1,200 m^3 capacity. The effluent is re-circulated over the bio tower from the tower's sump. The sump overflows to the inter-stage tank. The sludge from the inter-stage tank is normally pumped to the forward feed tank, or if necessary to the sludge tank. The overflow from the inter-stage tank goes to the top weirs and flows back to bio-tower no. 2 which has a capacity of 800m^3. The same process occurs in bio-tower no. 2 and overflows to the forward feed sump. From here, the effluent is pumped to the aeration tank.

The aeration tank is 7000m^3 capacity and has six surface aerators. The aerators are automatically controlled based on the dissolved oxygen reading. There is a probe in this tank which measures the oxygen content of the mixed liquor. The contents in the aeration tank are called the mixed liquor. The mixed liquor overflows the aeration tank on the town side. The overflow is then split in two with half going to each of the two clarifiers. The settlement tanks overflow the clarified or treated effluent to their top weirs and water flows by gravity to the outfall monitor. Following this treated effluent which is in compliance with IE licence limits flows by gravity via an underground pipe to the Lung River. The underflow in the settlement tank is sludge which is mainly returned to the aeration tank with similar proportion wasted out for removal from the system.

Aluminium sulphate is dosed automatically to the overflow weir of the aeration tank. This pump operates in conjunction with the forward feed pumps. This causes phosphorous to come out of solution and into the sludge. The sludge settles on the bottom of the settlement tanks and is either pumped back to the aeration tank to maintain the biological activity or wasted out to the sludge tank. The amount wasted is determined by the suspended solids level which should be maintained between 4000 & 9000ppm.

There is a conductivity meter at the outlet monitoring for detection of high solids in the effluent. If high solids are present this automatically triggers the failsafe pumps located just before the monitor. This emergency diversion system pumps the effluent back to balance tank 2 where the effluent is re-circulated through the plant again for further treatment.

Sludge wasted from the two big settlement tanks is pumped to the sludge holding tank. Also sludge wasted from the inter-stage tank goes to either the sludge holding tank or the forward feed sump. The fat from the DAF also goes to the sludge holding tank. These are all fed to the dewatering plant and end up as sludge cake to be transported off site for recycling on agricultural lands in line with an approved nutrient management plan.

As part of the licence requirements a Biological Quality Rating survey was carried in 2018 at both up and downstream of process effluent discharges. Three sites were approved for sampling and analysis. From a combination of sampling the Q rating 3-4 was determined downstream of ADIL and the Ballaghaderreen Sewage Treatment Plant. This recovers to a Q4 at the nearest EPA monitoring station downstream of the installation.

A review of historical performance of the ADIL wastewater treatment plant has it at almost 100% compliance with the requirements of its IE licence limits. There have been occasional and marginal breaches in suspended solids or nutrients on very limited occasions over the last ten years.

The daily output of process water from the new dryer and existing arrangement will be within the capacity of the Waste Water Treatment Plant.

In the event the effluent quality deteriorates at any stage and there is a chance the ELV's as set out by the Industrial Emissions Licence could be breached, the partially treated effluent is diverted by recirculation to balance tank 2. All discharges can be ceased until the performance of the plant is sufficient to treat the effluent to licensed effluent quality standards.

There has been a design upgrade approved by the EPA which will improve the control of any suspended solids which are detected above the ELV. The upgrade turbidity monitoring system will make the controls more robust and eliminates the possibility of non-compliant liquid entering the river.

Between the continuous monitoring systems and plant upgrade works, the installation is mitigating against any risks of pollution to surface waters.

Other mitigation measures incorporated into the design for control of waters during operational phases are detailed below;

- All materials on site are stored as per IE licence requirements and in line with the EPA guidance for Storage and Transfer of Materials for Scheduled Activities;
- All storage areas are and will be appropriately bunded to provide secondary containment;
- These storage areas are and will be certified and integrity tested in line with IE licence requirements;
- All production and process areas from the site entrance to storage areas for raw materials are hardstand to prevent contamination of groundwater in the event of a spill;
- The milk intake and delivery yard is designed as a catchment which discharges to the wastewater treatment plant;
- Storm waters pass through oil and silt interceptors prior to discharge from site;
- Routine monitoring is carried out in the in house environmental laboratory on treatment plant and storm waters giving direct data within hours of sampling;
- If surface water has somehow become contaminated it can be diverted to the treatment plant;
- Procedures are in place for spill notification, management and control of waters on storm water lines;
- Emergency spill kits and emergency response procedures are developed and personnel have been trained in their existence and execution;
- All spent liquid wastes are and will be stored in the dedicated bunded waste stores with regular disposal to ensure there is no large scale bulk storage;
- Spillage materials for localised spills are established inside the facility buildings and outside at areas where spills are more likely to occur;
- Loading and unloading operations are supervised and located on hardstanding ground in the event of spillage;
- The storm water drainage network is fitted with a penstock valve and diversion mechanism to prevent discharge to surface water and collection of material in the event of spillage for treatment at the wwtp;
- The installation operates under an IE licence which is subject to the rigorous controls applied by the EPA;
- The site operates to an environmental management system;
- All technicians are fully trained in operations and activities at the installation and also in Emergency Response procedures, reference copies of procedures attached- Vol III, Appendix 8.0

6.5 Residual Impact

Where the above control measures in relation to water are implemented, the potential residual impact of the project is reduced to negligible.

7.0 Air Quality, Odour and Climate

7.1 Introduction

This chapter considers and assesses potential environmental impact from proposed and existing emissions to atmosphere from what are classified as major emission points at Aurivo Dairy Ingredients Limited (ADIL).

The principal air quality impacts are associated with particulate matter released from the milk powder dryers, flue gas emissions from the boilers and odour from the milk intake area and the wastewater treatment plant.

Receptors which could potentially be affected by reduced ambient air quality as result of process operations are considered in this section of the report.

An air dispersion model was carried out to predict the potential impacts on local air quality from combined operations at the facility. A full copy of the air dispersion model can in reviewed in Vol III, Appendix 4.0 of this report.

Climate change impacts were assessed based on pollutants that could be generated from the proposed new dryer and existing operational phases.

Emissions to air from construction activities were assessed to determine if these would be construed as a potential nuisance during the construction stage of the new dryer.

7.1.1 Methodology

- In order to assess the potential impacts from activities on site the following guidance and reports were assessed:
- EPA “Guidelines on the Information to be contained in Environmental Impact Assessment Reports-Draft, August 2017”;
- EPA “Guidelines on the Information to be contained in Environmental Impact Statements- Draft, September 2015;
- EPA “Advice Notes for Preparing Environmental Impact Statements- Draft, September 2015”;
- Environment, Community and Local Government, “Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment”, March 2013;
- EPA “Air Dispersion Modelling from Industrial Installations Guidance Note, AG4, 2010”;
- Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC);
- Review of all existing / proposed process and combustion emissions from the facility;
- Review of fugitive emissions that could potentially occur from the installation;
- Assessment of historical air emissions monitoring reports;
- Desktop survey of the National and EU legislation;
- Inclusion of an Air Dispersion Model (ADM) for the installation;
- EPA (2016b) Ireland’s Greenhouse Gas Emissions to 2020 – An Update;
- Environment Agency (2003) IPPC H1 - IPPC Environmental Assessment for BAT;
- European Council (2014) (23 and 24 October 2014) Conclusions on 2030 Climate and Energy Policy Framework, SN 79/14 Framework Convention on Climate Change (FCCC) (1997) Kyoto Protocol To The United Nations Framework Convention On Climate Change;
- IPCC (2006) IPCC Guidelines for National GHG Inventories;

The assessment of impact will be based on the EPA guidance;

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects ''Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance* below.).	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it

7.2 Receiving Environment

Aurivo Dairy Ingredients Limited (ADIL) is located in on the Ballaghaderreen to Frenchpark road (L1224), approximately 1km east of Ballaghaderreen town, Co Roscommon.

A review of the surrounding area was undertaken with specific focus on land use and sensitive receptors. A sensitive receptor can be defined as any living thing which can be adversely affected by contaminants and/ or pollution. They may include hospitals, child care facilities, elderly housing, and convalescent facilities. In this context, a review of the most likely sensitive receptors was determined within the catchment of 1km. With respect to the current surrounding areas, the nearest local sensitive receptors were residential dwellings.

At present the land used for the development is zoned 'Industrial Uses' and the company has been in operation at this site since 1972. The proposed extension to the plant of an additional dryer building is all within the existing site boundary.

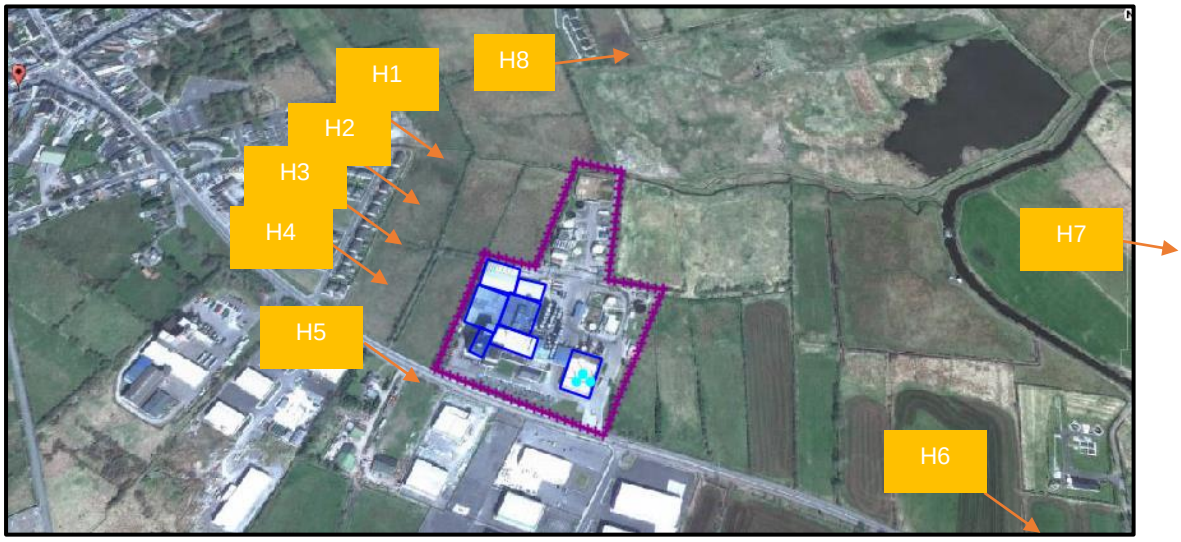
The surrounding properties predominantly consist of agricultural land (open farmland and pastures) as well as residential dwellings and industrial buildings. There are no land designations located on or near the proposed development. The nearest Special Area of Conservation is Tullaghanrock Bog SAC which is approximately 2.6 km north east of the development.

Potential air quality impacts associated with the facility are predicted to be at their most significant closest to the site. However, some impacts could be experienced at lower concentrations moving further away from the installation depending on terrain and dispersion effects. The study area encompassed a 10km radius of the installation and the potential air quality impacts which could arise was demonstrated by an Air Dispersion Model (ADM).

The receptors located closest to the site, those potentially impacted by the emissions are summarised in Figure 7-2:

Fig 7-1: Site Location Map

Fig 7-2: Nearest Sensitive Receptors



7.2.1 Baseline Conditions

The existing baseline conditions in the vicinity of the proposed site were assessed and equate to what the Environmental Protection Agency would consider a Zone D area.

7.2.2 Regional Air Quality

In 1996, the Environment Council adopted the Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management (AAQ&M). The Directive sets a general policy framework for dealing with ambient air quality. Instead of looking first at the sources of the pollution, the Directive looks at the effects of the air pollution on human health and environments, and then shifts the focus to those sources that contribute the most to the effects.

The main objectives of the Air Quality Framework Directive are to set out an EU-wide system for setting binding air quality objectives for specific pollutants to protect human health and environment. It requires Member States to put in place systems for assessing the quality of the ambient air based upon common methods and criteria. It requires Member States to maintain ambient air quality where it is good and improve it in other cases, by means of plans and programmes of action and it lays down provisions for a system of gathering, reporting and publicising information. This includes both data to be reported to the European Commission and information to be disseminated to the public.

The CAFE Directive (2008/50/EC) was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999. The 4th Daughter Directive was transposed by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. No. 58 of 2009). The limit values set out in the CAFE Directive for Particulates, Sulphur Dioxide, Nitrogen Dioxide, Oxides of Nitrogen and Carbon Dioxide are as follows in Table 7-1 below:

Table 7-1: AQS from CAFÉ Directive

Pollutant	Limit Value Objective	Averaging Period	Limit Value ug/m^3	Limit Value ppb	Basis of Application of the Limit Value	Proposed Development Impact
SO_2	Protection of human health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	No Impact
SO_2	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	
SO_2	Protection of vegetation	Calendar year	20	7.5	Annual mean	
SO_2	Protection of vegetation	1 Oct to 31 Mar	20	7.5	Winter mean	
NO_2	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	No Impact
NO_2	Protection of human health	Calendar year	40	21	Annual mean	
NO + NO_2	Protection of ecosystems	Calendar year	30	16	Annual mean	
PM_{10}	Protection of human health	24 hours	50		Not to be exceeded more than 35 times in a calendar year	No Impact
PM_{10}	Protection of human health	Calendar year	40	-	Annual mean	
$PM_{2.5}$ - Stage 1	Protection of human health	Calendar year	25	-	Annual mean	
$PM_{2.5}$ - Stage 2	Protection of human health	Calendar year	20	-	Annual mean	
Carbon Monoxide	Protection of human health	8 hours	10,000	8620	Not to be exceeded	No Impact

The Directive deals with each EU member state in terms of "Zones" and "Agglomerations". For Ireland, four zones are defined in the Air Quality Regulations (2002), amended by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations (2009).

The EPA have divided the country into zones for assessment and management of air quality. Zone A is the Dublin conurbation; Zone B is the Cork conurbation with Zone C comprising 23 large towns in Ireland with a population >15,000. Zone D is the remaining area of Ireland.

The ADIL site is located in Air Quality Index for Health (AQIH) Region Zone D which is classed as a zone with good air quality. There are no permanent monitoring stations located within or close to the ADIL from EPA records.

Fig 7-3: 2016 Air Quality Results for Zone D

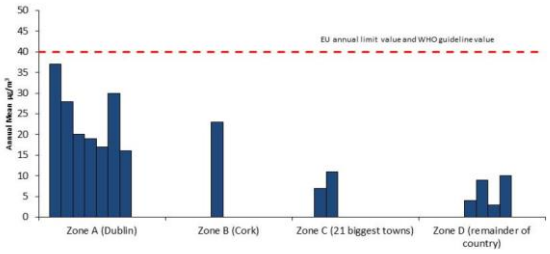


Figure 2.1 Annual mean NO_2 concentrations at individual monitoring stations in 2016

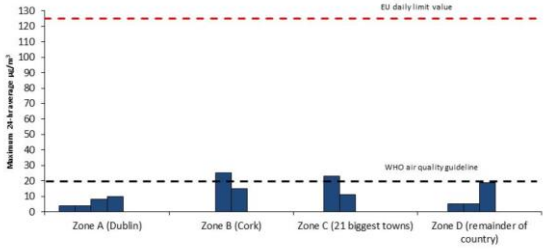


Figure 2.2 Daily maximum concentrations for SO_2 at individual monitoring stations in 2016

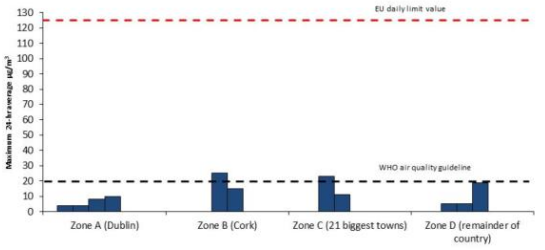


Figure 2.2 Daily maximum concentrations for SO_2 at individual monitoring stations in 2016

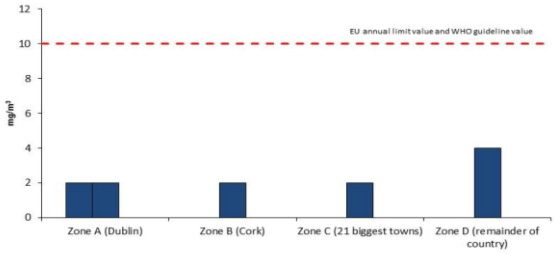


Figure 2.3 Max 8-hour mean CO Concentrations at individual stations in 2016

Source: EPA Air Quality in Ireland 2016

The EPA manages the National Ambient Air Quality Network and routinely monitors ambient air quality at approximately 33 locations in Ireland. The data is collected and collated for publication in the Annual Air Quality Reports.

The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold.

There has been appropriate Zone D data collected on an annual basis which is used for this assessment from Emo, Castlebar, Kilkitt, Shannon, Claremorris and Enniscorthy air monitoring stations. The results have been summarised in Table 7-2 and was used as a baseline concentration for determining the proposed impact on the local environment from activities at ADIL.

Table 7-2 EPA Background Data for Zone D

Annual Mean	NO_x as NO_2 $\mu g/m^3$	SO_2 $\mu g/m^3$	CO $\mu g/m^3$	PM_{10} $\mu g/m^3$
Emo Laois	3	-	-	-
Castlebar	8	-	-	13
Kilkitt	2	2	-	9
Shannon Estuary	-	2	-	-
Claremorris	-	-	-	10
Enniscorthy	9	2	500	18
Average	**5.5**	**2**	**500**	**12.5**
2 times Annual Mean	**11**	**4**	**-**	**-**

Source: Data obtained from EPA Air Quality in Ireland

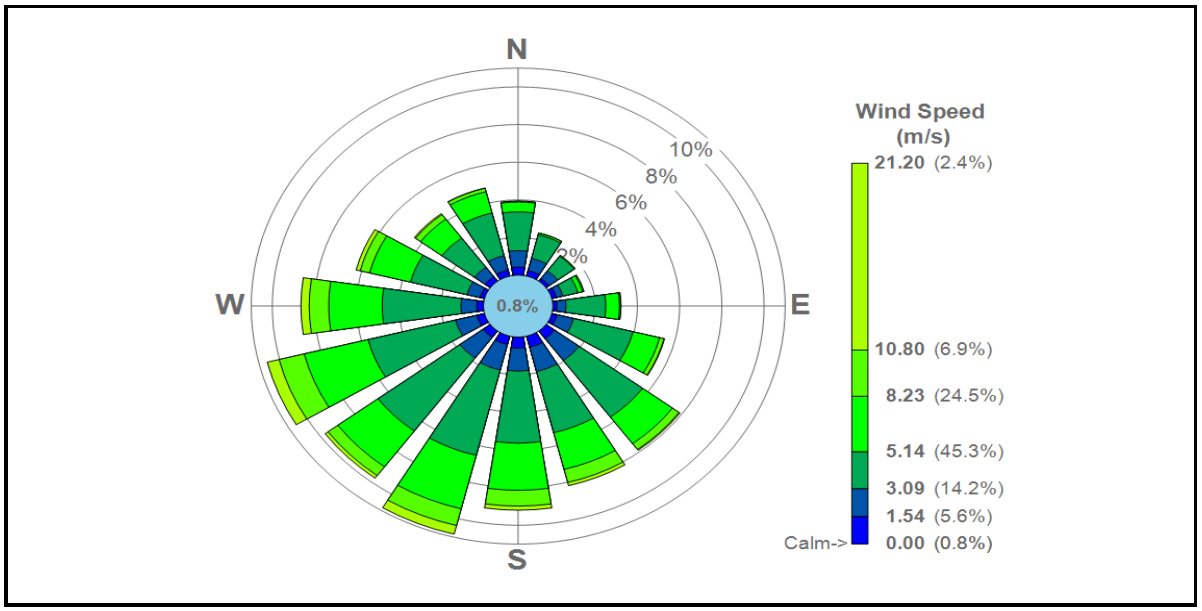
7.2.3 Meteorological Data

Meteorological and terrain effects were included as part of the modelling analysis, and the meteorological data set was defined using wind speed and direction. Wind speed and wind direction in particular are important in determining how emissions associated with the activity are dispersed. The prevailing wind direction determines which areas are most significantly affected by the emissions from the activity and wind speed determines in part the effectiveness of the dispersion.

The closest met station to ADIL was Knock Airport Met Station, Co Mayo. Three years of data was obtained from 2014 – 2016 for this location. The met station is located approximately 15km west of the installation in very similar terrain.

The wind rose used in the air dispersion model indicate that the wind direction is from the south west quadrant. Three years of met data was used in the model to predict ground level concentrations. The volume, timeframe and quality of data complied with specific criteria outlined in AG4, the EPA guidance note *Air Dispersion Modelling from Industrial Installations Guidance Note, 2010*.

Fig 7-4: Wind Rose for Met Data



There are two types of meteorological files used in the ADM model, a file containing surface scalar parameters and a file containing vertical profiles. Both data filters for the surface and mixing heights were used to generate the meteorological files required by the AERMOD dispersion model, using the AERMET meteorological pre-processor programme. This AERMET programme has three stages to process the data. The first stage extracts met data and assesses data quality through a series of quality assessment checks. The second stage merges all data available for 24 hour periods and writes these data together in a single intermediate file. The third and final stage reads the merged met data and estimates the necessary boundary layer parameters for dispersion calculations by AERMOD.

The AERMOD model used hourly surface data values for wind speed, wind direction, temperature, rainfall, relative humidity, pressure, cloud cover, ceiling height and solar radiation and at least once daily mixing height data.

7.2.4 Climate

Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in 1997 (Framework Convention on Climate Change, 1999 and Framework Convention on Climate Change, 1997). For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six GHGs under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012. The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties (COP22) to the agreement was convened in Marrakesh, Morocco in December 2016. Prior to this COP21 was held in Paris, France in December 2015. COP21 was an important milestone in terms of international climate change agreements. The "Paris Agreement", agreed by over 200 nations, has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatons as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made on elevating adaption onto the same level as action to cut and curb emissions.

The EU, on the 23/24th of October 2014, agreed the "2030 Climate and Energy Policy Framework" (EC, 2014). The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under "Renewables and Energy Efficiency", an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_X), Volatile Organic Compounds (VOCs) and Ammonia (NH_3). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42 kt for SO_2 (67% below 2001 levels), 65 kt for NO_X (52% reduction), 55 kt for VOCs (37% reduction) and 116 kt for NH_3 (6% reduction). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for $PM_{2.5}$. In relation to Ireland, 2020 emission targets are 25 kt for SO_2 (65% on 2005 levels), 65 kt for NO_X (49% reduction on 2005 levels), 43 kt for VOCs (25% reduction on 2005 levels), 108 kt for NH_3 (1% reduction on 2005 levels) and 10 kt for $PM_{2.5}$ (18% reduction on 2005 levels).

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005. Data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO_2, VOCs and NH_3 but failed to comply with the ceiling for NO_X. Directive (EU) 2016/2284 "On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC" was published in December 2016. The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3 and $PM_{2.5}$. In relation to Ireland, 2020-29 emission targets are for SO_2 (65% below 2005 levels), for NO_X (49% reduction), for VOCs (25% reduction), for NH_3 (1% reduction) and for $PM_{2.5}$ (18% reduction). In relation to 2030, Ireland's emission targets are for SO_2 (85% below 2005 levels), for NO_X (69% reduction), for VOCs (32% reduction), for NH_3 (5% reduction) and for $PM_{2.5}$ (41% reduction).

7.3 Potential Impacts

7.3.1 Construction Phase

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50 metres. The closest sensitive receptor to the building area is approximately 100m therefore is outside the general radius for nuisance dust. Given the procedures and action plans in place during the construction phase, dust emissions from construction would be limited.

In terms of climate change, the impacts would be limited to transportation vehicles delivering construction materials to the proposed site and construction vehicles operational during the construction phase. These would be insignificant impacts in terms of other local or national emissions.

7.3.2 Risk of Accidents

There is a low risk of accidents at this site due to the level of control applied and management procedures in place. In the event of major fire at the installation there is potential for emissions of CO_2, NO_x and combustion gases to atmosphere. There is a low risk of disaster, including those caused by climate change. The site has been reviewed against the requirements stipulated under the Control of Major Accident Hazards and was determined to be sub-threshold.

7.3.3 Emission Points

The installation was assessed for existing and proposed sources that would emit potentially polluting material to atmosphere.

ADIL currently has two licenced boiler emission points at the facility. It is proposed to reintroduce a previously licenced auxiliary boiler to the installation called A1-3 which will operate on heavy fuel oil (HFO). This boiler would only be required to operate if one of the 2 main boilers was not available (i.e. breakdown, maintenance, servicing, etc.).

There are currently three licensed dryers A2-1, A2-2 and A2-3 at the installation. A2-2 has a limitation applied, that it will not operate without prior agreement of the Agency.

There are two additional emission points requested as part of the extension project including:

A new spray dryer (A2-4) with a designated integrated liquid natural gas (LNG) burner (A1-4).

Fig 7-5: Emission Point Locations

The location of each existing and proposed major point source is located in Fig 7-5. The emissions from A1-1, A1-2, A1-3 and A1-4 are combustion related pollutants. A2-1, A2-3 and A2-4 are process emission points releasing particulates in the form of milk powder.

Each emission point was modelled at proposed maximum emissions to determine the local impact of such emissions and the potential air quality impacts benchmarked against Air Quality Standards (AQS) where applicable and guidelines derived from the EPA Guidance Note AG4.

There would also be emissions of greenhouse gases in the form of carbon dioxide to atmosphere during the operational phase of this development via the combustion processes at the installation. AIDL would also generate greenhouse gases indirectly due to electricity and transport requirements.

7.3.4 Air Dispersion Model

The assessment methodology for the air dispersion modelling exercise followed the guidance specified by the Environmental Protection Agency, *AG4, Air Dispersion Modelling from Industrial Installations Guidance Note, 2010*.

The model of selection was Breeze AERMOD/ISC which is designed to estimate pollutant concentrations and deposition from an industrial source complex. The latest version of AERMOD with the most current version of the AERMOD terrain pre-processor (AERMAP) was used on this assessment.

The effects of the ADIL are described by considering the possible impacts that could occur as a result of proposed and existing licensed activities at the facility. Five existing and two proposed emission points at the installation were evaluated in terms of elevation and proximity to nearby structures. All buildings located reasonably close (<100 metres) to the point sources on the property were included in the modelling analysis to account for building downwash.

The purpose of building downwash evaluation was to determine if stack discharges may become caught in the turbulent wakes generated by these structures. AERMOD incorporates the Plume Rise Model Enhancements (PRIME) algorithms for estimating enhanced plume growth and restricted plume rise for plumes affected by building wakes.

Direction specific structure dimensions and the dominant downwash structure parameters used as input to AERMOD were determined using the BREEZE®BPIPP software, developed by Trinity Consultants, Inc. The software incorporates the algorithms of the U.S. EPS's sanctioned SPIP PRIME (BPIPP). The software creates downwash input cards that were used in AERMOD.

Ground level concentrations were calculated for receptors covering an area that extends 10km from all edges of the boundary line. Sensitive receptor locations were positioned at local private residence's closest to the installation boundary.

The terrain elevation for each modelled building, source and receptor was determined using Digital Terrain Model (DTM) Data from the Ordinance Survey of Ireland (OSI). The terrain height for each modelled source, building and receptor was calculated using the AERMOD terrain pre-processor AERMAP. AERMAP computes the terrain height from the digital terrain elevations surrounding the modelled receptors, sources and buildings. It also computed the hill height scale required for the receptors.

7.3.5 Impact Assessment Criteria

The assessment of air quality has been carried out in accordance with the following guidance and has been applied to this proposed installation based on professional judgement and local conditions:

- EPA "Guidelines on the Information to be contained in Environmental Impact Assessment Reports-Draft, August 2017";
- EPA "Guidelines on the Information to be contained in Environmental Impact Statements- Draft, September 2015;
- EPA "Advice Notes for Preparing Environmental Impact Statements- Draft, September 2015";
- Environment, Community and Local Government, "Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment", March 2013;
- EPA "Air Dispersion Modelling from Industrial Installations Guidance Note, AG4, 2010";
- Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC)**;**
- The Air Quality Standards currently applicable in Ireland are specified in EU 2008/50/EC, Clean air for Europe (CAFÉ) Directive as summarised in Table 7-1.

The air dispersion model assessed existing and proposed maximum emissions from the facility under worst case meteorological conditions, to predict worst case ground level concentrations in the vicinity of the plant.

7.3.6 Proposed Emissions from Site

There are five existing and two proposed emission points to atmosphere from the installation which will be applied for and controlled under an EPA Industrial Emission Licence. The emission points will have specified maximum concentration and mass emission limits for what can be emitted from the installation. As per the EPA policy on air emissions monitoring issued in March 2012, air emissions will require to be tested independently by an ISO 17025 accredited organization. The policy requires that Standard European (EN) methods are used, tested by certified equipment, with analysis carried out by competent personnel and where required further analysis carried out in an accredited test laboratory.

Table 7-3 Summary of Emission Points

Source ID	Type	Description	X Co-ord. m	Y Co-ord. m	Elevation metres	Height metres
A1-1	Point Source	HFO Main Boiler	162760	294375	67.72	28
A1-2	Point Source	Biomass Boiler	162767	394403	68.53	28
A1-3	Point Source	HFO Standby Boiler	162756	294389	68.06	28
A1-4	Point Source	New LNG Burner	162605	294415	77.19	36
A2-1	Point Source	Niro Dryer	162626	294445	77.59	30
A2-3	Point Source	Anhydro Dryer	162632	294430	76.55	34
A2-4	Point Source	New Dryer	162611	294411	75.09	36

Two of the three process emission points will be abated via individual baghouse filtration systems. The third dryer is fitted with a cyclone filtration system. These would be considered major emissions points for the site and would be licensed by the Industrial Emissions Licence issued by the EPA. The biomass boiler is fitted with both cyclone filter for primary removal of particulate matter prior to secondary treatment by a baghouse filter.

There will be three types of fuel used on site including:

- Biomass (Wood Chip);
- Heavy Fuel oil (HFO);
- Liquefied Natural Gas (LNG).

The concentration of fugitive emissions from the proposed installation would not be significant. The existing site operates within the confines of the Industrial Emissions Directive and has maintained its fugitive emissions from the installation well below any legal requirements. This methodology will be carried forward to include the extension whereby all materials that have a potential environmental impact are delivered, managed, used and stored in line with legislative requirements under observation by the EPA.

There is minimal odour potential from the facility. This has been confirmed by assessing the existing ADIL operations and reviewing results of odour assessments carried out both on and off site on a daily basis. These assessments have been carried out both independently and by in house personnel. For these reasons, ADIL will not generate any significant odours that would be a considered a nuisance in the local community.

Greenhouse gases emitted from the site would be insignificant in the context of Ireland's national greenhouse gas emissions. The main emissions of CO_2 are via the boiler emissions which are monitored and reported on to the EPA on an annual basis. ADIL is licenced by the EPA under the Greenhouse Gas Emissions scheme and hold a valid permit for the emissions from site. The sites emissions of CO_2 are less than 0.03% of the total CO_2 emissions for Ireland.

7.3.7 Predicted Impacts

The existing and proposed management controls for Particulate Matter at the site include installation, and operation of baghouse filtration systems and cyclone filters on major process emission points.

A summary of the proposed emissions points, their respective pollutants, emission limit values and proposed abatement methodology are included in Table 7-4.

Table 7-4 Summary of Emissions

Parameter	Units	A1-1 Main Boiler	A1-2 Biomass Boiler	A1-3 Auxiliary Boiler	A1-4 Burner	A2-1 Spray Dryer	A2-3 Spray Dryer	A2-4 Spray Dryer
Co-Ordinates	-	162760E, 294375N	162767E, 294403N	162756E, 294389N	162605E, 294415N	162726E, 294445N	162632E, 294430N	162611E, 294411N
Carbon Monoxide	mg/m^3	-	20,000	-	-	-	-	-
Oxides of Nitrogen	mg/m^3	1,000	600	1000	200	-	-	-
Sulphur Dioxide	mg/m^3	1,700	700	1,700	-	-	-	-
PM_{10}	-	-	50	-	-	30	12	6
Exit flow rate	Nm^3/hr	30,000	23,100	18,000	8,000	179,325	150,000	135,000
Abatement	-	N/a	Cyclone / Bag Filter	N/a	N/a	Cyclone	Bag Filter	Bag Filter

The assumption in compiling an air dispersion model is that the emission points will operate continuously for 24 hours per day at maximum permitted emissions, 365 days per year. In practice this would not occur as the emissions will be required to operate well below the emission limit value and volumetric load, therefore the mass emissions would be well below those mass emissions modelled. The site will not be operational 24/7/365, therefore the conditions modelled are depicting a worst-case scenario for this proposed site. This will result in worst case ground level concentrations to be predicted by the model in the surrounding environment.

The site layout was obtained from proposed drawings submitted as part of the recent planning application. Topographical information was obtained from the Ordnance Survey of Ireland.

The averaging intervals chosen were 1 hour, 8 hour, 24 hour and annual average ground level concentrations where applicable for assessment against the Air Quality Standard outlined for any of the pollutants to be emitted from site.

Ground level concentrations were calculated for receptors covering a region that extends 10km from all edges of the boundary line. As per the guidance note, receptors inside the site boundary would not be assessed in the model. Sensitive receptor locations were located at eight local private residences' closest to the installation boundary.

Fig 7.6: Property Boundary

The property boundary line is a discrete receptor grid with receptors spaced at 10m intervals along the property line. All receptors inside the property line were removed from the model run in line with AG4;

- The inner grid contains 100 m resolution spaced receptors extending to 1,000 m from the property line;
- The middle grid contains 500 m resolution spaced receptors extending to 5,000m from the property line;
- The outer grid contains 1000 m resolution spaced receptors extending to 10,000m from the property line.

The sensitive receptor locations for which data was given is summarised below:

Table 7-5 Sensitive Receptor Grid Reference

House	UTM East	UTM North
House 1	528111.1	5972322.9
House 2	528140.3	5972376.3
House 3	528167.9	5972436.6
House 4	528193.7	5972483.1
House 5	528157.6	5972217.9
House 6	528992.7	5971873.5
House 7	529415.8	5972369.0
House 8	528422.4	5972611.6

7.3.8 Assessment of Impact Effects

There would be variable concentrations and compounds that would be emitted as part of normal operations at the installation (dust and combustion flue gases). The individual and combined emissions are required to be monitored on a routine basis by independent accredited contractors under requirement of the Industrial Emissions licence registered to the company.

The range of effects to human health and the local environment differs, with each compound having its own specific risk.

Particulate matter

The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometres in diameter pose the greatest problems, because they can penetrate into the lungs, and some may even enter the bloodstream. Exposure to such particles can affect the lungs and heart. Particle pollution exposure has been linked to a variety of problems, including:

- premature death in people with heart or lung disease;
- nonfatal heart attacks;
- irregular heartbeat;
- aggravated asthma;
- decreased lung function;
- Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

Particles can be carried over long distances by wind and then settle on ground or water. Depending on their chemical composition, the effects of this settling may include:

- making lakes and streams acidic;
- changing the nutrient balance in coastal waters and large river basins;
- depleting the nutrients in soil;
- damaging sensitive forests and farm crops;
- affecting the diversity of ecosystems;
- Contributing to acid rain effects.

In order to minimise the impact of particulate matter on the local environment, limits have been set out in the EU Directive 2008/50/EC, also known as the CAFÉ Directive. The limits for particulate matter in the form of PM_{10} are to ensure 24 hour average concentrations do not exceed 50 ug/m^3 on more than 35 occasions in any one year, or an annual average of 40 ug/m^3. From 2020, a limit of 20 ug/m^3 for an annual average for particulate matter less than 2.5 microns will be implemented, a reduction from the current limit of 25 ug/m^3.

Oxides of Nitrogen (NOx)

NOx mainly impacts on respiratory conditions causing inflammation of the airways at high levels. Long term exposure can decrease lung function, increase the risk of respiratory conditions and increases the response to allergens. NOx also contributes to the formation of fine particles (PM) and ground level ozone, both of which are associated with adverse health effects.

High levels of NOx can have a negative effect on vegetation, including leaf damage and reduced growth. It can make vegetation more susceptible to disease and frost damage. NOx also reacts with other pollutants in the presence of sunlight to form ozone which can damage vegetation at high concentrations.

The limit value objective for the protection of vegetation is 30 µg/m^3 measured as an annual average. The values applied in the CAFÉ Directive for protection of human health are 40 µg/m^3 for a calendar year average and 200 µg/m^3 is not to be exceeded in any one hour period on more than 18 times in a calendar year.

Sulphur Dioxide (SO_2)

Sulphur dioxide irritates the skin and mucous membranes of the eyes, nose, throat, and lungs. High concentrations of SO_2 can cause inflammation and irritation of the respiratory system, especially during heavy physical activity. The resulting symptoms can include pain when taking a deep breath, coughing, throat irritation, and breathing difficulties. High concentrations of SO_2 can affect lung function, worsen asthma attacks, and worsen existing heart disease in sensitive groups. This gas can also react with other chemicals in the air and change to a small particle that can get into the lungs and cause similar health effects. The following table summarises the limits applied under the CAFÉ Directive for protection of human health and the environment.

Table 7-6 Sulphur Dioxide Limits

Pollutant	Limit Value Objective	Averaging Period	Limit Value ug/m3	Basis of Application of the Limit Value
Sulphur Dioxide	Protection of human health	1 hour	350	Not to be exceeded more than 24 times in a calendar year
	Protection of human health	24 hours	125	Not to be exceeded more than 3 times in a calendar year
	Protection of vegetation	calendar year	20	Annual mean

Carbon Monoxide

Carbon monoxide affects healthy and unhealthy people. Increased levels of carbon monoxide reduce the amount of oxygen carried by haemoglobin around the body in red blood cells. The result is that vital organs, such as the brain, nervous tissues and the heart, do not receive enough oxygen to work properly.

For healthy people, the most likely impact of a small increase in the level of carbon monoxide is that they will have trouble concentrating. Some people's coordination is affected, and they get tired more easily.

People with heart problems are likely to suffer from more frequent and longer angina attacks, and would be at greater risk of heart attack. Children and unborn babies are particularly at risk because they are smaller and their bodies are still growing and developing.

The levels of carbon monoxide in the general environment is low at approximately 500 - 2000 ug/m^3 in Zone D areas. The CAFÉ Directive has a limit applied of 10,000 µg/m^3 which is not to be exceeded in any 8 hour period for the protection of human health.

Model Exercise

With the various sources and pollutants identified, a model domain established of 10km from the site boundary and centred in the middle of the proposed facility, the necessary input files created, model predictions were made for the emissions for averaging periods of 1 hour, 8 hour, 24 hour and annual average for each appropriate parameter.

Model impacts were assessed for point sources alone and combined with EPA ambient air quality data published under the national ambient air quality monitoring programme for a predicted environmental concentration.

The following assumptions were made in the air dispersion model:

- The site is in operation 24 hours per day, 365 days per year;
- The point sources are emitting continuously and consistently at maximum proposed emission limit values;
- 3 years of met data have been used from the closest met station which is representative of met conditions at this site;
- The maximum ground level concentration for the appropriate reporting value was recorded outside the boundary of the facility;

7.3.9 Particulate Air Dispersion Model Results

The predicted ground level concentrations for particulate matter in the form of PM_{10} resulting from the proposed activity, combined with background concentrations are summarised in Table 7-7 alongside the relevant Annual Average Air Quality Standard.

A summary of the predicted GLC at each of the eight nearest sensitive locations has been included in Table 7-8. Fig 7-7 is a graphical representation of the dispersion data for the model run. The isopleth is a line on a map connecting points having equal values, in this case showing the concentration of PM_{10}'s dispersion trend.

Table 7-7: Annual Average

Receptors	Year	Model Result	Background	Cumulative	Limit	Compliant
		Process Contribution (PC)	Average of Annual Mean for Zone D EPA monitoring stations	Predicted Environmental Concentration (PEC)	The limit for PM_{10} under 2008/50/EC for an annual mean	
		ug.m^{-3}	ug.m^{-3}	ug.m^{-3}		
Annual Average 1st High 528275.5, 5972326.2	2014 - 2016	7.25	12.5	19.75	40	Compliant

Fig 7-7: Annual Contour Plot Process Contribution

Contours (ug/m^3)

	5		4		3		2	1

Table 7-8: Sensitive Receptor Results

House	UTM East	UTM North	PM_{10} µg/m³	CAFÉ Directive Limit
House 1	528111.1	5972322.9	1.06	40
House 2	528140.3	5972376.3	1.18	
House 3	528167.9	5972436.6	1.47	
House 4	528193.7	5972483.1	1.44	
House 5	528157.6	5972217.9	0.27	
House 6	528992.7	5971873.5	0.40	
House 7	529415.8	5972369.0	0.40	
House 8	528422.4	5972611.6	1.16	

The data presented in Tables 7-7 and 7-8 demonstrates that the proposed maximum emissions from the installation would not cause air quality standards to be exceeded.

Using the EPA's conservative approach of comparing the ground level concentrations against the CAFÉ Directive limits, the highest annual average result outside the boundary of the installation is approximately 18.8% of the defined limit.

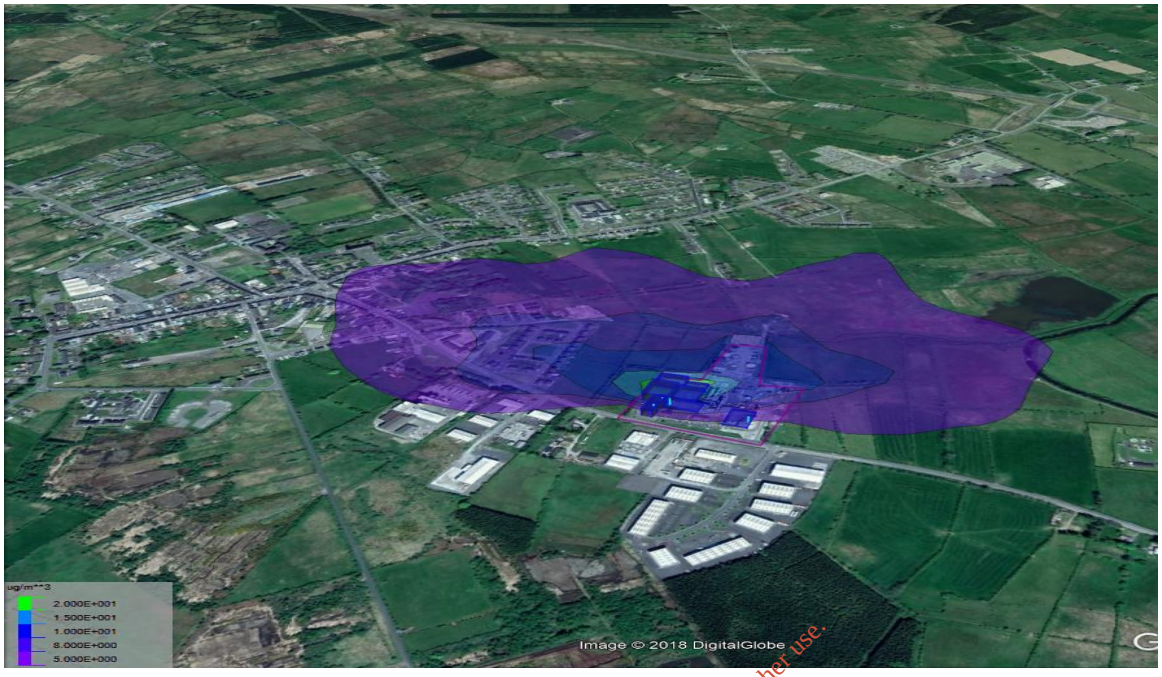
7.3.10 Particulate 24-hour Air Dispersion Model Results

A model run was also carried out for the short term (24 hour) ground level concentrations that could potentially result from the installation during worst case scenarios. The worst case scenario from this model prediction was that approximately 60% of the allowable limit could be consumed by the proposed emissions from site.

Table 7-9: 24 Hour Results

Receptors	**Year**	**Model Result**	**Background**	**Cumulative**	**Limit**	**Compliant**
		Process Contribution (PC)	**Average of Annual Mean for Zone D EPA monitoring stations**	**Predicted Environmental Concentration (PEC)**	The limit for PM_{10} under 2008/50/EC for a 24 hour 90.4th %ile	
		ug.m^{-3}	ug.m^{-3}	ug.m^{-3}		
24 hours 36th High 528271.6, 5972317.0	2014 - 2016	29.54	12.5	42.04	50	Compliant

Fig 7-8: 24 Hour Contour Plot Process Contribution



Contours (ug/m^3)

	20		18		15		10	5

Table 7-10: Sensitive Receptor Results

House	UTM East	UTM North	PM_{10} µg/m^3	CAFÉ Directive Limit
House 1	528111.1	5972322.9	9.38	50
House 2	528140.3	5972376.3	9.72	
House 3	528167.9	5972436.6	10.63	
House 4	528193.7	5972483.1	9.04	
House 5	528157.6	5972217.9	2.02	
House 6	528992.7	5971873.5	2.41	
House 7	529415.8	5972369	1.93	
House 8	528422.4	5972611.6	6.15	

7.3.11 Oxides of Nitrogen Air Dispersion Model Results

The predicted ground level concentrations for NOx in the form of NO_2 resulting from the activity, combined with background concentrations are summarised in Table 7-11 alongside the relevant Air Quality Standard.

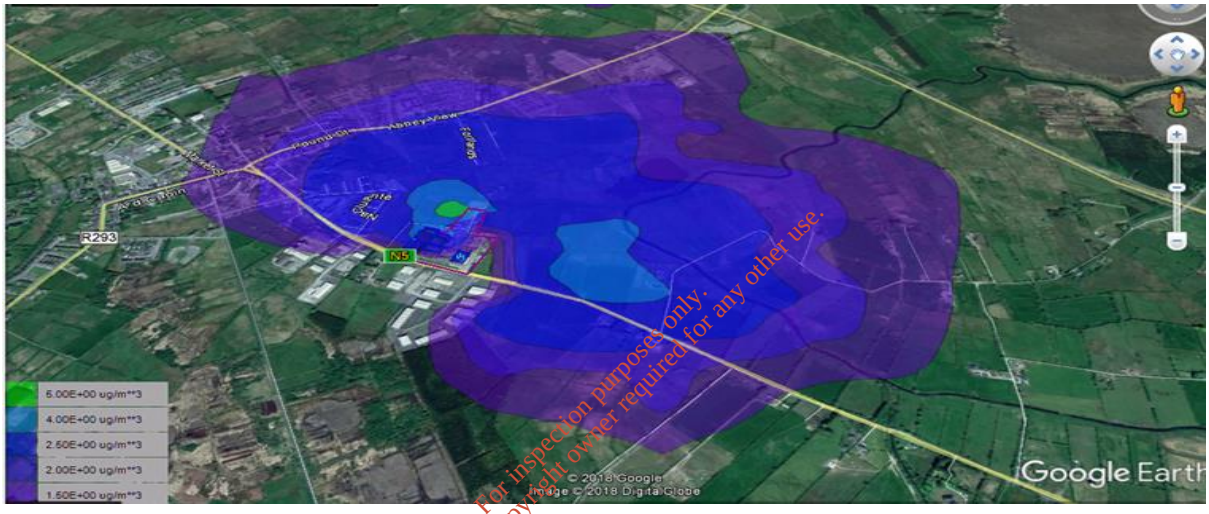
There were two different scenarios modelled in the air dispersion report, as the site has different modes of operation for the boilers. Taking the worst case scenario from the model runs, there was no stage where emissions from site were deemed to exceed limits applied by the CAFÉ Directive.

A summary of the predicted GLC at each of the eight nearest sensitive locations has been included in Table 7-12. Fig 7-9 is a graphical representation of the dispersion data for the model run.

Table 7-11: NO_2 Highest Annual Average

Receptors	Year	Model Result	Background	Cumulative	Limit	Compliant
		Process Contribution (PC)	Average of Annual Mean for Zone D EPA monitoring stations	Predicted Environmental Concentration (PEC)	The limit for Nitrogen Dioxide under 2008/50/EC for an annual limit	
		ug.m^{-3}	ug.m^{-3}	ug.m^{-3}		
Annual 1st High Result 528275.5, 5972326.2	2014 - 2016	7.82	5.5	13.32	40	Compliant

Fig 7-9: Annual Contour Plot Process Contribution



Contours (ug/m^3)

5	4	2.5	1	0.5

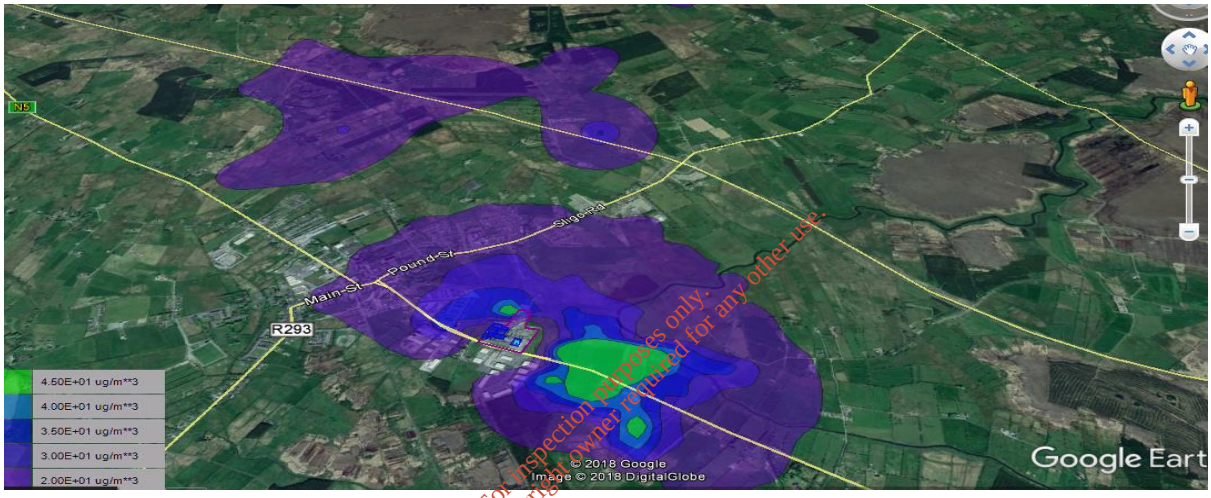
Table 7-12: Sensitive Receptor Results

House	UTM East	UTM North	NO_2 µg/m^3	Limit
House 1	528111.1	5972322.9	2.50	40
House 2	528140.3	5972376.3	2.75	
House 3	528167.9	5972436.6	3.89	
House 4	528193.7	5972483.1	4.08	
House 5	528157.6	5972217.9	1.06	
House 6	528992.7	5971873.5	2.58	
House 7	529415.8	5972369	2.18	
House 8	528422.4	5972611.6	3.89	

Table 7-13: NO_2 1 Hour Average

Receptors	Year	Model Result	Background	Cumulative	Limit	Compliant
		Process Contribution (PC)	Average of Annual Mean for Zone D EPA monitoring stations	Predicted Environmental Concentration (PEC)	The limit for Nitrogen Dioxide under 2008/50/EC for an hourly limit	
		ug.m^{-3}	ug.m^{-3}	ug.m^{-3}		
1 hour 1st High Result 528758.6, 5972162.3	2014 - 2016	78.04	11	89.04	200	Compliant

Fig 7-10: 1-Hour Contour Plot Process Contribution



Contours (ug/m^3)

45	40	35	30	20

Table 7-14: Sensitive Receptor Results

House	UTM East	UTM North	NO_2 µg/m^3	Limit
House 1	528111.1	5972322.9	37.00	200
House 2	528140.3	5972376.3	32.77	
House 3	528167.9	5972436.6	40.62	
House 4	528193.7	5972483.1	38.82	
House 5	528157.6	5972217.9	23.19	
House 6	528992.7	5971873.5	38.89	
House 7	529415.8	5972369	22.55	
House 8	528422.4	5972611.6	35.09	

7.3.12 Sulphur Dioxide Air Dispersion Model Results

The predicted ground level concentrations for SOx in the form of SO_2 resulting from the activity, combined with background concentrations are summarised in Table 7-15 alongside the relevant Air Quality Standard. There are three different AQS in the CAFÉ Directive for SO_2, an annual average, a daily average and an hourly average. There were two different scenarios modelled in the air dispersion report, as the site has different modes of operation for the boilers. Taking the worst case scenario from the model runs, there was no stage where emissions from site were deemed to exceed limits applied by the CAFÉ Directive.

Table 7-15: SO_2 Annual Average

Receptors	Year	Model Result	Background	Cumulative	Limit	Compliant
		Process Contribution (PC)	Average of Annual Mean for Zone D EPA monitoring stations	Predicted Environmental Concentration (PEC)	The limit for SO_2 under 2008/50/EC for an annual limit	
		ug.m^{-3}	ug.m^{-3}	ug.m^{-3}		
Annual 1st High Result 528358.6, 5972462.3	2014 - 2016	8.65	2	10.65	20	Compliant

Fig 7-11: Annual Average Contour Plot Process Contribution

Contours (ug/m^3)

8	7	6	5	3

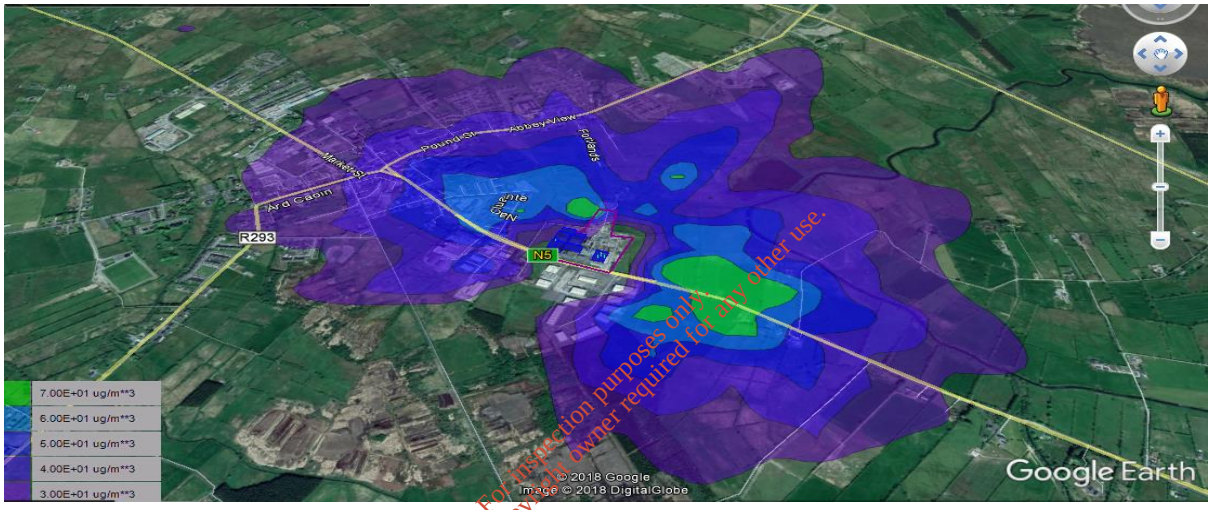
Table 7-16: Sensitive Receptor Results

House	UTM East	UTM North	SO_2 µg/m^3	Limit
House 1	528111.1	5972322.9	3.13	20
House 2	528140.3	5972376.3	3.19	
House 3	528167.9	5972436.6	4.63	
House 4	528193.7	5972483.1	5.07	
House 5	528157.6	5972217.9	1.65	
House 6	528992.7	5971873.5	4.09	
House 7	529415.8	5972369	3.47	
House 8	528422.4	5972611.6	5.26	

Table 7-17: SO_2 24-Hour Average

Receptors	Year	Model Result	Background	Cumulative	Limit	Compliant
		Process Contribution (PC)	Average of Annual Mean for Zone D EPA monitoring stations	Predicted Environmental Concentration (PEC)	The limit for SO_2 under 2008/50/EC for an annual limit	
		ug.m^{-3}	ug.m^{-3}	ug.m^{-3}		
24 Hour 4th High Result 528358.6, 5972358.6	2014 - 2016	98.46	4	102.46	125	Compliant

Fig 7-12: 24-Hour Average Contour Plot Process Contribution



Contours (ug/m^3)

70	60	50	40	30

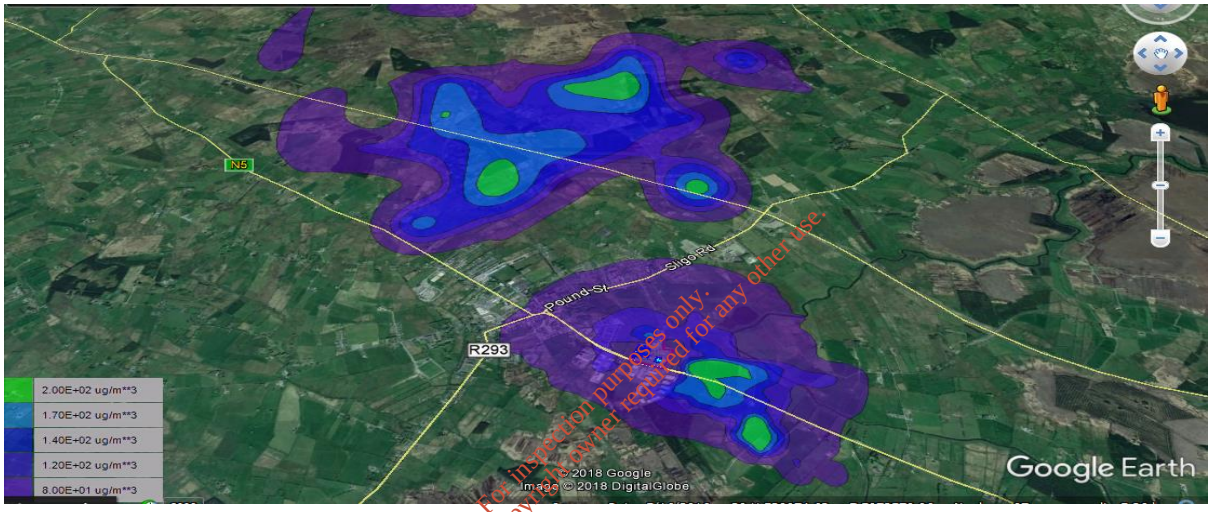
Table 7-18: Sensitive Receptor Results

House	UTM East	UTM North	SO_2 µg/m^3	Limit
House 1	528111.1	5972322.9	56.35	125
House 2	528140.3	5972376.3	41.14	
House 3	528167.9	5972436.6	71.95	
House 4	528193.7	5972483.1	64.38	
House 5	528157.6	5972217.9	31.85	
House 6	528992.7	5971873.5	48.54	
House 7	529415.8	5972369	33.61	
House 8	528422.4	5972611.6	52.43	

Table 7-19: SO_2 1-Hour Average

Receptors	Year	Model Result	Background	Cumulative	Limit	Compliant
		Process Contribution (PC)	Average of Annual Mean for Zone D EPA monitoring stations	Predicted Environmental Concentration (PEC)	The limit for SO_2 under 2008/50/EC for an annual limit	
		ug.m^{-3}	ug.m^{-3}	ug.m^{-3}		
1 hour 25th High Value 528958.6, 5971662.3	2014 - 2016	323.75	4	327.75	350	Compliant

Fig 7-13: 1-Hour Average Contour Plot Process Contribution



Contours (ug/m^3)

200	170	140	120	80

Table 7-20: Sensitive Receptor Results

House	UTM East	UTM North	SO_2 µg/m^3	Limit
House 1	528111.1	5972322.9	126.53	350
House 2	528140.3	5972376.3	112.66	
House 3	528167.9	5972436.6	135.81	
House 4	528193.7	5972483.1	133.06	
House 5	528157.6	5972217.9	115.61	
House 6	528992.7	5971873.5	152.84	
House 7	529415.8	5972369	78.65	
House 8	528422.4	5972611.6	125.79	

7.3.13 Carbon Monoxide Air Dispersion Model Results

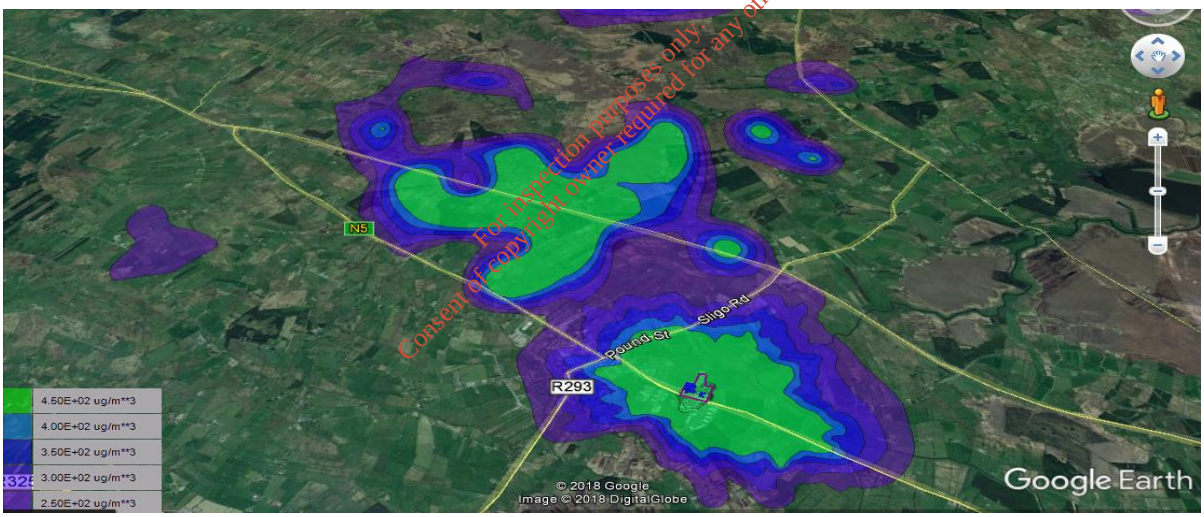
The predicted ground level concentrations for carbon monoxide (CO) resulting from the activity, combined with background concentrations are summarised in Table 7-21 alongside the relevant Air Quality Standard.

There is one limit in the CAFÉ Directive for CO, an 8 hour average at 10,000 ug/m^3. The ground level concentrations of CO from the biomass boiler was determined via modelling. The model predicted that at no stage was the limit applied in the Directive encroached by emissions from the boiler even with exaggerated emission limit values.

Table 7-21: CO 8-Hour Average

Receptors	Year	Model Result	Background	Cumulative	Limit	Compliant
		Process Contribution (PC)	Average of Annual Mean for Zone D EPA monitoring stations	Predicted Environmental Concentration (PEC)	The limit for Carbon Monoxide under 2008/50/EC for an 8 hour limit	
		ug.m^{-3}	ug.m^{-3}	ug.m^{-3}		
8 hours 1st High Result 528858.60, 5972062.30	2014 - 2016	1,437.9	500	1,937.9	10,000	Compliant

Fig 7-14: 8-Hour Average Contour Plot Process Contribution



Contours (ug/m^3)

450	400	350	300	250

Table 7-22: Sensitive Receptor Results

House	UTM East	UTM North	Carbon Monoxide µg/m^3	Limit
House 1	528111.1	5972322.9	631.32	10,000
House 2	528140.3	5972376.3	525.32	
House 3	528167.9	5972436.6	675.85	
House 4	528193.7	5972483.1	693.63	
House 5	528157.6	5972217.9	522.66	
House 6	528992.7	5971873.5	831.37	
House 7	529415.8	5972369	314.03	
House 8	528422.4	5972611.6	621.91	

7.3.11 Climate Impact

Construction Stage

Due to the size and nature of the development, emissions of CO_2 and N_2O from construction equipment and materials will have negligible impact on climate change.

Operational Stage

During the operational stage there will be very limited CO_2 or N_2O emissions form the activity. The only sources proposed at the installation would be from the boilers used for steam and hot water. There have been considerable decreases in CO_2 emissions from this site since the introduction of the Emissions Trading Scheme, with the site now emitting less than 0.03% of the national carbon dioxide emissions. There would be CO_2 emissions from transport vehicles moving to and from the site. This is currently being offset by the proposal to purchase larger volume carriers which will reduce run times and mileage on the road, therefore a reduction in emissions. The CO_2 emissions will not be significant in the context of Irelands national greenhouse gas emissions inventory.

7.4 Mitigation and Monitoring Measures

7.4.1 Construction Phase

In order to ensure that no dust nuisance occurs, a series of measures will be implemented. In summary, the measures which will be implemented during the construction stage will include:

- Hard surface roads are swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic;
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions;
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 15kph, and on hard surfaced roads as site management dictates;
- Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary;
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods;
- If required, during movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions;
- At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, due to the short-term and temporary nature of these works the impact on climate change will not be significant.

7.4.2 Operational Phase

While this assessment has demonstrated that the development as proposed would not significantly impact on local sensitive receptors, the following mitigation measures should be put in place to ensure ground level concentrations are not exceeded:

The stack heights have been assessed in line with industry standards to ensure that an adequate height was selected for dispersion of the emissions. Provided the emission limit values applied in the air dispersion model are implemented, the air impact assessment has demonstrated that mitigation measures are not required;

The installation has applied for review of its Industrial Emissions (IE) Licence from the Environmental Protection Agency. This licence will encompass and control all activities, operation, management, storage and emissions from the proposed facility;

The IE Licence issued will apply appropriate Emission Limit Values for each of the process emission points and these shall be complied with on a continuous basis to minimise the impact on the local community;

The IE Licence requires that the emissions to atmosphere are independently tested on a routine basis by an accredited organization to ensure that the proposed emission points remain within the allowable and licensed criteria;

There are abatement systems for four of the major emissions points at the installation. These will require to be maintained in line with manufacturer specifications and replaced if damaged, consumed or deteriorating in quality;

The condition of the abatement systems will be monitored and regenerated as appropriate. The abatement systems must be included on the maintenance program for the installation;

Good housekeeping practice and procedures from the existing plant are to be installed at the new dryer plant for minimising the volumes of process or fugitive emissions from site;

All environmentally significant raw materials are to be stored in certified containers and tanks which are fully secured with a ‘no open lid policy’ in place for materials in storage. This prevents fugitive emissions, and will minimise losses from the installation and is a requirement of the IE Licence;

Liquids are transferred using fully enclosed pipework, couplings and pumps;

Effective training programmes are to be implemented in line with the existing environmental management system for the site. These training programmes are to encompass both new and existing employees;

A strategy for ensuring effective communication with the local community and authorities will be maintained;

There are no significantly odorous materials used on site that could give rise to adverse odour at the nearest sensitive locations. Should this situation change then appropriate controls and measures will need to be investigated to ensure odours do not become an impact from site;

In terms of climate change, the site has implemented significant changes to operations and practices on site to reduce energy consumption as part of the standard ISO 50001. As a consequence of these changes and future proposed changes, the impact on climate change will continue to be reduced.

7.5 Residual Effects

The results of the air dispersion model show that the residual impacts of the proposed development on air quality and climate change will be in line with EU standards for protection of human health and the local environment.

8.0 Noise and Vibration

8.1 Introduction

Aurivo Dairy Ingredients Limited (ADIL) is applying for a review of their existing Industrial Emissions licence (P0802) due to the expansion of its current installation in Ballaghaderreen, Co Roscommon. The company has gradually increased its milk intake at the plant to above 50 million gallons of milk equivalent per year and therefore is required to submit an Environmental Impact Assessment Report as part of the application for inclusion of a new dryer and its associated infrastructure to the licence.

This report assesses the noise and vibration impacts associated with the development, both existing and proposed, on the surrounding environment. A full copy of the noise assessment completed is available in Vol III, Appendix 2.0 of this report.

The site has completed annual noise surveys since the original licence was issued by the Environmental Protection Agency in 2008. Information on noise measurements at the nearest noise sensitive location was assessed as part of this report.

8.1.1 Methodology

This section of the EIAR was prepared in line with the following guidance:

- EPA, Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Draft August 2017;
- EPA, Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- EPA, Advice Notes on Current Practice (in preparation of Environmental Impact Statements), September 2003;
- EPA, Guidelines on the information to be contained in Environmental Impact Statements, March 2002;
- Environment, Community and Local Government, Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, March 2013;
- *BS 8233 (2014): Guidance on Sound Insulation and Noise Reduction for Buildings;*
- *ISO 9613: Acoustics – Attenuation of sound outdoors, Part 2: General method of calculation, 1996;*
- *Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 October 2004*, National Roads Authority;
- British Standard BS 5228-1 -2009 (*Code of practice for noise and vibration control on construction and open sites Part 1: Noise)* for setting limits for noise emissions from a construction site;
- *BS 8233 (2014): Guidance on Sound Insulation and Noise Reduction for Buildings;*
- *British Standard BS 7385-2 (1993): Evaluation and measurement vibration in buildings Part 2: Guide to damage levels from ground borne vibration;*
- *British Standard BS 5228-2 (2009): Code of practice for noise and vibration control on construction and open sites Part 2: Vibration;*
- *ISO 1996-2: 2017: Acoustics - Description, measurement and assessment of environmental n*oise;
- EPA's *Guidance Note for Noise: Licence Applications, Surveys and Assessments in relation to Scheduled Activities (NG4).*

When considering a development of this nature, the noise and vibration impact on the surroundings must be considered for each of two distinct stages: the short term impact of the construction phase and the longer term impact of the operational phase.

The construction phase involves excavating foundations and the construction of the new dryer building with its associated infrastructure.

There are four primary sources of noise in the operational context as follows:

- Ventilation extraction fans;
- Delivery truck events;
- Fork lift operation; and
- Additional vehicular traffic on public roads.

The forecasting methods employed and criteria that was established for the assessment are detailed in the following sections.

8.1.2 Forecasting Methods

Construction noise calculations have been conducted generally in accordance with *BS 8233 (2014): Guidance on Sound Insulation and Noise Reduction for Buildings*.

Prediction calculations for ventilation extraction fans and delivery truck / fork lift operation have been conducted generally in accordance with *ISO 9613: Acoustics – Attenuation of sound outdoors, Part 2: General method of calculation, 1996*.

8.1.3 Construction Phase Noise Criteria

There is no Irish Standard containing guidance that is applicable in this instance. Local authorities typically control construction activities by imposing limits on the hours of operation and consider noise limits generally in line with NRA and EPA guidance notes.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the National Roads Authority (NRA) publication *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*[13]. This document states the following criteria and hours of operation at the facade of dwellings during the construction period in Table 8-1.

Table 8-1: Maximum Permissible Noise Levels

Days and Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
	$L_{Aeq(1hr)}$	L_{Amax}
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60*	65*
Saturdays 08:00 to 16:30hrs	65	75
Sundays & Bank Holidays 08:00 to 16:30hrs	60*	65*

* Note: Construction activity at these times, other than those required for emergency works, will normally require the explicit permission of the relevant local authority.

The levels set out in Table 8-1 above are also generally consistent with the levels recommended in British Standard BS 5228-1 -2009 (*Code of practice for noise and vibration control on construction and open sites Part 1: Noise)* for setting limits for noise emissions from a construction site.

8.1.4 Operational Phase Noise Criteria

Due consideration must be given to the nature of the primary noise sources when setting noise emissions criteria. In this instance, there are four primary sources of noise associated with the development. Criteria for noise from each of these sources is considered in terms of the $L_{Aeq,T}$ parameter (the equivalent continuous sound level).

There is no Irish Standard containing guidance for appropriate noise limits in this instance. In the absence of such standards, best practice dictates that the potential noise impact of the development is assessed against appropriate British and/or International Standards.

Appropriate guidance is contained within *BS 8233 (2014): Guidance on Sound Insulation and Noise Reduction for Buildings*. This British Standard sets out recommended noise limits for indoor ambient noise levels in residential dwellings as detailed in Table 8-2.

[13] *Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 October 2004*, National Roads Authority.

Table 8-2: Ambient Noise Levels BS 8233 (2014)

Activity	Room Type	Design Criterion $L_{Aeq,T}$ (dB)	
		Daytime (07:00 – 23:00hrs)	Night Time (23:00 – 07:00hrs)
Resting / Sleeping Conditions	Living Rooms	35dB $L_{Aeq,16hr}$	-
	Bedrooms	35dB $L_{Aeq,16hr}$	30dB $L_{Aeq,8hr}$

For the purposes of this assessment, it is necessary to derive external limits based on the internal criteria detailed in the table above. This is done by factoring in a degree of noise reduction afforded by an open window, which is defined in the standard as being 15dB.

Applying the 15dB factor to the values from the BS8233 table, the following criteria would apply at the façades of the adjacent dwellings:

Daytime (07:00 to 23:00 hours) *50dB $L_{Aeq,16hr}$*

Night-time (23:00 to 07:00 hours) *45dB $L_{Aeq,8hr}$*

These criteria are consistent with the following guidance taken from the World Health Organisation publication "Community Noise".

To protect the majority of people from being moderately annoyed during the daytime, the sound pressure level should not exceed 50dB L_{Aeq}.

At night, external sound pressure levels should not exceed 45dB L_{Aeq}, so that people may sleep with bedroom windows open.

Finally, in order to assist with the interpretation of the noise associated with changes in level, Table 8-3 offers guidance as to the likely impact associated with any particular relative change.

Table 8-3: Likely Impact Associated with Change in Noise Level

Change in Sound Level (dB L_{Aeq})	Subjective Reaction	Impact
< 3	Inaudible	Imperceptible
3 – 5	Perceptible	Slight
6 – 10	Up to a doubling of loudness	Moderate
11 – 15	Over a doubling of loudness	Significant
> 15		Profound

8.1.5 Vibration Criteria

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- *British Standard BS 7385-2 (1993): Evaluation and measurement vibration in buildings Part 2: Guide to damage levels from ground borne vibration;*
- *British Standard BS 5228-2 (2009): Code of practice for noise and vibration control on construction and open sites Part 2: Vibration;*

BS 7385 states there should typically be no cosmetic damage if transient vibration does not exceed 15mm/s at low frequencies rising to 20mm/s at 15Hz and 50mm/s at 40Hz and above. These guidelines relate to relatively modern buildings and should be reduced by 50% or less for more critical buildings or structures that are considered to be compromised.

BS 5228 recommends that for soundly constructed residential property, light commercial buildings and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak particle velocity of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and increasing to 50mm/s at 40Hz and above for intermittent vibration. In the case of continuous vibration, it states that these figures may need to be reduced by up to 50%. Below these vibration magnitudes minor damage is unlikely; although, where there is existing damage, these limits may be reduced by up to 50%.

8.2 Receiving Environment

In order to assess the potential for noise and vibration impact on the installation surroundings, a visual survey of the area was initially conducted in order to identify all existing noise sensitive locations in the vicinity of the development. Annual environmental noise surveys were then assessed to quantify the existing noise environment in this area.

The survey was conducted in general accordance with *ISO 1996-2: 2017: Acoustics - Description, measurement and assessment of environmental n*oise and the EPA's *Guidance Note for Noise: Licence Applications, Surveys and Assessments in relation to Scheduled Activities (NG4).*

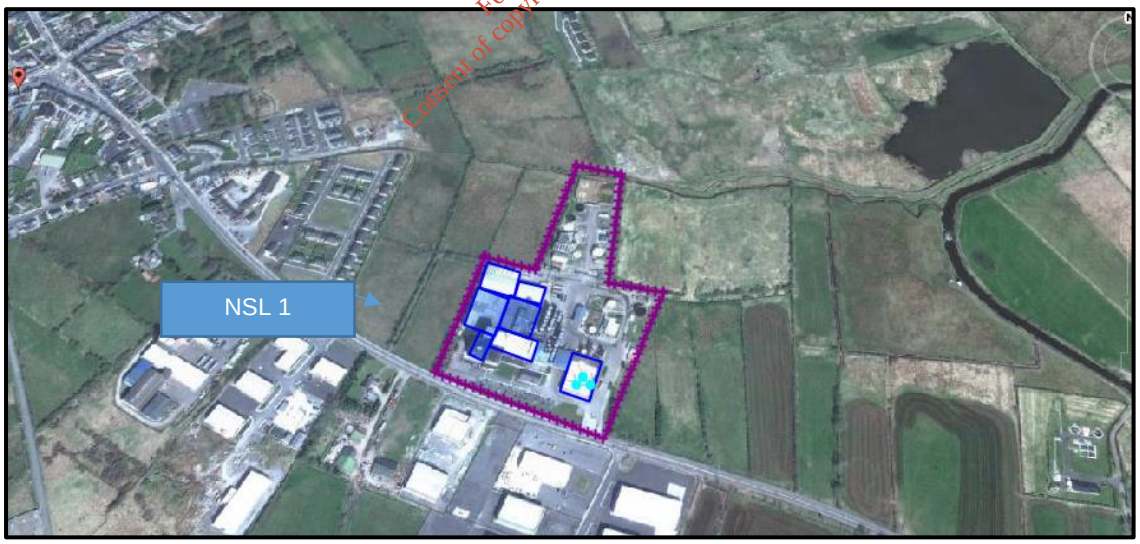
Specific details of the survey are set out below.

8.2.1 Existing Noise Sensitive Locations

The installation is located on the Dublin Road, Ballaghaderreen, Co Roscommon and has been in operation since 1972. The site has not changed significantly in the context of layout or process activities since the original IPPC licence was issued by the EPA in 2008.

The nearest noise sensitive locations include a residential dwelling located to the southwest and a residential estate located to the west. The noise sensitive location (NSL1) has had an annual noise survey carried out for over 10 years. The nearest house to the installation from this estate is approximately 150m from the process operations.

Figure 8-1: Noise Sensitive Locations in the Vicinity of the Proposed Facility



8.2.2 Choice of Measurement Locations

The noise sensitive location agreed with the EPA for annual noise measurement was selected as this estate is a noise sensitive location close to the installation and the new extension.

8.2.3 Survey Details

Noise measurements were assessed over the course of 2 recent annual noise surveys as follows:

Table 8-4: Ambient Noise Measurements – Facility in operation

Year	Daytime	Night Time
2017	19-04-2017 13:26 – 15:56	25-05-2017 23:03 – 00:03
2018	19-06-2018 09:02 – 10:32	18-06-2018 23:00 – 00:00

The daytime measurements occurred during a period that was selected in order to provide a typical snapshot of the existing noise climate with the plant in operation. The primary purpose being to ensure that the proposed noise criteria associated with the development are commensurate with the prevailing environment.

Table 8-5: Ambient Noise Measurements – Weather Conditions

Year	Daytime	Night Time
2017	Temperature: 16^0C Wind Speed: 2.4 m/s Wind Direction: Westerly	Temperature: 10^0C Wind Speed: 0.0 m/s Wind Direction: N/a
2018	Temperature: 18^0C Wind Speed: 1.0 m/s Wind Direction: Westerly	Temperature: 9^0C Wind Speed: 0.0 m/s Wind Direction: N/a

Sample periods for the noise measurements were 90 minutes during all the daytime measurements and 60 minutes for night-time periods. The results were saved to the instrument memory for later analysis. All primary noise sources contributing to noise build-up were also noted.

The noise survey results are presented in terms of the following parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{Amax} is the instantaneous maximum sound level measured during the sample period.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing.

All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

8.2.4 Measurement Results

The survey results for Noise Sensitive Location 1 are summarised in Table 8-6 below.

Table 8-6: Summary of Measured Noise Levels at Location NSL1

2017		**Measured Noise Levels (dB re. $2x10^{-5}$ Pa)**		
		L_{Aeq}	**L_{Amax}**	**L_{A90}**
Daytime	13:26	53	59	51
	13:56	55	66	51
	14:56	53	73	51
Night-time	23:03	42	54	41
	23:33	44	52	42
2018		**Measured Noise Levels (dB re. $2x10^{-5}$ Pa)**		
		L_{Aeq}	**L_{Amax}**	**L_{A90}**
Daytime	09:10	50	59	47
	09:40	51	63	48
	10:10	51	60	47
Night-time	22:36	50	75	44
	23:06	45	60	44

During daytime monitoring periods, the dominant sources of noise noted in the area were process noise from the factory and passing traffic from the adjacent roads. The monitoring location is <40 meters from the L1244 and 2km from the N5 which is audible as background noise. The L1244 is a main road into the town of Ballaghaderreen from the N5 and from neighbouring industrial units. For this reason and to remove the interference of traffic from the survey in line with ISO 1996, use of the L_{A90} is made to assess noise at the NSL from ADIL. The general day time noise observed from the existing facility in full operation was between 47 and 51 dB(A) during day time measurements, and 41 – 44 dB(A) at night.

No significant source of vibration was noted during either of the survey periods.

8.3 Potential Impact

When considering an existing installation with an extension of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages: the short-term impact of the construction phase and the longer-term impact of the operational phase. Given the nature of this development, there will be overlap of these phases.

All noise prediction calculations were conducted in general accordance with ISO 9613: *Acoustics – Attenuation of sound outdoors, Part 2: General method of calculation, 1996.*

8.3.1 Construction Phase

A variety of plant items will be in use such as lifting equipment, dumper trucks and general construction plant items. There will be vehicular movements to and from the site that will make use of existing roads and will be a source of noise emissions.

Table 8-7 indicates typical noise levels that would be expected from the proposed construction site during the various phases of the construction project.

For the purposes of the calculation, it is assumed that equipment will be operating at a distance of 150 meters from the residential dwelling to the west. However, it must be stated that, for most of the time, plant and equipment will be at a greater distance than these and, consequently, will have a lower noise level and therefore lesser impact. This assessment would therefore be considered representative of a “worst-case” scenario.

The following assumptions have been made in the preparation of these construction noise prediction calculations:

- utilisation of equipment of 75% over a working day;
- the site will be surrounded by a 2.4m high solid hoarding.

Table 8-7: Predicted Noise Emission Levels at Nearest NSL during Construction Phases

Phase	Item of Plant (BS5228)	L_{Aeq} at 10m (dB) [14]	L_{Aeq} at Noise Sensitive location, dB(A)
Site Clearance / Excavation	Tracked Excavator plus Lorry (D.3.92)	76	48
	20T Dump Truck (D.9.17)	74	
	Compressor (D.6.19)	72	
	Poker Vibrators (2) (D.6.40)	73	
	Cement Mixer (C.4.18)	75	
Foundations / Steel Erection	Tower Crane (C.4.48)	76	45
	Articulated Lorry (C.5.27)	76	
General Construction	Compressor (D.6.19)	72	46
	Diesel Hoist (D.7.97)	73	
	Pneumatic Circular Saw (D.7.79)	75	
	Generator (C4.84)	74	

The noise levels from these plant items above are considered typical and would not be considered out of the ordinary or in excess of the limits outlined in Table 8-1 or limits as applied by the EPA for licensed sites. The predicted noise levels do not exceed the adopted criterion of 70dB L_{Aeq} for construction activities at the facades of the nearest residential dwellings.

In respect of vibration, the only potential for impact at neighbouring sensitive locations during construction is typically limited to excavation works and lorry movements on uneven road surfaces, the more significant of which is likely to be uneven road surfaces. However, there is little likelihood of structural or even cosmetic damage to existing business park commercial buildings and there are no residential dwellings adjacent to the main access road. The internal routes for traffic is also tarmacked and level.

No vibration impact is therefore expected on any adjacent noise sensitive locations during the construction phase.

8.3.2 Operational Phase

There are four principal sources of noise which are will arise during the operational phase of the installation including the new dryer:

- Ventilation Extraction Fans;
- Delivery Truck Events;
- Fork Truck Operation;
- Additional Vehicular Traffic on Public Roads.

Additional vehicular traffic on public roads is considered to be a daytime source. All other sources have been assessed for both daytime and night-time periods. Each one of these potential sources of noise is considered in turn in the following sections.

8.3.2.1 Ventilation Extraction Fans

The proposed mechanical plant of significance will be the ventilation extraction fans that are proposed to be located within the new dryer. There will be one of these fans and it is proposed to have sound pressure level noise

[14] Sound Pressure Level data from BS5228-1:2009+A1:2014 *Code of practice for noise and vibration on construction and open sites*.

emissions of 80dB(A) at a distance of 1m. This dryer will likely operate 24 hours per day when in operation and will have direct line of sight with the nearest residential dwelling.

Taking into consideration the 80dB(A) sound pressure level along with the appropriate corrections for distance and shielding, the resultant noise levels at the façades of the nearest noise sensitive location was calculated and predicted to be as follows:

Residential Dwelling to the West 39dB L_{Aeq}

The noise level at this NSL is predicted to be ≤ 40dB L_{Aeq} which is lower than both the daytime criterion of 55dB L_{Aeq}, the evening time limit of 50 dB(A) and the night time criterion of 45dB L_{Aeq} and is of the same order as the ambient noise levels in the vicinity.

The impact of ventilation extraction fan noise is therefore considered to be negligible and no additional mitigation measures would be required.

8.3.2.2 Delivery Truck Events

In order to consider noise from delivery trucks, a noise level measurement was conducted during a typical delivery truck event at the existing ADIL facility. The noise level measured at a distance of 3m was of the order of 68dB L_{Aeq}. This measured noise level included the effects of reflections from building façades / service yard boundaries and contributions from all sources of delivery event noise (i.e. vehicle starting, accelerating, and braking).

The facility's intake bays are located in between the dryers and the boiler house. Taking into account the delivery truck noise levels referred to above, as well as the distance between the intake and various receivers and the shielding by the installation buildings themselves, the resultant noise levels at the façades of the nearest noise sensitive location was calculated and predicted to be as follows:

Residential Dwelling to the west 24dB L_{Aeq}

The noise levels at the nearest residential dwelling was predicted to be ≤30dB L_{Aeq} which is lower than the daytime, evening and night time criterion as well as the ambient noise levels in the vicinity of the nearest noise sensitive locations.

The impact of delivery truck event noise is therefore considered to be negligible and no mitigation measures are required in respect of delivery truck events.

8.3.2.3 Fork Lift Operation

In order to consider noise from fork lift operation, a noise level measurement was conducted during a typical fork lift unloading event at the existing installation. The noise level measured at a distance of 3m was of the order of 70dB L_{Aeq}. This noise level included the effects of reflections from building façades / service yard boundaries and contributions from all sources in the fork lift operation (i.e. vehicle accelerating, rotating, lifting, setting down, etc.).

The majority of fork lift operations would be in and around the storage warehouse area. Taking into account the fork truck noise levels referred to above, as well as the distance between the loading bay areas and various receivers, the shielding by the installation buildings, the resultant noise levels at the façades of the nearest noise sensitive location was calculated and predicted to be as follows:

Residential Dwelling to the west 26dB L_{Aeq}

The noise level at the nearest residential dwellings are predicted to be ≤30dB L_{Aeq} which is lower than both the daytime and night time criterion criteria as well as the ambient noise levels in the vicinity of the nearest noise sensitive location.

The fork lift operation will only occur for approximately 8 hours per day during normal working hours. Taking this into account, the equivalent noise level emissions averaged across the extent of a daytime or night time period would be far less than those listed above.

The impact of fork truck operation noise is therefore considered to be negligible and no mitigation measures are required in respect of fork lift operation noise.

8.3.2.4 Additional Vehicular Traffic on Public Roads

The proposed development will introduce some additional traffic onto public roads in the locality of the site. The impact of this small increase in vehicular traffic on commercial area roads is therefore considered to be both imperceptible and negligible. The company has committed to replacing its existing fleet of trucks with larger volume trucks to reduce the volumes of vehicular movements to and from the installation.

8.3.3 Vibration

There are no significant sources of vibration associated with the operational phase of the development so there will be no potential for vibration impact.

8.4 Mitigation and Monitoring

Whilst all of the noise impacts described in the previous sections fall within the adopted criteria, the following best practice measures are still recommended to minimise the potential for disturbance due to noise.

8.4.1 Construction Phase

With regard to construction activities, reference should be made to *BS5228: Noise control on construction and open sites*. This document provides detailed guidance on the control of noise from demolition and construction activities.

In particular, it is proposed that the following various practices be adopted during the construction phase:

- Ensure noise generated during the construction phase is in line with the NRA document on construction noise;
- Appoint a site representative responsible for matters relating to noise.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These should include:

- Selection of plant with low inherent potential for generation of noise;
- Erection of barriers as necessary around items such as generators or high duty compressors;
- Placement of noisy plant as far away from adjacent dwellings as permitted by site constraints.

Given the likely very minimal impact on the adjacent dwellings, no noise or vibration monitoring would be explicitly required.

8.4.2 Operational Phase

8.4.2.1 Ventilation Extraction Fans

The predicted noise levels are within the adopted criteria for both the daytime and night-time periods. However, the following 'good practice' issues would be advised for the site:

Extraction fans shall be regularly maintained to ensure that excessive noise generated by any worn or rattling components is minimised;

Any new or replacement extraction fans shall be provided so that noise emissions do not exceed the noise limits outlined in the existing or proposed Industrial Emissions Licence.

8.4.2.2 Delivery Truck Events

The predicted noise levels for delivery truck events are within the adopted criteria for both the daytime and night time periods and there will only be a few deliveries each day. The impact of delivery truck event noise is therefore considered to be negligible and no mitigation measures are therefore required.

Notwithstanding that the delivery truck event noise levels are within the criteria, the following 'good practice' issues would be advised for the site:

- Vehicle engines should not be left idling once on site;
- Drivers should minimise impact sounds whilst working about their vehicle (including dropping tailgates and moving pallets);
- All radios and amplified music in the truck cab shall be turned off prior to the doors being opened;
- No shouting or communicating in raised voices whilst on site;
- No unnecessary sounding of horns whilst on site.

In addition to the above delivery truck event noise management practices, it is proposed that the following practices are also adopted to minimise potential noise disturbance for neighbours:

- The appointed Environmental Officer shall ensure that all truck drivers have been briefed and understand the requirements of the site. It will be the Officer's responsibility to ensure that drivers are adhering to the requirements of site practice;
- Staff should not communicate in raised voices in the loading or intake bay areas;
- Appropriate signs should be erected requesting that staff should keep noise to a minimum within the external loading bay areas;
- The surface of the loading bay and adjacent areas are currently smooth and continuous with no holes or ridges that would cause trucks to vibrate unnecessarily. This practice should be maintained at the installation.

8.4.2.3 Fork Lift Truck Operation

The predicted noise levels for fork lift truck operation are within the adopted criteria for the daytime, evening time and night time periods and are only likely to occur for up to 8 hours during the working day. The impact of fork lift operation noise is therefore considered to be negligible and no mitigation measures are therefore required.

The only additional good practice recommendations for fork truck operations are similar to those recommended in respect of delivery truck events in the previous section.

8.4.2.4 Additional Vehicular Traffic on Public Roads

The noise impact assessment has demonstrated that noise levels from additional vehicular traffic are negligible and that ameliorative measures are not required.

8.5 Residual Impact

This section summarises the likely residual noise impact associated with the proposed development, taking into account the ameliorative measures described in Section 5.0.

8.5.1 Construction Phase

During the construction phase of the project, there will always be a potential for impact on nearby residential properties. However, noise emissions are predicted to be well within appropriate limits. Furthermore, since the site is in a relatively mixed commercial and residential area, it is expected that the various noise sources will not be excessively intrusive. Limiting the hours of noisy operations, along with implementation of appropriate noise control measures, will further ensure that noise impact is kept to a minimum and within appropriate levels.

8.5.2 Operational Phase

8.5.2.1 Ventilation Extraction Fans

The predicted noise levels associated with the ventilation extraction fans are within the relevant criteria of 55dB $L_{Aeq,}$ daytime, 50dB L_{Aeq} evening time and 45dB $L_{Aeq,}$ night-time at the nearest neighbouring noise sensitive locations.

8.5.2.2 Delivery Truck Events

The predicted noise levels associated with delivery truck events are within the relevant criteria of 55dB $L_{Aeq,}$ daytime, 50dB L_{Aeq} evening time and 45dB $L_{Aeq,}$ night-time at the nearest neighbouring noise sensitive locations.

8.5.2.3 Fork Lift Truck Operation

The predicted noise levels associated with fork lift truck operation are within the relevant criteria of 55dB $L_{Aeq,}$ daytime, 50dB L_{Aeq} evening time and 45dB $L_{Aeq,}$ night-time at the nearest neighbouring noise sensitive locations.

8.5.2.4 Additional Vehicular Traffic on Public Roads

The increase in noise as a result of the additional traffic associated with the proposed facility will not be perceptible.

8.5.3 Vibration

The development will impart no perceptible vibration to any adjacent noise sensitive locations.

9.0 Material Assets

9.1 Introduction

This chapter of the EIAR, examines the impact of the existing and proposed development on material assets. EPA Guidance defines a material asset as 'resources that are intrinsic to specific places. They may be of either human or natural origin.'

9.1.1 Study Methodology

This section of the EIAR was prepared in line with the following legislation and guidance;

- EPA, Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Draft August 2017;
- EPA, Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- EPA, Advice Notes on Current Practice (in preparation of Environmental Impact Statements), September 2003;
- EPA, Guidelines on the information to be contained in Environmental Impact Statements, March 2002;
- Environment, Community and Local Government, Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment, March 2013;
- Roscommon Local Area Plan, 2017-2023- (copy attached, reference Vol III, Appendix 3.0)
- NRA Traffic and Transport Assessment Guidelines 2014.
- The following websites have also been consulted in the preparation and development of this chapter of the EIAR;
- National Roads Authority; www.nra.ie;
- Ballaghaderreen Local Area Plan; http://www.roscommoncoco.ie/en/Services/Planning/Roscommon-County-Council-Planning-Publications/Roscommon-County-Council-Planning-Publications/Local-Area-Plans/ESB networks;
- https://www.esbnetworks.ie/
- Eir; www.eir.ie

EPA Draft Guidance August 2017 titled "Environmental Impact Assessment Reports" provides guidance on how the description of effects should be assessed;

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects ''Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance* below.).	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.

	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it

The material assets focused on during the discussion of this chapter include;

- Land Zoning, Use & Landscape;
- Major Utilities;
- Impact on Traffic.

Other material assets which may be impact on the proposed development but which are detailed in other chapters of this EIAR include;

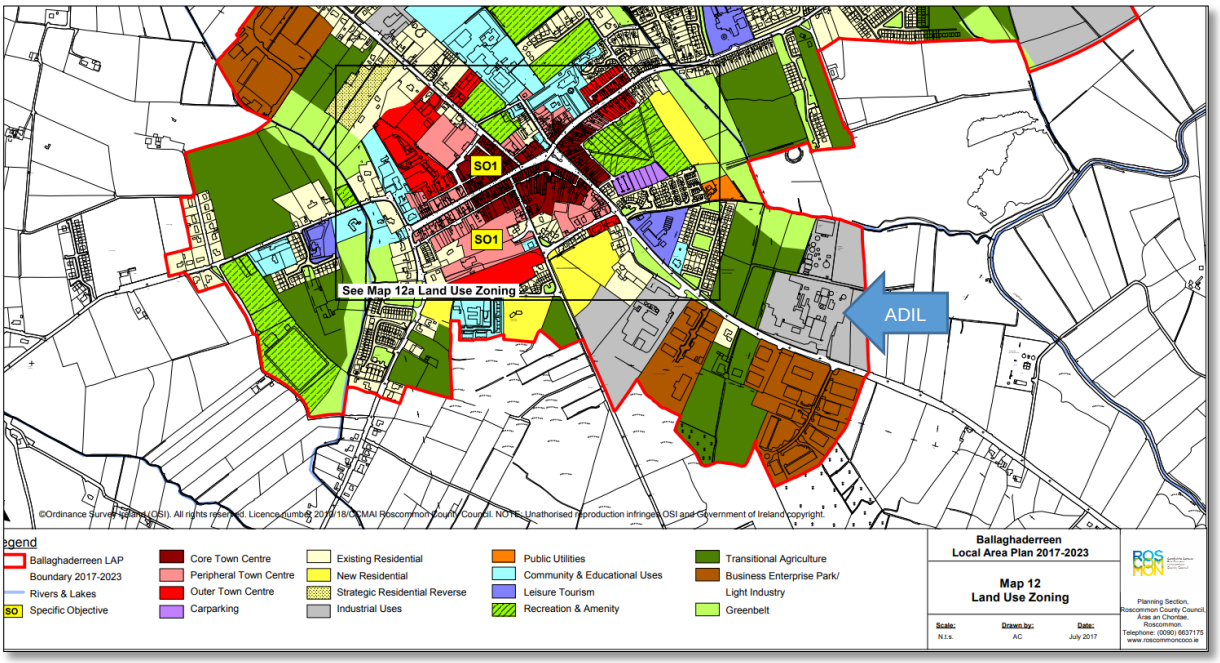
- Water (Chapter 6);
- Air, Climate & Odour (Chapter 7);
- Noise (Chapter 8);
- Soil, Geology & Groundwater (Chapter 5).

9.2 Existing Environment

9.2.1 Land Zoning & Use

9.2.1.1 Land Zoning

The installation is located on lands zoned 'Industrial Uses'. The adjacent lands are a mixture of agricultural, commercial, residential and industrial in nature. The nearest residential dwellings to the facility are c.100 SW and 150 west of the proposed extension. ADIL has operated as a milk production facility since 1972 and is recognised in the Local Area Plan as important to the local economy. A copy of the full Local Area Plan is available in Vol III, Appendix 3.0, with specific information on zoning available in Appendix 6.1.



9.2.1.2 Land Use

There will be no alteration in land use as part of the existing and proposed new development. The additional new dryer will be located within the current site boundary. There is no proposal to change any existing works in or around the installation that would lead to an alteration of adjacent land use.

9.2.1.3 Landscape and Visual Impact

As part of the planning application it was recognised that the proposed extension is a substantial development in terms of scale and visual presence however it will be forming part of an existing building in an area zoned for industrial uses. Based on the plans that were submitted it was considered that the proposed new development did not give rise to unacceptable visual impact nor was it considered to give rise to an unacceptable impact on adjoining properties. The western boundary of the property is lined with mature trees which assist in screening the development from the town.

9.2.2 Utilities

The proposed development is located within the existing site which has all necessary utility links already in place. A summary of the utilities used on site can be reviewed below.

Electricity

Aurivo already has all necessary connections to electrical supplies that are and will be required at the installation for commencement of the new dryer. The proposed extension will only require connection to the existing network already in place.

Water/ Wastewater

Water is supplied from a groundwater well on site and supplemented by public supply to the facility via an existing 150mm diameter water main connection which serves the needs of all the processing and cleaning operations of the facility. The proposed dryer will reduce the water requirements per tonne of product as the new plant will be more efficient in both production and CIP (Clean in Place).

ADIL's sewage is managed via an existing connection to the public sewer. The sewer connection has been assessed and has the capacity to receive effluent from the additional employees proposed on completion of the project.

Wastewater from process operations are treated in the wastewater treatment plant on site as detailed in Chapter 6 of this report. The plant has excess capacity and can treat more than will be supplied by both the existing and proposed projects.

Telecommunications & Broadband

ADIL has all necessary links to telecommunications and broadband already in place. The site extension will connect into the existing network in place where required.

Fuel

ADIL will have requirements for gas, biomass and oil use in order to heat the milk powder dryer's and provide warm water for clean in place (CIP). There are 3 existing boilers at the installation (2 currently licensed and 1 under licence review for inclusion) which provide steam and hot water to the existing installation. The new dryer will require a standalone LNG boiler which will be more efficient and specific to its purpose of heating the new dryer.

9.2.3 Traffic

The proposed development will form part of the existing Aurivo Dairy Ingredients Facility in Ballaghaderreen, which is accessed off the L1244 Local Road. The facility currently employs 75 people and has parking provision for 96 (including 3 disabled parking bays, visitor and subcontractor parking). It is proposed to increase the number of employees to 85 and increase parking provision to 108 (including 3 disabled parking bays, visitor and subcontractor parking). Additional temporary car parking areas have been installed at the installation to accommodate construction employees and any overflow during the construction project.

9.3 Potential Impacts

9.3.1 Land Zoning, Use & Visual Impact

There will be no uptake of land outside the existing boundary for the new development. The existing factory is situated within an area already zoned for 'Industrial Uses' outside of any special areas of conservation or habitats. Therefore it can be considered there will be no impact from the existing development and proposed extension.

9.3.2 Utilities

9.3.2.1 Electricity

It is envisaged that during construction works power will mainly be supplied from the existing factory supplies with backup provided in the form of using diesel generators where and if required. Controls in relation to accidental spills of diesel on unprotected soils have been included in all contract arrangements with the necessary building contractor and formed part of the Construction and Site Management Plan. Reference Chapter 5 Groundwater, Soils and Geology.

A review of the electricity demands during operational phases has been undertaken in association with the Electricity Supply Board (ESB) prior to the project commencing. Significant upgrade works will not be necessary to facilitate the new dryer.

There will be slight increase in electricity consumption during the construction phase of the new development. As large components of the new building are precast and most of the works will be carried out between 10pm and 4am daylight it is predicted this will help mitigate against some of the increased power consumption. In the overall terms of energy consumed on site, energy consumed during construction activities would not be significant.

9.3.2.2 Water / Wastewater

Details on surface water from the site are discussed in Chapter 6. Surface water from the installation will be strictly controlled at all stages of the expansion project from construction to normal daily operation in line with IE licence requirements.

Surface water controls to be undertaken as part of the construction phase include the prevention of silt infiltration resulting in surface water contamination. There is also the need for mitigation measures to prevent any surface water becoming contaminated with diesel from storage or filling procedures for equipment during the construction phase.

9.3.2.3 Telecommunications and Broadband

ADIL has all necessary links to major utilities including telephone and broadband communication links already in place in the existing factory. There is no reason for this development to create disruption of the networks for neighbouring sites as part of the expansion project.

9.3.2.4 Fuel

There is currently heavy fuel oil and biomass stored within the installation boundary for use in the boilers. The boilers are required to provide steam and hot water to the process for evaporation and cleaning purposes.

There are potential impacts to the local drainage systems and groundwater from loss of control during storage or filling procedures at the installation. The site has had an IE licence from the EPA since 2008 therefore there are strict procedures, training and policies in place to minimise any potential impact from fuel use and its management on site. These procedures are mature and the company has developed extensive systems and installed procedures to minimise the risk of environmental exposure.

9.3.3 Traffic

ADIL's existing and proposed car-parking arrangements for the development were considered acceptable by the Roscommon County Council Planning Department. Based on the submitted details it was not considered that the proposed construction of an extension to the existing spray dryer facility will have any significant impact on the number of traffic movements generated at this location.

The department concluded that the proposed works are within the site and will not have any significant impact on traffic movement. As part of the planning recommendation the council stated that the developer shall maintain the public road free of debris and all other materials generated by on site activity relating to the construction process and operational phase.

It can therefore be seen that the impact of the site on traffic will be negligible. The existing site has been in operation since 1972 and therefore the traffic levels associated with the facility have become normal in the area. The entrance to the facility is on the "old" Westport to Dublin road. Since the N5 Ballaghaderreen by-pass opened 2014 traffic volumes past the plant have considerably reduced from 2014 levels and the impact of road traffic from the factory is not significant.

9.4 Mitigation Measures

9.4.1 Land Zoning, Use & Visual Impact

There will be negligible impact of the development on land zoning, use and visual impact. The measures outlined in Roscommon County Council Planning Permission No. 186 regarding the profile, materials used and colour of the building means the impact on the landscape will be minimal. The cladding on the building is a low shade of grey which will be less apparent from the adjacent road.

The design and layout of the proposed projects site infrastructure including access and storage have been completed in order to mitigate the impact of the proposed development on neighbouring sites and land uses.

The location of the site is compliant with zoning requirements as specified by the Local Area Plan, reference Vol III, Appendix 6.1 of this report.

9.4.2 Utilities

There will be negligible impact from the existing or proposed development on utilities. Prior to the commencement of the project, a detailed construction plan was implemented and included connection procedures and points to all major utilities. The project plan will be complete in conjunction with all relevant stakeholders, utility suppliers and the project team.

9.4.3 Traffic

There will be negligible impact of the development on traffic in the local area. The latter was also noted by Roscommon County Council on foot of the planning application, reference Vol III, Appendix 6.0 of this report.

The facility entrance is located on the "old" Dublin to Westport road, which is now by-passed by the new N5 which opened in 2014. Therefore volumes of traffic on this road have considerably decreased on this road. The volumes of traffic associated with ADIL have not changed dramatically since the site opened in 1973. On completion of the extension, there will be approximately 20 additional car movements to and from the plant on a daily basis.

Milk supply from the 1,070 ADIL dairy farmers is expected to expand by 25% from 2018 to 2022. To maintain or minimise the number of milk deliveries to the facility and continue with the Co-operatives sustainability programme, ADIL are investing in an upgrade to its milk collection tanker/truck fleet and have commenced the roll out of a new milk collection routing system.

At present ADIL collects 400 million litres of milk with 33 milk collection tanks. ADIL is investing in 5 new 29,000 litre capacity milk tankers and the Co-operative will be reducing its fleet of 33 trucks to 23 trucks, a reduction of 30% in the number of milk trucks on the road network.

ADIL are also investing in high speed pumps on the milk collection tankers which will reduce the collection time from 4 hours per tank at present to 2 hours per tank per trip.

A new milk collection routing system is presently being developed with a company called UDS Technology, this will also provide the most efficient milk collection routes for the reduced milk collection fleet.

The overall result is that there will be less truck movements and deliveries on the ADIL site in Ballaghaderreen.

There will be additional traffic from construction workers during the development process, however this will only for a short period during the construction process. There is an additional temporary car park made available on site for any additional cars during this period. On completion of construction the existing car park has the capacity to facilitate any additional employees at the installation.

9.4.4 Storm, Surface and Groundwater Protection

Controls such as the inclusion of silt traps in conjunction with strict project management and control procedures will form part of a Construction plan to control the potential impacts of the development during construction.

Surface water from the site will be managed by:

- Uncontaminated surface water from roof areas will be collected directly for discharge;
- Surface waters from production/ carpark areas flow through an interceptor into an existing storm water line. Acceptable Test criteria/ trigger limits that form part of the Industrial Emissions (IE) Licence limits as set by the Environmental Protection Agency (EPA) are used to monitor and control storm water quality. Where surface water meets the requirements allowable under the IE licence, the surface water is released to land drain. If surface water does not meet the required criteria, it will be diverted to the wastewater treatment plant.
- Existing procedures outlined in the environmental management system and conditions applied by the Industrial Emissions Licence will be applied during both construction and operational phases to ensure surface and storm water does not contaminate local waterbodies at the installation.
- Where oil or diesel is required for use on-site, adequate controls will be implemented to prevent and mitigate the threat of a spill and associated environmental impacts. Controls include;
- Bunding in accordance with BS 8007 Code of practice for design of concrete structures for retaining aqueous liquids and EPA Guidance, Storage and Transfer of Materials for Scheduled Activities.
- Appropriately sized bunds to be used;
- All connections to be inside the bund;
- No surface water gullies located in the vicinity of storage or filling operations;
- Spill kit available in the area;
- Procedural controls as outlined in the IE licence and those in practice already for management of bunding.

9.5 Residual Impact

The site is zoned industrial and meets the planning requirements for the proposed project. Once the appropriate landscaping and other mitigation measures in this chapter are implemented, there will be a slight to negligible impact on the environment. As such the overall residual impact will be positive.

10.0 Archaeology, Cultural & Architectural Heritage

10.1 Introduction

Chapter 10 of the EIAR, examines the impact of the existing and proposed development on the archaeology, cultural and architectural heritage of the receiving environment with a view to mitigating any potential impacts.

The installation incorporates a milk processing dairy site with the capacity to process in excess of 50 million gallons of milk equivalent per year. The existing production plant capacity is to be extended in 2018 – 2019 with the addition of a new dryer and associated infrastructure.

The factory is located in an area zoned 'Industrial Uses' according to the Ballaghaderreen Local Area Plan 2017 - 2023. ADIL is currently operating under Industrial Emissions (IE) licence P0802-02 which oversees the entire environmental management operations of the installation.

The existing site and new dryer building are all within the existing boundary of the site which has been in operation since 1972.

UNESCO[15] define cultural heritage as;

Cultural heritage *is the legacy of physical artefacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations.*

This chapter of the EIAR examines two distinct areas of heritage and makes reference to previous chapters as detailed below;

Natural Heritage (Reference Chapter 4 - Biodiversity & Chapter 6 - Water)

This assesses the impact of the project on designated sites and natural heritage areas. Discussion on designated sites, biodiversity and landscaping have all been assessed and included in mitigation measures under Chapters 4 & 6 previously.

There are no designated sites within the plan area, however, there are a number of Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Natural Heritage Areas (NHAs), and proposed Natural Heritage Areas (pNHA) within a 15km radius of the town. The town also falls within two Landscape Character Areas, LCA 22: Cloona Lough and Lung River Bogland Basin and LCA 23: Ballaghaderreen and Brockagh Hill Uplands. Both are of Moderate Landscape Value reflecting the high nature value and low lying scenery of the river and lake, and the spatial relief provided from Brockagh Hill.

The economic profile for Ballaghaderreen is identified as a Tier 2 settlement in the RCDP Settlement Hierarchy in recognition of its role as a Key Town in the county and having regard to its existing population base, economic development potential, availability of services and critical infrastructure, and its urban structure. In relation to industrial and commercial development, industries such as ADIL, as well as those located in the town's business and enterprise parks are important to the local economy

Built Heritage (including Architectural and Archaeological Heritage)

This examines the impact of the existing and proposed project on protected structures and architectural conservation areas and will form the basis of this chapter.

[15] http://www.unesco.org/new/en/cairo/culture/tangible-cultural-heritage/

10.1.1 Study Methodology

This section of the EIAR was prepared in line with the following legislation and guidance;

- National monuments Act 1920-2014;
- Heritage Act, 1995;
- EPA, Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Draft August 2017;
- EPA, Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- EPA, Advice Notes on Current Practice (in preparation of Environmental Impact Statements), September 2003;
- EPA, Guidelines on the information to be contained in Environmental Impact Statements, March 2002;
- Environment, Community and Local Government, Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment, March 2013;
- Roscommon Local Area Plan, 2014-2020;
- County Roscommon Heritage Plan 2012-2016.

The following websites have also been consulted in the preparation and development of this chapter of the EIAR;

- http://webgis.archaeology.ie/historicenvironment/
- https://www.archaeology.ie/sites/default/files/media/pdf/Archaeology-RMP-Roscommon-Map-(1998)-0043.pdf
- http://www.roscommoncoco.ie/en/Download-It/Heritage-Publications/County-Roscommon-Heritage-Plan-2012-2016.pdf
- http://www.roscommoncoco.ie/en/Download-It/Heritage-Publications/Heritage-Plan-2017-2021.pdf
- http://www.buildingsofireland.ie/
- http://www.roscommoncoco.ie/en/services/planning/roscommon-county-council-planning-publications/roscommon-county-council-planning-publications/county_development_plan_2014_-_2020/?pageNumber=2
- http://www.roscommoncoco.ie/en/Services/Planning/Roscommon-County-Council-Planning-Publications/Roscommon-County-Council-Planning-Publications/Local-Area-Plans/Current-Plans/Ballaghaderreen-LAP-2017-%E2%80%93-2023/1-Plan.pdf

The EPA Draft Guidance August 2017 titled “Environmental Impact Assessment Reports” provides guidance on how the description of effects should be assessed;

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects ‘’Significance’ is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance* below.).	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it

10.2 Existing Environment

10.2.1 Introduction

This chapter of the EIAR will focus on Built Heritage. Built Heritage takes account of architectural and archaeological heritage.

Roscommon County Development Plan states there are 26 protected structures within the townland of Ballaghaderreen set out in the Roscommon County Development Plan 2016-2020, 402 records on the National Inventory of Architectural Heritage (NIAH), 17 of which are in the Ballaghaderreen townland, as well as one Architectural Conservation Area (ACA) at Market Square. Vol III, Appendix 5.0 illustrates the position of the protected structures in the vicinity of the proposed development.

Table 10-1 Protected Structures

Number	Description	Location	Structure
00800206	St. Nathy's Cathedral	Ballaghaderreen	Cathedral
00800207	Tower House	Ballaghaderreen	Former Rent Collectors Office
00800216	Museum	Ballaghaderreen	Former Generating Station
00800209	Dillon House	Ballaghaderreen	Former Town House
00800211	St. Nathy's College	Ballaghaderreen	Diocesan College
00800213	Ratra House, Entrance	Ballaghaderreen	Former Site of Country House
00800214	The Four Altars	Ballaghaderreen	Penal Altars
00800303	1 St. John's Terrace	Ballaghaderreen	End of House Terrace
00800304	2 St. John's Terrace	Ballaghaderreen	Terraced House
00800305	3 St. John's Terrace	Ballaghaderreen	Terraced House
00800306	4 St. John's Terrace	Ballaghaderreen	Terraced House
00800307	5 St. John's Terrace	Ballaghaderreen	Terraced House
00800308	6 St. John's Terrace	Ballaghaderreen	End of House Terrace
00800210	Railway Buildings	Ballaghaderreen	Former Railway Terminus Station
00800364	St. Mary's Convent	Friarshill, Ballaghaderreen	Former Convent Complex and Graveyard
00800365	Courthouse	Main Street, Ballaghaderreen	Courthouse Garden Station, Offices
00800368	Bank Bar	Main Street, Ballaghaderreen	Detached Former Bank
00800369	M. Gallagher	Main Street, Ballaghaderreen	End-of –terrace House/Shop
00800370	M.J. Hanley	Main Street, Ballaghaderreen	Terraced House/Pub
00800371	B. Mulligan & Co.	Main St. Ballaghaderreen	End-off-Terrace shop
00800372	St. Mary's Chapel Graveyard	Ballaghaderreen	Graveyard
00800373	Post Box	Cathedral Street, Ballaghaderreen	Cast Iron Post Box
00800374	2 Benchmarks	Cathedral Street, Ballaghaderreen	Limestone Benchmarks
00800375	House	Pound Street, Ballaghaderreen	Detached House
00800376	Beech Mount House	Lung, Ballaghaderreen	Detached House
00800377	P. Mulligan	Market Square, Ballaghaderreen	Terraced House/Shop

Fig 10-1 Location of Architectural Heritage and National Monuments

The National monuments Act 1920-2014 acts as the primary legislative driver for the protection of archaeological heritage in Ireland.

The existing site is located on the main Ballaghaderreen to Frenchpark road and had been in operation since 1972. A site walk over was undertaken in November 2018 in preparation for the compilation of this chapter of the EIAR report. Nothing of note was recorded from either an archaeological or architectural viewpoint inside the boundary of the installation.

Following on from the site walk over, a desk top scoping exercise was completed in order to identify the presence and proximity of areas of archaeological and architectural interest in the vicinity of the proposed site. The review is based on data obtained from the following sources;

- Sites and Monuments Records (SMR), https://www.archaeology.ie;
- Record of Monuments and Places (RMP), https://www.archaeology.ie;
- National Monuments in State Care.

There are no known archaeological sites within the site boundary and no reason to suspect the presence of such sites relating to the new development as it is also within the bounds of the existing site.

No indication of archaeological sites/features was observed as part of previous developments within the boundary of this factory. In addition, there is no visual evidence of any archaeological feature on the lands adjoining the site. There are no recorded sites within 0.2km of the proposed development as per the Archaeological Survey database. The closest recorded protected structure is a rath/ring for located 200 metres north of the existing site. The nearest architectural site is 400 metres west of the existing and proposed development.

Fig 10-2 Closest Architectural Heritage and National Monuments

Location 1 from Fig 10-2 RO008-038 is classified as a Ringfort, which is described as a roughly circular or oval area surrounded by an earthen bank with an external fosse. Some examples have two (bivallate) or three (trivallate) banks and fosses, but these are less common and have been equated with higher status sites belonging to upper grades of society. They functioned as residences and/or farmsteads and broadly date from 500 to 1000 AD.

The site is described as located on a slight east facing slope. Circular grass-covered area (diam. 38m E-W) defined by an earthen bank (Wth 3m; int. H 0.4m; ext. H 0.5m) which is reduced to a scarp (H 0.2m) NE-SE. An outer fosse (Wth of base 2-2.2m; D 0.6m) separates it from an outer bank (Wth 1.7-2.7m; ext. H 0.2-0.5m) NE-NW. There is no visible entrance, and the site is truncated by an ENE-WSW railway bank. Archaeological testing previously carried out c. 20m to the east failed to produce archaeological material.

Location 2 is described as Beech Mount House, Reg. No. 31805023 which dates back to 1810 – 1840. The original use of the property was as a residential dwelling, and it is still used for this purpose.

Fig 10-3 Beech Mount House

10.2.2 Amenities and Recreation

ADIL is located approximately 1 km south east of Ballaghaderreen town, within an area zoned for industrial purpose. The surrounding lands are mixed commercial, industrial, agricultural and residential.

Ballaghaderreen is located 1km from the 18 mile long Lung River, a tributary of the Shannon. The Lung River has 6 major connecting lakes, which vary in size from 500 - 2000 acres. The Lung Valley offers coarse fishing waters with an extensive variety of fish including perch, roach, pike, brean, rudd, tench, eel and trout. The Lung Valley is a developed stretch of fishing water with easy access, boat slip-ways, fishing stands, off the road safe parking and nature walks.

Ballaghaderreen golf course is a 9 hole parkland course, situated approximately five kilometres outside the town.

History enthusiasts can explore the numerous hill forts and ringforts in the surrounding townlands.

10.2.3 Economy and Tourism

The main environment tourist attractions in Ballaghaderreen are listed as follows:

Nature Walks;

Boating and fishing in the local river and lakes;

Ballaghaderreen Golf Club;

The key economic area in Ballaghaderreen is the town centre.

10.3 Potential Impacts

The impact of operations at ADIL and its the proposed extension on the existing architectural and archaeological heritage in the area is considered negligible considering the proximity of the nearest sites as listed in Figures 10-1 and 10-2 above.

Given the proposed dryer site is on the existing site, an extension to the existing building on made ground (Chapter 5) there is very low possibility of the discovery of unknown items of archaeological significance during the construction phases of the development. Where items are discovered, controls will be put in place to ensure construction activities are halted on site and finds are reported to the National Museum of Ireland without delay.

Chapter 4 & Chapter 6 detail the potential impact of the proposed development on cultural heritage. Given the strong controls in place, the impact is believed to have been mitigated to an imperceptible impact.

10.4 Mitigation and Monitoring

Controls have been incorporated for the protection of cultural heritage throughout this report. No mitigation measures are necessary for built heritage as the proposed and existing development will not impact on any listed sites or monuments.

Controls and mitigation will be put in place where items of archaeological significance are uncovered during the construction phase.

10.5 Residual Impact

The impact of the existing and proposed development is considered negligible considering the proximity and type of the nearest sites. The existing factory has been in situ since 1972 with no recorded impact on any existing archaeological, architectural or heritage sites.

The proposed new development will not impinge on any site outside the existing site boundary and therefore any impacts would be negligible in this regard.

In the unlikely event, that archaeological finds are discovered during construction works, mitigation measures will be implemented immediately and details of any discovery will be forwarded to the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. The area on which the extension is proposed is made ground, therefore the likelihood of any findings are low.

11.0 Interaction of the Above

11.1 Introduction

This section of the EIAR examines the potential for the individual topics discussed in previous chapters to impact together to cause a cumulative impact. Many of the individual chapters describe the impact of the existing and proposed project together with any potential cumulative impact on other chapters previously. This chapter endeavours to summarise the overall impact of the proposed project taking account of existing and future developments in the vicinity.

The installation incorporates a milk processing dairy site with the capacity to process in excess of 50 million gallons of milk equivalent per year. The existing production plant capacity is to be extended in 2018 – 2019 with the addition of a new dryer and associated infrastructure.

The factory is located in an area zoned 'Industrial Uses' according to the Ballaghaderreen Local Area Plan 2017 - 2023. ADIL is currently operating under Industrial Emissions (IE) licence P0802-02 which oversees the entire environmental management operations of the installation.

11.1.1 Study Methodology

This section of the EIAR was prepared in line with the following guidance;

- EPA, Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Draft August 2017;
- EPA, Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- EPA, Advice Notes on Current Practice (in preparation of Environmental Impact Statements), September 2003;
- EPA, Guidelines on the information to be contained in Environmental Impact Statements, March 2002;
- European Commission Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.

A review of the overall industry and commercial operations located in the vicinity of the installation was also undertaken. The search indicated that there is the following EPA licensed sites in Ballaghaderreen.

Table 11-1 EPA Licenced / Certified Sites

Site	Licence Number	Activity
Aurivo Dairy Ingredients	P0802	Food and Drink
Ballaghaderreen Landfill	W0059	Waste Disposal
Bruscar Bhearna Teoranta	W0163	Waste Management
Dawn Country Meats	P0178	Closed
Ballaghaderreen WWTW	Certificate D0123-01	Wastewater treatment

Ballaghaderreen Landfill, which is located c. 1.8km south east of the site is registered as a landfill licensed to dispose of 25,000 tonnes or mixed municipal, industrial, commercial and non-inert C&D waste under licence W0059-03.

Ballaghaderreen and environs wastewater treatment plant (D0123) is a treatment plant with the capacity to accept a maximum flow of 2,763 m^3/day and has a design population equivalent of 2,500. Treated water from this plant is discharged to the Lung River.

Bruscar Bhearna Teoranta is a waste transfer and segregation centre. There are no discharges or aspects from this plant that would be of significance when assessing the impact from ADIL. Dawn County Meats although retains a licence has been closed down and no longer produces or discharges from this site.

Table 11.2 Matrix of Interaction between Potential Impacts of Proposed Site

	Population & Human Health	*Biodiversity*	*Groundwater, Soils & Geology*	*Water*	*Air, Climate & Odour*	*Noise & Vibration*	*Material Assets & Landscape*	*Cultural Heritage*
Population & Human Health					X	X	X	X
Biodiversity			X	X	X		X	X
Groundwater, Soils & Geology	X	X		X			X	
Water	X	X	X				X	
Air, Climate & Odour	X	X					X	
Noise & Vibration	X							
Material Assets & Landscape	X	X	X	X	X			
Cultural Heritage		X						

The matrix above illustrates the interaction between the topics on the left-hand column with the topics on the top row. 'X' delineates the topics which interact together.

A summary of the main interactions of the project as discussed in the section 11.2 below.

11.2 Interactions of Environmental Effects

11.2.1 Population & Human Health and Air Climate & Odour

A review of the impact of the proposed project on Air, climate and Odour is completed in Chapter 7.

A number of mitigation measures have been recommended to reduce the impact of dust and vehicle emissions during the construction phase. Implementation of these measures will reduce the impact to short term negligible levels.

An air dispersion model has also been completed for the operational phase of the site using data on stack heights, materials in use etc. No mitigation measures were required to maintain compliance with regulations once the proposed abatement systems are employed and emission limits applied for are adhered to. The installation will be subject to compliance with an Industrial Emissions (IE) Licence an issued by the EPA with Emission Limit Values on all process air emission points. The impact of Air, Climate and Odour for the operational phase of the project has been reduced to negligible.

The emissions of CO2 from the installation are not considered significant in terms of the national figures, with Aurivo producing 0.03% of the national total emissions.

11.2.2 Population & Human Health and Noise and Vibration

Chapter 8 of this EIAR examines the impact of the proposed project in relation to Noise and Vibration.

Mitigation measures, including restricting work hours on the site during the construction phase will reduce the impact of the construction project to an imperceptible level from a noise and vibration point of view.

Similarly, noise measures for extraction fans, vehicular traffic and fork lift operation during operational phases have all been found to meet the requirements of limits of 55dB LAeq daytime and 45dB LAeq night-time at the nearest noise sensitive locations.

The site implements a policy on assessing noise and vibration of new equipment prior to purchase. The new equipment operating in line with current operations will not have an impact on the nearest sensitive receptors.

11.2.3 Population & Human Health and Material Assets and Landscape

On examination of the impact of Material Assets and Landscape (Chapter 10) with Population and Human Health, the following was considered;

Traffic Management & Control - the main route for the site for construction and operational phase traffic will be via the L1224. From the results assessment in terms of construction activities and employee numbers, the increase in traffic volumes fall within the National Roads Authority guidance and the impact is therefore deemed insignificant.

Change in Land Use, Zoning & Visual Impact – The land is appropriately zoned for the activity taking place currently at the installation. All mature trees in the area are being maintained and further landscaping has been committed to by the organisation to enhance the visual impact of the site. The proposed cladding on the building as agreed with planning was specified to be non-obtrusive in the local environment. The change in use when coupled with the mitigation measures will result in a slight to negligible impact.

Utilities – All utilities are already in place at the installation. As part of the expansion project, connections will be made to each of the utilities, however the effects will be appropriately managed by a construction plan thus not affecting any neighbouring sites during the process.

Operational phases in relation to lighting etc. will also be mitigated to reduce the impact of the sites operations on nearby neighbours and wildlife in line with relevant guidance and any planning stipulations and IE licence requirements. The implementation of the mitigation measures is expected to reduce the potential impacts to a neutral effect.

11.2.4 Population & Human Health and Groundwater

Groundwater, soil and geology are covered under Chapter 5 of this EIAR. A review of the groundwater wells in the area illustrated that there was no impact on drinking water wells. The mitigation and control measures implemented as part of the expansion project will result in a neutral impact on groundwater.

11.2.5 Population & Human Health and Water

Chapter 6 of this EIAR examines the impact of the proposed development on water. Currently there are storm water, surface water, cooling water and effluent discharges to local waterbodies on and adjacent to the installation.

Similar to groundwater above, the land use surrounding the site is primarily agricultural, however the mitigation measures proposed as a result of this project are significant to ensure potential environmental impacts are avoided.

Discharge waters from ADIL merge with the Lung River, which subsequently flows in a northerly direction to Lough Gara. This lake is used as drinking water for the Ballaghaderreen environs.

There are controls in place on all materials, especially those which have been identified with environmental pollution potential to minimise the risk of pollution from these sources.

The wastewater treatment plant has been fitted with automated controls as well as daily management from a treatment plant manager to ensure the plant is operating effectively. There is capacity to recirculate effluent if additional treatment is required prior to discharging in line with conditions of the IE licence. In addition, there is capacity at the treatment plant for retention of storm or surface waters that does not meet specified quality standards.

11.2.6 Biodiversity and Groundwater, Soils and Geology

Chapter 5 of this EIAR considers the impact of the proposed project on Groundwater, Soils and Geology. The interaction between Biodiversity and this topic, centres on the potential for the disturbance of habitats during construction phase and damage to the biodiversity as a result of accidental spills during both the construction and operational phases.

Significant thought has been given to both of these potential impact stages. Mitigation measures have been incorporated into both the construction and operational phases of the project to reduce the potential impacts to a negligible level.

11.2.7 Biodiversity and Water

The topic of surface water is examined in Chapter 6 of this EIAR. At present, there are storm waters, surface waters, cooling waters and treated final effluent discharged to the Lung River, all controlled under an environmental management system with legal obligations applied through conditions from the existing IE licence.

Significant control measures are in place already and more have been proposed for the operational and construction phases of the site to ensure there are no adverse impacts on surface waters.

A construction plan will be implemented to mitigate against all impacts during the construction phases, controls include proper site management and the deployment of silt traps in line with CIRIA & Inland Fisheries Guidance.

Operational controls include an effective wastewater treatment plant which has the design and excess capacity for all effluent produced on site. At any stage any storm or surface water which does not meet strict quality standards can also be diverted to the plant for treatment.

Controls have also been implemented on a worst-case scenario basis with capacity included in the treatment plant for firewater retention in the event of an emergency on site. The mitigation and control measures incorporated ensure an imperceptible impact.

11.2.8 Biodiversity and Air, Climate and Odour

A review of Chapter 7 on Air climate and Odour illustrate that the impact from an air perspective on the local environment is insignificant and will not impact Natura 2000 sites nor flora and fauna in the immediate vicinity of the site.

11.2.9 Biodiversity and Material Assets

The interaction between Material Assets and Biodiversity focusses on the Landscape element. The existing site is hardstanding already with mature trees and shrubbery around the perimeters. The expansion project will also be on made ground, therefore having minimal impact on the local biodiversity. Any hedgerow that will be impacted will be replanted after construction has been completed. However there would be no damage to any mature trees as part of this project.

11.2.10 Biodiversity and Cultural Heritage

Ballaghaderreen has significant amenity values which are intrinsically linked to the number of protected sites for biodiversity and built heritage. Strict controls have been proposed to mitigate the impact of the project on the biodiversity of the site and associated areas.

11.2.11 Groundwater, Soils & Geology and Water

Chapter 5 (Groundwater, Soils and Geology) and Chapter 6 (Water) are intrinsically linked. Significant mitigation measures have been introduced as part of the construction and operational phases of the design to ensure the protection of soils, groundwater and surface waters. Controls are further summarised in Chapter 12 below and in the respective chapters above. Implementation of the mitigation measures proposed will result in an imperceptible impact on the environment.

11.2.12 Groundwater, Soils, Geology and Material Assets

There is no evidence of groundwater drinking wells in the vicinity for human consumption, however given the land use is primarily agricultural to the south of the site, it may be possible that a well for agricultural purposes may be in use. However given proximity to the Lung River and its many tributaries this is unlikely.

As ADIL is under licence and there have been no records of material losses to ground, it has been assessed that land, soil or groundwater is not contaminated.

Significant controls have been incorporated as part of the environmental management system to reduce the likelihood and severity of any impacts on groundwater and soils which will in turn protect the surrounding land use.

IE licence monitoring requirements are implemented to ensure on-going monitoring of company performance and water quality in the vicinity of the proposed site. Following the implementation of the design and mitigation measures proposed the risk to material assets from groundwater, soil and geology of the proposed site will be imperceptible.

11.2.13 Water and Material Assets

All water including process and storm waters from ADIL eventually discharge to the Lung River, approximately 7km upstream if Lough Gara. Significant control measures have been implemented to minimise the likelihood and severity of any impacts on surface water during both the construction and operational phases of this project such that the overall impact will be imperceptible.

11.2.14 Air, Climate & Odour & Material Assets

Air, Climate and Odour interacts with the material assets through production of traffic fumes, and the impact on land use in relation to health impacts and agriculture.

An air dispersion model has been completed for the site and illustrates that levels are fully compliant with specified legislation for both humans and flora and fauna. Mitigation measures for construction and operational phases have been advised in line with best practice and guidance and the implementation of such measures should allow an imperceptible impact on the environment.

11.2.15 Cultural Heritage & Population & Human Health

Cultural heritage takes account of the amenities of the area which in turn impact on overall well-being of the person. The project measures incorporated into the new building design and the fact that there is an existing building on the site already to which this is an extension will mean that the impact from the proposed building will not be intrusive on the local setting. The implementation of the landscaping measures will result in an imperceptible impact on the local environment.

11.2.16 Cultural Heritage & Biodiversity

The Natura 2000 sites together with Biodiversity are a cultural asset of the area. Significant controls have been implemented as part of the mitigation measures for Chapter 4 of this EIAR, which result in an insignificant impact of the project on the biodiversity and cultural heritage of the area.

12.0 Mitigation Measures & Residual Impact

Mitigation measures examines the controls to be put in place in order prevent, reduce and control any potential impacts from the existing and proposed development during both the construction and operational phases. A review of the control measures for the construction and operational phases of the project have been completed in the previous chapters which have been summarised in the sections below under the construction and operational phases of the project.

12.1 Construction Phase

Environmental controls and mitigation measures will be incorporated into the construction phase of the development. The tendering process to subcontractors included the minimal requirements of the company and will be overseen by ADIL Senior Management and Environmental Health & Safety Manager, Bill Staunton.

A construction plan, developed in line with the following guidance, was developed by the successful tenderer and was approved by the Project Manager before work began.

Inland Fisheries Guidelines on protection of fisheries during construction works in and adjacent to waters[16];

CIRIA-Environmental good practice on site guide. 4th edition

Prior to any construction work taking place, protection measures shall be incorporated on-site for the protection of storm and surface waters at the installation.

The following mitigation measures will be accounted for in the construction plan;

[16] http://www.fisheriesireland.ie/fisheries-management-1/624-guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters

Table 12.1 Construction Plan

General Site Management	• Environmental responsibilities to form part of contract negotiations; • Site management including environmental responsibilities to be clearly stipulated as part of contract negotiations; • All contractors to be informed of site rules and requirements in relation to environmental protection measures; • Relevant signage put up through the site, illustrating environmental areas of concern; • Structured site layout, completed in line with CIRIA, Good Practice Guidelines; • Reporting procedures to be put in place • Security measures to be put in place; • Waste management facilities to be put in place; • Daily checks to be completed on local drains, stock piles, overall house-keeping etc.; • Emergency response procedures are in place for spills etc. to include notification procedures for regulatory authorities; • All chemicals/ fuels to be used on-site should be approved for use, be appropriately bunded (where possible in an enclosed bund to prevent rainwater entry), hold minimum quantities and have a relevant safety data sheet; • Regular site audits and checks implemented by ADIL site management.
Biodiversity	• Mature Trees and Hedgerows to remain on-site; • Protection measures for trees to be put in place; • No hedging/scrub to be removed between March and August; • Silt traps to be installed where required.
Groundwater	• No concrete wash-out on site; • Specified areas for refuelling with relevant controls for groundwater; • Spill trays to be used under any diesel generator used; • Notification & Approval of chemicals and fuels before being brought on-site; • Bunding and Safety Data Sheets to be available for all chemicals and fuels on-site; • Spill procedure and kit to be maintained on site; • Stockpiling and storage on-site is to be kept to a minimum; • Samples of soil and groundwater to be taken for analysis before removal off-site.
Water	• No concrete wash-out on site; • Specified areas for refuelling with relevant controls for groundwater; • Spill trays to be used under all diesel generators; • Notification & Approval of chemicals and fuels before being brought on-site; • Bunding and Safety Data Sheets to be available for all chemicals and fuels on-site; • Spill procedure and kit to be maintained on site; • Stockpiling and storage on-site is to be kept to a minimum; • Silt traps to be used to prevent silt getting into drains; • Daily house-keeping checks to be completed on-site, to include material stock piled, silt traps and local drains.

Air, Climate & Odour	• Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic; • Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions; • Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 15kph, and on hard surfaced roads as site management dictates; • Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust; • Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary; • Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods; • During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions; • At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.
Noise & Vibration	• Installation of hoarding around the site; • Ensure noise generated during the construction phase is in line with the NRA document on construction noise; • Appoint a site representative responsible for matters relating to noise; • Selection of plant with low inherent potential for generation of noise; • Erection of barriers as necessary around items such as generators or compressors; • Placement of noisy plant as far away from adjacent dwellings as permitted by site constraints. • Limiting the hours of noisy operations and excavations work
Material Assets	• Implementation of communication's programme where potential disruption of service could be caused to any neighbours; • Screening and landscaping on site will be strengthened and further enhanced by addition of planting on the western boundary; • Main traffic route will be from the L1224, limiting the impact on sensitive receptors
Cultural Heritage	• Controls for the mitigation of amenity values have been listed in chapters 4 Biodiversity, 6 Water & 10 Materials Assets above.
Archaeology	• In the unlikely event, that archaeological finds are discovered during construction works, mitigation measures will be implemented immediately and details of any discovery will be forwarded to the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

12.2 Operational Phase

The operational phase of this project is already controlled and mitigated primarily by the compliance with an Industrial Emissions Licence as issued by the EPA. The licence has set limit values for air, noise, surface water, effluent, etc.

ADIL also operates to a structured environmental management system which examines how the site impacts on the environment with a view to reducing/ removing this impact. It also provides structure on operating procedures and training requirements for the company to ensure that everyone at the plant is aware of their environmental responsibility.

A summary of the mitigation values the operational phase can be reviewed in Table 12.2 below. Where the licence does not specify a requirement for the control of the potential impact as listed below, the Environmental management system (EMS) will incorporate the requirement into the EMS procedure.

Table 12-2 Mitigation Measures for Operational Phase

Biodiversity, Surface Water and Groundwater	• IE Licence Limits for emissions to air and water; • IE conditions for operation on an licenced installation; • All materials on site are stored as per IE licence requirements and in line with the EPA guidance for Storage and Transfer of Materials for Scheduled Activities; • All storage areas are appropriately bunded to provide secondary containment; • These storage areas are certified and integrity tested in line with IE licence requirements; • All production and process areas from the site entry to storage are hardstand to prevent contamination of groundwater in the event of a spill; • The delivery yard was designed as a bund which leads to the wastewater treatment plant; • Procedures are in place for spill notification, management and control of waters on storm water lines; • Emergency spill kits and emergency response procedures are developed and personnel are trained in their existence and execution; • All spent liquid wastes are stored in the dedicated bunded waste stores with regular disposal to ensure there is no large-scale bulk storage; • Spillage materials for localised spills are established inside the facility buildings and outside at areas where spills are more likely to occur; • Loading and unloading operations are supervised and located on hardstanding ground in the event of spillage; • The installation is operating under an IE licence which is subject to the rigorous controls applied by the EPA; • The site operates to an environmental management system ISO 14001; • All technicians are fully trained in operations and activities at the installation and also in Emergency Response procedures, reference copies of procedures attached- Vol III, Appendix 8.0