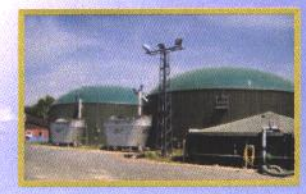
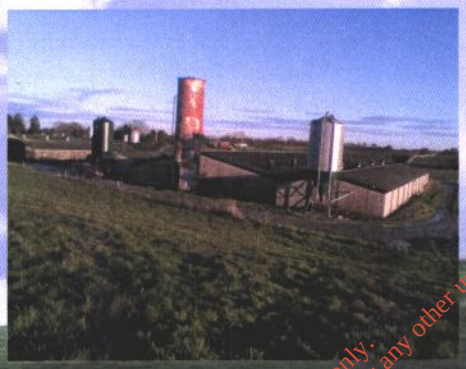
NRGE
Nutrient Recovery to Generate Electricity

Mooresfort
Lattin
Co. Tipperary
Tel 062 55385
Fax 062 55483
E-mail info@nrge.ie














JOHN SHERIDAN
Levally, Ballinrobe, Co Mayo
ENVIRONMENTAL IMPACT STATEMENT
November 2011
Revised April 2012

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ENVIRONMENTAL IMPACT STATEMENT

In respect of the expansion of the PIG FARM DEVELOPMENT to an 850 sow integrated unit and the incorporation of a Biogas Plant for

JOHN SHERIDAN

AT

LEVALLY
BALLINROBE
CO MAYO

Prepared by

NRGE Ltd,
Mooresfort, Lattin, Co. Tipperary.

Date November 2011

Revision 1 25 April 2012

PROJECT TEAM

MICHAEL McENIRY	**B.Eng CIWM NRGE LTD, MOORESFORT LATTIN CO TIPPERARY**
JER KEOHANE ENVIRONMENTAL	**M.Sc MIEI GEOTECHNICAL & SERVICES LTD, CARLOW RTC. CO CARLOW**
JOHN OLIVER DELANEY	
MICHAEL SWEENEY	**NRGE LTD, MOORESFORT, LATTIN, CO. TIPPERARY.**
DERMOT LEAHY	**B.Agr. Sc NRGE LTD, MOORESFORT LATTIN CO TIPPERARY**
PAUL WALSH	**B.Eng NRGE LTD, MOORESFORT LATTIN CO TIPPERARY**
BOB WITHERS	**MSc AML Archaeology**
THOMAS JENNINGS	**DBFL Engineers & Traffic Consultants**
MERVIN RICHARDSON	**JETWASH Ltd**
LARS BO ADAMSEN CONSULTANT	**M.Sc ANIMAL HOUSE DESIGN SKIOLS A/S, Saeby, DENMARK**
LARS BAADSTORP	**M.Sc BIOGAS CONSULTANT PlanAction A/S, Aarhus DENMARK**

APPENDICES

1 Location Maps

2 Drawings of the pig farm amd Biogas Plant

3 Farm Structures Table

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6 Flora & Fauna Report

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1. NON-TECHNICAL SUMMARY

This is the summary of the information contained within the Environmental Impact Statement, which reports the findings of the assessment into the environmental effects associated with the proposed expansion of the Pig farm facility and the addition of a Anaerobic Digester to the existing piggery facility at Levelly, Ballinrobe, Co. Mayo.

The Environmental Impact Assessment, prepared by NRGE Ltd as a submission to be included in support of a Planning Application to Mayo County Council and an IPPC Licence Application to the Environemtal Protection Agency. The Environmental Impact Assessment, has been produced in accordance with the European Community Directive on Environmental Impact Assessment and the Regulations implementing the Directive in Ireland.

The Environmental Impact Assessment, has involved consultation with statutory bodies and regulatory authorities in an attempt to identify and predict any likely environmental effects of the development, and the evaluation of these effects against specified criteria such as legal guidelines and limits.

It is the intention of this summary to provide all the relevant information contained within the Assessment, in a non-technical and comprehensible manner.

The Environmental Assessment is an evaluation of the potential significant likely environmental impacts that this development will have on the locality.

Mr. Sheridan was granted planning permission for a 200 sow integrated unit at this site in 1987. He has built it up over the last fifteen of years into a financially viable pig farm operating as a 200 sow fully integrated unit and granted planning permission 2011 for Planning Permission for retention of existing pig production unit, initiated in 1962 and fully established in 1989. This proposal is fully in line with Government policy aimed at increasing the competitiveness of the Irish pig meat industry in overseas markets.

The development will occupy a landscaped site of approximately 2.35 hectares (5.81 acres). The proposed development consists of a of Extension to Existing Farrowing House 5(N), Extension to Fattening House 12(N), New Farrowing House 6, New Dry Sow Houses 8(N) ,9(N), New Weaner House 15 new Fattening Houses 13, 14, a manure collection tank, 5 Additional Feed Bins, demolition of Weaner House 6 and 2 manure tanks, a Biogas Plant consisting of 2 no digester tanks, 2 geomembrane lined manure storage basins, 1 no fibre store, 3 No Feed Tanks, Reception Building, Reception Bays, Plant Building, Pasturisation Tanks, Weighbridge and associated site works to produce renewable energy and fertilizer. The proposed works will reduce net emissions from the adjacent facility, with the proposed Anaerobic Digester, which will require fresh delivery of manure from the pig houses. This proposal will also provide compliance with the new E.C. Regulations on Animal Welfare, Nitrate Directives, and incorporates emission reduction measures, as required required by IPPC licence Conditions. A map (Scale 1:2500) in Appendix 1 clearly outlines the site boundary marked red.

Facilities

The buildings and their layout will be state of the art for the industry. A thorough review was undertaken of best available techniques to minimise emissions from the proposed development, and to maximise welfare conditions for animals and staff alike on site. The proposed animal houses are compliant with BAT. All run-off water from the site, is collected via the storm-water collection system (See Site Layout Plan, in Appendix 2), All run-off water from the Pig Rearing Yard wil be routed to a single storm water monitoring point SW1(N) discharging to a watercourse to the Robe River, the Biogas Facility's storm water will be routed to a single stormwater monitoring point and then piped to the OPW land drainage watercourse in the adjoining landowner's property. An agreement to allow the pipe to the adjoining landowners property and confirmation attached. Each of the proposed structures will have an independent leak detection system, with individual inspection chambers, which will be connected to 2 No site inspection chambers on the Pig Rearing Yard identified as LD1 and LD2, the Biogas complex will have at the southern end of the site identified as LD1, on the site layout plan.

Employment

The pig farm currently gives direct employment to 4 full time staff and indirectly provides employment amounting to a total of 35 full time jobs. The expamsion will lead to 8 Jobs on the farm and Biogas Plant with indirect employment 45 full time jobs in pig meat processing, milling, waste and biomass collection sectors.

Manure storage capacity

Annual, neat pig slurry production and extraneous water (10%) is 14280m3. Underground storage amounts to 3460m3 (net of free-board reduction of 200mm for gasses accumulation under slat) equivalent to 13 weeks manure storage capacity. Slurry storage in excess of 32 weeks is provided on site.

Landspreading Areas

The spreadlands are situated in the Ballinrobe / Hollymount area of south east Mayo. The pig farm is located 2.5 km north east of the town of Ballinrobe. There is a total of 706.2 hectares of tested usable area in the landbank. The bedrock in the region is limestone in origin, containing a regionally important aquifer. Ballinrobe Biogas Ltd and Sheridan Pig Farm have with the consent of his neighbours supplied the nutrients for crop growth on 18 farms in the customer farmer list. There are 8 reserve farms should nutrients build up or a recipient withdraw from the scheme. Formal nutrient plans have been devised for all farms in this application.

Manure Spreading

The application of digested manure to farmland is now regulated under S.I. No. 101 of 2009 and distribution of digested manure from this site will comply with those regulations. This facility is entitled to supply manure to any local farmer who wants it, and is obliged to record all dispatches from the holding and the farmers acquiring manure are obliged to record all consignments acquired and to use it in compliance with the regulations. Manure will not be supplied to customer farms between 15th October and 15th January in any year except with the consent of the local authority, or

any other relevant authority. Outside that period, manure will be supplied from the site to a customer farmer, only in response to an order. Managed and used in this way, manure produced at this facility will not have any adverse impact on environmental parameters either inside or outside the site.

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It is planned to import an additional 11,500 tonnes of organic material per annum to mix with the pig manure to increase the efficiency of the proposed Anaerobic Digester. This organic material will be added directly to the mixing tank and will be green crop (maize, grass, oil seed or corn), or alternatively will be belly grass material (digestive tract contents separated from the digestive tract) from adjacent meat factories, Dairy Floatation sludge from adjacent dairy processing plants, fish waste (Subject to approval by Dept of Communications, Marine, and Natural Resources), and Animal By Products (Subject to approval by Dept of Agriculture & Food). It is proposed to primarily target organic materials that are currently being land spread, as this process will greatly reduce current environmental impacts, in accordance with current land spreading directives. The approval of the Environmental Protection Agency, Mayo County Council and the Department of Agriculture will have to be granted, to permit the treatment of other waste types at this proposed anaerobic digester

This organic material will be imported onto the site on a needs basis only. It will be delivered directly into the relevant pre mix tanks. The high fibre material will be transferred directly into the underground pre mix tanks, and liquid material will be pumped into the sealed storage tanks on site. Waste material will only be accepted on site from approved facilities, to be delivered by approved contractors. All deliveries will be recorded on site, and this register will be available for inspection.

Following a detailed review of all available alternative technologies, to treat pig manure, it has been decided that the most suitable technology for this site is Anaerobic Digestion, which is simply the natural breakdown of organic waste in the absence of air. A Digester is simply a warmed, mixed, airless vessel which creates ideal conditions for the necessary bacteria, to naturally break down this material. A chain reaction of different bacteria, attack the carbon in the digesting material, giving off methane gas as biogas (65% Methane). This gas can be collected, contained, and then burned to create electricity, and/or heat, or in some cases processed further into a vehicle fuel. It is now accepted within the EU that farming and life in general must become more sustainable with regard to care taking of the environment, and maintaining rural life. There is now a significant amount of legislation that is demanding this sustainable and integrated approach. The use of anaerobic digestion can help to meet many of these targets.

(i) The pig manure produced on this pig farm will provide the required fuel base for this anaerobic digester
(ii) The additional fuel waste required will be sourced, and transported to the facility by lorry, at a rate of 10-15 loads per week.
(iii) The gas generated will be used to supply power for the pig farm, and heat replacing oil usage.
(iv) The excess power will be exported.

(v) The solids will be separated, including 80% of the P approx.
(vi) The liquid fertiliser will be used on customer farms, in accordance with a fertiliser plan.
(vii) The odour impact of spreading digestate vv pig manure will be reduced by 80% min.
(viii) The digestion process will destroy 98% of all pathogens & parasites.
(ix) The digestate is relatively stable, and will not produce a crust in storage.
(x) The digestion process will kill all weed seeds.
(xi) The digestate is a pleasant, clean and easy material to handle.

Application methods
Land spreading of slurries is carried out using a vacuum tanker fitted with a low trajectory splash plate. The Landspreading Agreements Forms and maps are maintained at Applicant's farm for inspection at all reasonable times.

Steps have been taken in the selection of the customer farms whereupon it is proposed to use digestate and in designing the management of its use to ensure that no contamination of surface and groundwater takes place. The proposed development of an anaerobic digester on site will significantly reduce the risk to surface and groundwater. The existing customer farm base has the capacity to recover the proposed volume of liquid digestate. (See NMP 2011 Report in Appendix 4)

Storm/clean surface water
All clean water is separated from soiled water. Roof water is collected via galvanised gutters and downpipes and piped underground to a nearby watercourse.
Areas of animal movement are the main sources of the soiled water. This soiled water is discharged to the underground storage tanks.

Surface Water.
Connemara Labs and HSE Galway carried out a baseline study on ambient surface water quality at the site.

Traffic,
An assessment of sightlines at the entrance to this facility,was undertaken by DBFL in order to ascertain that adequate sightlines were available to support an increase in the level of traffic movement due to the proposed increase in the level of organic material to the biogas plant. This report is included in full in Appendix 14.

Noise & Odour.
This farming operation has no significant effect on noise or odour. To date there has been no noise or odour related complaints from the existing pig farm.

Archaeological Features

An assessment of Archaeological Features in the vicinity of the propsed development has been carried out by AML Archaeology . It is considered unlikely that there are any unknown archaeological remains or features in the vicinity of the proposed development, or that the development will impact, either physically or visually, on the archaeological heritage of this area.

Heritage Areas

The pig farm and selected spreadlands do not impinge on any Heritage areas.

Cultural Heritage and Material Assets

Farming traditions in the area have been stock rearing, milk production and Weaner pig production. Animal manures were recycled onto the land reducing the cost of production. Balla Co-Op was set up in mid eighties to buy weaners from the local pig producers and to steady the market price. Pig production declined in the nineties due to the cyclical nature of pig price returns. The Co-Op closed and those remaining in pig production were forced to integrate. Small scale pig production in general declined in the area being replaced by intensive modern integrated pig farms.

Climate

Pigs are non-ruminants have a minimal effect on atmospheric carbon levels. The predicted impact on the climate is therefore insignificant.

Population

The town of Ballinrobe has a population of 1270 people. Ballinrobe rural district has a density of occupation (persons per 1,000 acres) of 8.4, the third lowest in all of Mayo.

The development will have a positive impact on human beings from the increased employment it will create, and the resultant reduction of existing impacts from emissions. The development is located in an agricultural area, the buildings will blend into the surrounding area. Also, the development will be landscaped with a screening of trees, shrubs and flowers. Thus, there will be no nuisance or loss of amenity.

Effects of the development on air are insignificant outside the buildings and adjoining yards. The ventilation system will ensure that foul air is dispelled high into the atmosphere where it will mix with fresher air and thus minimise odour. Mitigation measures taken will minimise the effects of odour on the days of digestate spreading. The application of digestate will replace the current practice of pig manure application to land, resulting in an 80% reduction of odours generated, due to gas extraction. Pig manure will also be moved fresh from the farm to the Anaerobic Digester, every 2-4 weeks, thereby further reducing emissions from the pig farm. Low protein diets are being utilised on site, which can achieve a reduction of 30%, of emissions from the site. Inserting the slurry tankers armoured suction hose in a fixed pipe in the walls of the pig manure tanks will minimise the effects of odour as will the use of a low trajectory splashplate and/or band spreader, and adhering to the Code of Good Practice for Spreading of Slurry.

This report was prepared in accordance with the EPA publication (*Odour Impacts and Odour Emission Control Measures for Intensive Agriculture).*

Noise levels from the development are unlikely to be a nuisance. The main sources of noise on the development will be at feeding time (10-15 minutes) and from feed delivery vehicles. However, at a distance of 100 metres from the development noise levels are not greatly above background noise levels.

The development will have an insignificant effect on the climate of the area.

Thus the measures that have been put in place will ensure that impact/effects of the development on human beings, noise, air, climate and the interaction of human beings, Fauna, soils, air, water, climate, landscape and material assets will be minimised.

In a discussion paper published by the Environmental Protection Agency (January 2005), it concluded that "*Anaerobic Digestion has the potential to deliver multiple environmental benefits, including reduced water pollution potential, lower green house gas emissions, and reduced odours from agricultural slurries*"

This proposed development has the potential to benefit all stakeholders adjacent to the proposed site and the customer farms. The nett result of this proposed development will be a reduction of existing impacts to the order of at least 30% from the site and 80% from the application of digestate in place of pig manure to customer farms.

This proposed development has the potential to provide an economic outlet for crops grown by customer farmers in the area, on lands that may not otherwise be utilised fully. These crops can be fertilised by the digestate from the process.

A full process control system (SCADA) has been prepared for this proposed facility. This report has been prepared by our Associates who have twenty five years experience in the anaerobic sector. It is based on the professional management systems currently operational on similar anaerobic digestion facilities throughout Europe. It details the type of system software, reporting, alarm systems, data exchange and functional systems required to operate a facility such as the proposed development. This expertise is available to the management and operators of the proposed development, at local and remote levels.

Monitoring and Register

Proposals for monitoring storm water emissions at the site and for monitoring soil fertility are set down in the Environmental Report. A register of slurry quantities. rates and locations of spreadlands will be maintained for inspection and monitoring by Mayo County Council and other Regulatory Bodies.

An Annual Environmental Report will be submitted annually to the Environmental Protection Agency, in accordance with the requirements of an IPPC Licence

2. INTRODUCTION

2.1 Relevant Regulations for Environmental Impact Statements (EIS)

The development of an installation that is above the Threshold in a class listed in Schedule 5 Part 2 of the Planning and Development Regulations 2001, and the submission of an Environmental Impact Assessment therefore is not a mandatory requirement. The scale of the proposed development is above the threshold for Class 1(e) (ii) activity, "*Installations for intensive rearing of pigs not included in Part 1 of this Schedule which would have more than 2000 places for production pigs (over 30 Kilograms), in a finishing unit, more than 400 places for sows in a breeding unit or more that 200 places for sows in an integrated unit*"

• Guidelines on the information to be contained in Environmental Impact Statements, (EPA, 2002).

• Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003).

• Environmental Noise Survey-Guidance Document, (EPA, 2003).

2.2 National and E.C. Policy

National level:
The proposed development is in line with national policy, (I) as expressed by the Minister for Agriculture on 10/7/1987 in a development plan for the Irish Pig Industry (ii) as expressed in the Pig Production Group Report of 1988 and (iii) is in line with projected slaughtering of pigs at meat plants by the IDA, aimed at increasing the competitiveness of Irish pig meat in overseas markets. The Irish Government and the EC have updated Irish meat plants in accordance with national and E.C. policy, entailing the expenditure of large sums of money by the promoters and substantial capital grant-aid.

As recently as mid 1997 Teagasc launched a plan (Development of the National Pig Industry) to increase pig production in Ireland from 3.29 million pigs in 1996 to 4 million by the year 2000.

Currently the Department of Agriculture and Food is providing grant aid for the construction of new animal houses, to help ensure compliance with new Animal welfare Regulations, as well as grant aid to improve facilities, structures, and equipment to ensure compliance with the Nitrate Directive Regulations.

Local Level:
This enterprise presently provides employment for four full time stock persons, this will expand to six stock persons and one biogas plant operator.Maintenance contracts and repairs involving welders, builders and electricians are the equivalent of one full time employee. Professional services are required of veterinarians, an accountant and an agricultural consultant on an ongoing basis. In addition, the enterprise supports full time jobs in meat processing, feed compounding and services. According to I.F.A. figures, 12,000 people are

employed in the pig industry, based on a national sow herd of 175,000 sows. This means that every 15 sows provide full time employment for one person.
This enterprise will provide direct and indirect employment amounting to a total of 16 full time jobs.

Context.
The scoping exercise of the EIS was carried out in line with previous submissions to Mayo County Council in regard to Planning Application No 10/1148 submitted to Mayo County Council on behalf of Mr. John Sheridan.
Present structures are illustrated in Appendix 2. Buildings with planning approval and the proposed structures are colour-coded

2.3 Organisations and bodies consulted

Geological Survey of Ireland
The Heritage Service
Mayo County Council
Environmental Protection Agency
Bord na Mona Environmental Consultancy Division
Met Eireann
Dept. of Environment
Dept of Agriculture Food & Rural Development
Teagasc
Irish Farmers Association
Danish Pig industry Advisory Service
Irish Bio-energy Assiocation

2.4 Difficulties countered in compiling the required information

The processes and technology involved in the construction and operation of the proposed developments are standard for agricultural developments and well understood. The technical information on which to base an assessment of impact on environmental parameters is readily available in the public domain. There were no particular difficulties encountered and there is no reason to consider that there is any serious risk of error attaching to plans and projections for the treatment of wastes to be generated in the development.

3 DESCRIPTION OF PROJECT

3.1 Description of activities.

The proposal envisages the development of an Aerobic Digester adjacent to an expanded existing pig rearing facility for the expanded herd capacity of 215 farrowing sows, 635 dry sows, 3554 weaners, 4481 fatteners, 108 gilts and 25 boars comprising the facilities necessary for this pig farm, and associated meal and manure storage and distribution facilities. This proposal incorporates such features as covered storage tanks and covered extraction tank, covered passageways, which when coupled with the use of low protein diets, and anaerobic digestion, ensure the overall reduction of emissions, which is in accordance with BATNEEC for Intensive Agriculture. It is planned to submit this IPPC License application shortly after submission of the planning application. Drawings of the proposed new structures are presented in Appendix 2.

The facility is situated in a rural location where agriculture is the main industry. The site is located in a natural hollow, surrounded on all sides by open countryside/agricultural Land. The site is secluded and is located away from the public road and neighbouring houses

.

3.2 SIZE AND SCALE OF THE PROPOSED DEVELOPMENT

The size and scale of the proposed development have been chosen after consideration of such matters as the site, customer demand for manure, economic viability and labour efficiency. The development is designed to cater for the treatment of all the pig manure generated by the adjacent pig farm. The tariff available for electricity produced from alternative sources such as wind and anaerobic digestion in Ireland is among the lowest in Europe, therefore the size of the development reflects the economies of scale required to make the development viable. This review required the increase in organic materials to be imported, to ensure its future viability.

In full production the pig population at this site will comprise at any one time of the following maximum stock numbers 215 farrowing sows, 635 dry sows, 3554 weaners, 4481 fatteners, 108 gilts and 25 boars

3.2.1 Production

The production process starts with serving 56 breeding animals per week, mainly by artificial insemination. The farrowing rate success of 87%, results in an average of 48 farrowings per week. The young are born in the farrowing rooms which have supplementary heat via water heated "heat-pads". Presently piglets remain suckling on the sows for 26 days. Creep feeding is introduced in minute quantities, after the second week. The sow is weaned back into the service area where she is fed ad lib until she returns to cycle at approximately 5-7 days. Gestation period being 114-115 days, the pre-farrowing sow is moved to the farrowing rooms 4-5 days before parturition. The weaned pigs are moved into fully slatted heated rearing rooms, stocked at 0.21m2. They are fed top quality creep feed and grow to approx. 18 Kg over a four week period, consuming five Kg of creep, five Kg of Link feed and six Kg of bulk weaner diet. They are then transferred to the cold rearing rooms. Again these are fully slatted and stocking rates are 0.35m ^{2}.per animal. The pigs are fed bulk weaner pellets and grow to 32

134 Kg over a five week period. Transfer to finishing accommodation occurs at this weight. They are stocked at 0.72 1 0.74 m^2 and grow to 90 kg over a ten week period. They are kept on fully slatted concrete floors and again fed ad labium on a finisher pig pelleted diet.

3.2.2 Procedures of Production.

The pig farm has been inspected and accredited for the Bord Bia Code of Practice by the Rosderra inspectors. The daily procedure follows the Bord Bia Code of Practice for pig welfare and consists of the following procedures on a daily basis:

Farrowing House.

- ensure all sows have adequate feed and water
- check the health status of this area and treat as required.
- check house temperature and heat pad temperature
- check and record births and deaths.
- remove excess faeces, farrowing debris, dead and mummified pigs at the time of farrowing for hygiene purposes.

manually remove all faeces at weaning to reduce water waste at power washing

Dry Sow House.

- ensure all sows have adequate feed and water
- check health status and treat accordingly
- check sows returning to cycle after service
- scrape excess faeces from behind sows.

Weaner / Finisher Houses

- ensure all pigs have adequate feed and water
- check the health status of this area.
- check temperature and ventilation rates
- check for water wastage via drinkers

It is also important to take note of appropriate withdrawal periods of all medicines used and keeping accurate records of all pigs treated. Maintain the medicine records of treatments.

Feeding system

A dry feeding regime pertains throughout the pig farm. The 2nd stage weaners and the fatteners are feed pelleted feed in "wet/dry" feed hoppers. Pellets are eaten off the shelf and water is supplied via a nipple at the base of the shelf. Augers transfer the feed from the bulk silos. Suckling sows are fed ad-lib. Gilts, dry sows and boars are fed twice daily via augers.

Size & location of present feed storage units.

Feed is supplied to this farm by AW. Ennis and Al Feeds. This feed is made up of ingredients such as wheat, barley, soya bean meal and minerals. Storage capacity of meal on site in silo's is 150 tonnes. Presently there are 10 silo's on site. These silo's have the following storage capacities, 1 x 8 tonne, 3 x 12 tonne, I x 16 tonne, 1 x 20 tonne, 1 x 25 tonne, lx32 tonne and 2 x 5 tonnes. There is

approximately 120 tonnes of feed stored on site at any time. Additional Feed storage capacity as part of the proposed extension 2 x 20 tonne and 2 x 25tonne bins which would being the on site feed capacity to 240 tonnes

3.2.3 Scale of the Development

The integrated 850 sow pig farm comprises of the following stock numbers:

PIG TYPE	NUMBER OF STOCK 200
Farrowing Sows	215
Dry Sows	635
Boars	25
Gilts	108
Weaner	3554
Fattener	4481

The size of the existing development was decided upon with due consideration of economic viability, labour efficiency, management of the site, land availability for manure management i.e. resource recovery. Teagasc advisory service was consulted in all the above matters.

The Biogas Plant size and capacity has been decided upon the basis of the avaliablilty of suitable biomass in the region to co-digest with the pig manure. This is necessary to achieve an economy of scale to allow the plant to be constructed using standardised biogas equipment and to maximum gas yield to produce electricity at the current Renewable Electricity Feed in Tarriff and insure the viability of the project.

3.3 SITING, DESIGN, CONSTRUCTION AND STRUCTURAL DETAILS

3.3.1Detailed Drawings

A site layout of the pig farm is illustrated in Appendix 2 of this Report
Area of piggery.
The area of the site is 5.151hectares.
Buildings.
The number and type of animal houses on site presently is as follows:
(All houses contain underground slurry storage tanks)

2 Stage Weaner hse No 1	Existing
1Stage Weaner Hse No 2	Existing
Farrowing Hse No3	Existing
2 Stage Solari Pen No 4	Existing
Gilt House No 5	To be Demolished
Abstraction Tank No 5	To be Demolished
2 Stage solari Pen No 6	To be Demolished
Dry Sow Hse No 7	Existing
Dry Sow Hse No 8	Existing
Dry Sow Hse No 9	Existing
Fattening Hse No 10	Existing

Fattening Hse No 11	Existing
Fatteniing Hse No 12	Existing
Open tank A	To be Demolished
Covered Tank B	To be Demolished

Other buildings/tanks: 10 silos, a water tank, diesel tank, boiler room, E.S.B store and a disused canteen.

The proposed additional Pig Housing Buildings are as follows:

Farrowing House 5(N)	proposed
Farrowing House 6(N)	proposed
Dry Sow House 8(N)	proposed
Dry Sow House 9(i)	proposed
Fattening House 12 Exten.	proposed
Fattening House 13	proposed
Fattening House 14	proposed
Weaner House 15	proposed
Collection Tank 16	proposed

3.3.2 Design.

The proposed pig housing are designed and will be built in accordance with the Dept. of Agriculture & Food's Farm Development Service Specifications and best international practice in house design.

The slurry storage structures are designed and will be built in accordance with the Dept. of Agriculture & Food's Farm Development Service Specifications for manure storage S123 and S126.

The Biogas facility is designed and will be constructed in accordance with the requirements of the Department of Agriculture's Animal By-products Reulations S.I. No 252 of 2008 as amended by S.I. No. 291 of 2009 and S.I. No 345 of 2009)

3.3.3 Drainage.

Uncontaminated water from the roofs of the buildings, covered walkways and clean paved areas within the Unit are collected separately and discharged in Underground pipes to an existing watercourse/land drain the locations of the outflows from the unit are indicated as AS1 and AS2 on the Map at Section 8.1 of this report.

Contaminated water generated by once weekly pig movement is pumped to an Underground tank.

Confirmation of access.

This pig farm is serviced by a cul-de-sac off the secondary R331 road. The farm laneway joins this cul-de-sac on a straight stretch giving maximum visibility for traffic. Adequate on-site space is provided to ensure that the turning movements of all vehicles associated with the farm can be facilitated on-site. Sufficient parking is provided on-site for all vehicles associated with the farm.

Landscape and topographical setting:

The pig farm is located in a rural area. The structures comprise long low A-roofed houses. The tallest structures are the feed bins. The buildings consist of

single storey, steel framed structures with rendered blockwork externally to walls, and fibre cement corrugated roof sheeting to sloping roofs.

3.4 TYPES AND QUANTITIES OF WASTES PRODUCED

3.4.1 Pig Manure and Digestate

The quantities of Pig manure produced on the Farm are as follows:

PIG TYPE	NUMBER OF STOCK 850	NEAT excreta Pig/week (litres)	Total Litres	Total M3
Farrowing Sows	215	97	20855	20.855
Dry Sows	635	44	27940	27.94
Boars	25	44	1100	1.1
Gilts	108	44	4752	4.752
Weaner	3554	12	42648	42.648
Fattener	4481	34	152354	152.354
Total Pig Manure per week			249,649.00	249.649
Total Pig Manure per annum			12,981,748	12,982
Extreanous water 10%			1,298,175	1,298
Total annual production pig manure(M3)			**14,279,923**	14,280
Total annual production pig manure (Gallons)				**3,141,583**

In addition to the 14280 M3 of pig manure produced on the pig farm, it is proposed to import 5000 Tonnes of Dairy Sludge, 5000 Tonnes of Bellygrass, 100 tonnes of household residue, 200 Tonnes of Bread, 250 tommes Mash.draff, 500 tonnes vegetable waste, 200 tonnes fat trap waste, Mill Residude and 250 Tonnes of Chicken Litter, to bring the total volume of organic material to be treated at the proposed anaerobic digester to 25,830 Tonnes. Table 1(a) below sets out the calculation of volumes and nutrient content of the liquid and fiberous digestate to be produced on site. The liquid digestate will be recovered on the existing customer farm list, as set out in Table 1(b) overleaf.

The existing customer farm list is capable of recovering the entire volume of liquid digestate, with a 10% reserve capacity. A full copy of the NMP 2010 report which contains confidential information pertaining to the individual farms contained therein, is attached in a folder clearly marked "CONFIDENTIAL" . This information is also available on site for inspection by relevant officials of Mayo County Council, EPA, and Dept of Agriculture, during normal working hours. This information is confidential and therefore cannot be put on public file, but has been assessed by suitable qualified persons, and deemed suitable for the

purpose provided. All farms are required to operate their land in compliance with S.I. No 378 of 2006, and S.I. No 101 of 2009

TABLE 1(a): Digestate Production

TYPE	ESTIMATED VOLUME	KGS N/M3	KGS P/M3
	M3		
PIG MANURE	14280	4.2	0.8
HOUSEOLD	100	5.5	1
POULTRY DUNG	250	11	6
DAIRY FLOATATION SLUDGE	5000	6	2
BREAD	200	4.2	0.005
MASH/DRAFF (BREWERY)	250	4.5	1
VEGETABLE WASTE	500	4.5	1
FAT TRAP WASTE	200	5	3.7
PAUNCH COWS	5000	5.5	3.7
MILL RESIDUE	50	4	0.05
TOTALS	**25830**	**4.9**	**1.7**
VOLUME REDUCTION DUE TO GAS EXTRACTION @ 10%	**2583**		
ACTUAL VULUME DIGESTATE PRE SEPERATION	**23247**	**5.4**	**1.9**
PROPOSED SEPERATION PROCESS TO REMOVE MIN 80% P & 20% N WITH FIBRE			

TYPE	ESTIMATED VOLUME M3	KGS N/M3	KGS P/M3
PRESEPERATION	**23247**	**5.4**	**1.9**
LIQUID DIGESTATE	**20922.3**	**4.83**	**0.4**
FIBEROUS DIGESTATE	**2324.7**	**10.9**	**14.8**

LIQUID DIGESTATE FOR LAND APPLICATION AS FERTILIZER		TOTAL KGS
VOLUME M3	20922.3	
KGS P/M3	0.4	8603.5
KGS N/M3	4.8	100952.8

FIBEROUS DIGESTATE FOR USE OFF SITE		TOTAL KGS
VOLUME M3	2324.7	
KGS P/M3	14.8	34414.0
KGS N/M3	10.9	25238.2

TABLE 11B(i): CUSTOMER LIST & REQUIREMENT OF CUSTOMERS LANDS FOR FERTILISER

Farmers Code	Townlands in which manure may be used	Area ha	No Plots
1	Levally, Knocknadrimna, Cappacurry, Bawn, Cloongowla, Ballinteeaun	45.29	1 to 10
2	Summerhill Nth, Carrowbrack, Kilgreana, Bellanaloob, Creagh, Carrowlecka, Rathcarreen,Tonacartron, Cloongowla, Caheredmond, Knockanotish	170.30	1 to 23
3	Bellanaloob	16.71	1 to 2
4	Ardnacally	21.86	1 to 3
5	Knockadoon, Liskilleen,Rocksborough Sth, Rahard	22.15	1 to 7
6	Ballyargadaun	16.74	1 to2
7	Cloonkerry	41.72	1 to 4
8	Ballina, Bunacrower, Lecarrow, Carrowreagh, Lisheenmanus Bunagarraun	44.57	1 to 5
9	Skealoghan	18.79	1 to 3
10	Bungarraun, Deerpark, Cross East, Curraboy	67.58	1 to 9
11	Rathnaguppaun, Cappacurry, Bawn, Knockroe, Creevagh North,	41.72	1 to 8
12	Carrowmore, Skealoghan, Knocknacroagha, Bunacrower, Cloonerneen	40.14	1 to 13

13	Caherloughlin, Rathnaguppaun, Killimor, Cloonerneen, Cloonark, Killimor, Cavan	53.73	1 to 11
14	Derradda, Aghinish, Carrowmore, Cahernacreevy, Rathmalikeen, Knocknacroagha, Carrowmore	56.14	1 to 10
15	Carrowmore, Cregmore (Browne)	21.51	1 to 7
16	Skealoghan, Carrowmore, Knocknacroagha,	20.26	1 to 6
17	Carrowmore, Cloonkeeghan Commons, Carrowreagh, Cloonerneen, Knocknacroagha, Cregmore (Browne)	42.89	1 to 7
18	Cregmore (Browne) Levally, Knocknadrimna, Clooncorraun, Cregduff, Knocknacroagha, Cahernacreevy	63.23	1 to 13
19	Kiltrone, Knockanotish, Robeen Cornfield, Cloongowla, Liskileen	47.92	1 to 10
20	Cornaroya, Cavan, Saleen, Bawn, Cloonerneen, Friarsquarter West	58.03	1 to 11
21	Rathredmond	30.27	1 to 4
22	Cregmore (Lynch), Ballyjennings, Cahercroobeen,	18.06	1 to 5
23	Greaghans,	62.72	1 to 8
24	Cloonerneen, Ballinteeaun, Cappacurry	32.65	1 to 5
25	Knocknaglushy, Creagh Demense,	90.76	1 to 9
26	Ballinteeaun, Cloonerneen, Cappacurry, Knocknacroagh	63.73	1 to 13
27	Cloongowla	12.94	1 to 3
28	Carrowkeel,	18.78	1 to 3
29	Bunavaunish, Lawaus, Castletown, Nealepark	44.30	1 to 7
30	Kilvindoney, Creggarve, Kilvindoney,	34.33	1 to 7
31	Creevagh Middle, Nymphsfield, Creevagh Sth, Tobernashee, Creevagh Sth, Parknakillew	32.85	1 to 5
32	Cloonerneen, Bloomfield	31.95	1 to 4
33	Springvale,	2.88	1 to 1
34	Lecarrow, Ballina	9.60	1 to 3
35	Bunacrower, Lisheenmanus, Skealoghan Liscarrow Ballina	15.75	1 to 3
36	Curraboy, Clooncormick,	35.06	1 to 5
37	Cashel,Lisseveleen, Skeheen, Hollymount Demense	49.03	1 to 9
38	Lackaun, Nealepark, Caherinchole East, Ballycusheen	29.14	1 to 8
39	Gorteenlynagh, Springvale	24.73	1 to 3
40	Caher, Corraun	18.99	1 to 5
41	Curry, Kirwan	11.73	1 to 2
42	Creagh Demense	11.20	1 to 2
43	Curraboy, Clooncormick,	29.68	1 to 5
44	Ballinteeaun, Cappacurry,	11.00	1 to 2
45	Lissanisky	7.13	1 to 2
46	Lehinch Demense	13.08	1 to 2

47	Pollbaun, Roos	75.54	1 to 9
48	Cloonconmick	20.80	1 to 4
49	Ballyshingadaun, Nealepark, Lecarrowkilleen, Drumsheel Upper, Levally	46.42	1 to 10
50	Ballynanerroon Beg, Ballynaslee, Newtown	11.97	1 to 3
51	Kilglassan, Cregduff	12.55	1 to 2
52	Carrowkeel,	20.38	1 to 3
TOTAL		**1841.28**	

3.4.2 ANIMAL TISSUE

The quantities of Animal Tissue Waste Produced on the farm due to mortalities are as follows:

Mortality & Animal Tissue		
	%	kg's
Suckling Sows		
Dry Sows	3	6290
Boars		
Born dead Piglets	8	4254
Weaner	1.5	6129
Gilts		
Fattener	1	13260
Animal Tissue		2478
Total Annual		32411

Carcasses will be temporarily stored in a covered sealed metal skip for transport and disposal to a licensed rendering plant at regular intervals. A register is maintained on site of all collections of animal carcasses from the adjacent farm. This register is available for inspection by Mayo Co County Council, The Department of agriculture, or any other Regulatory Authority during normal working hours

3.4.3 Air Emissions

The main objective of this application is to aid the overall reduction of emissions from this facility. This issue was discussed in a report prepared by Odournet UK Ltd, in 2001 titled "**Odour Impacts and Odour Emission Control Measures for Intensive Agriculture Part A Odour annoyance assessment and criteria for intensive livestock production in Ireland",** which was commissioned by the Environmental Protection Agency, wherein section 9.6 page 69 it states " *that a reduction in odour emission is not likely to be greater than 50% and more likely to be in the order of 25-30%"* by reducing crude protein levels in the diets. Emissions from open slurry storage tanks are also discussed in section 9.9 page 74 wherein it states that ammonia emission reductions of 70-80% have been achieved by covering open tanks. Removal of pig manure from this facility at present is by tanker armoured suction hose inserted into the tank with minimal odour release.
This development proposes that all pig manure from this farm will be utilised to produce gas via the anaerobic digester, and transferred to adjacent covered storage tanks, after separation of solids, from where the odourless digestate will be exported to customer farms as liquid fertiliser. Odours that can arise during land spreading of the pig manure will be eliminated by this technology.

Control Measures to Minimise and Abate Odour on site at present

Emissions from this Pig Farm site are currently contained using the following recommendations;

1. Reducing uncontrolled air movements on site and leakage from the ventilation system and from pig houses (i.e. windows and doors)
2. The use of a high-tech computerized ventilation system, in animal houses with a backup system.
3. Minimising the generation of odours during meteorological conditions which favour spread of odours.
4. The storage of carcasses in covered sealed containers on site.
5. A 100mm buffer is maintained at the top of all covered pig manure storage tanks to allow for the accumulation of gases.
6. Minimisation of the agitation of pig manure and the filling and emptying of liquid storage tanks from below the surface of the stored manure.
7. Transporting pig manure in suitably contained leak proof vehicles.
8. Limited areas where pigs are moved outside buildings, and covering of passageways and yards where animals have access.
9. Use of low protein diets to all animals on site has reduced emissions on site by 30%.

3.5. PIG MANURE USE PROPOSALS

It is proposed to supply all the pig manure from this facility as fuel to the anaerobic digester, for gas production. After digestion, the solids will be separated containing approx 70-80% of the P content. This material will be suitable for supply to a nursery, garden centre, or alternatively to fertilise an agricultural crop with a high P demand (e.g. Beet or maize). The remaining digestate will be exported to customer farmers operating in the hinterland, who are currently customers for pig manure, in accordance with Nitrate Directive Regulations (S.I. No 101 of 2009). Odours that arise currently during application of pig manure will be reduced by 80% approx by this proposal.

3.5.1 Domestic Sewage

Canteen and W/C facilities are provided in Mr. Sheridan's dwelling house (c.150m) the pig farm. There is no septic tank or other sewage treatment system associated with the pig farm. There is a septic tank associated with this dwelling. The figures relating to emission details from a septic tank are based on figures for the average daily waste water/sewage produced by an individual living in a domestic house. The average daily usage/output from one person is 60 litres/ day as per Table 3 Recommended Wastewater Loading Rates from Commercial Premises from the WASTEWATER TREATMENT MANUALS (Treatment Systems for Small Communities, Business and Leisure and Hotels Produced by the EPA .The accumulative waste –water from the staff of the pig farm can be quantified as 240 l//day or 0.24m3/day.

The facilities provided at the Biogas Plant will be connected to the reception system for the biogas plant and the waste stream will be pasteurised and treated with the other biomas streams in the biogas plant and will not require a percolation system.

3.5.2 Feed waste.

Pelleted feed is delivered in bulk articulated trailers and blown into silos. Dust from the silo exhaust pipe is collected in a cylinder which contains water. This is deposited monthly to the underground tanks. Feed spillage, which is kept to a minimum, will go directly to the underground slurry stores.

3.5.3 Veterinary waste.

Veterinary medicine containers for vaccines, antibiotics and supplemental iron equates to approximately 700 bottles (100cc) annually. Syringes varying in size from 2cc - 20cc amount to circa 1,000 per annum. A maintenance contract is in place with a Permitted Medical Waste Collection Contractor and a copy of the Maintenance Agreement is attached to the Waste Management Plan in Appendix 13

3.5.4 Maintenance waste.

Bulbs (infra-red/florescent) –	The quantity of used Bulbs and tubes on the facility are small and these are accumulated and stored on the farm until the annual visit Chemcar to the area
Building materials -	Concrete & Stone reused on farm roadways, Timber cut/chopped and burned in domestic fire –wood

Electric motors/fans- Metals- Metals accumulated in the compound Area for reuse or to have sufficient quantities for a Metals collection contractor

A Waste Management Plan is included in Appendix 13; this plan contains all details of the relevant details of the Permitted contractors designated for specific waste streams.

3.5.5 Manure storage.

The manure is stored in mass concrete steel reinforced underground tanks, built by contractors to the Dept. of Agriculture standards.

Capacities.

The required slurry storage capacity is calculated based on BATNEEC Guidance Note for the Pig Production Sector (Revision 1 - February 1998). This requires a minimum of six months retention of of manure.

The Biogas facility has 9193m^3 of post digestion storage with 1752m2 of pre digestion storage and 3460m3 of pig manure storage equating to 29 weeks of on site storage

A table of slurry- tank capacities on the next page shows the existing holding capacities: (Previous deductions were made for gas accumulation).

TITLE	STRU LGT (M)	CTURE WTH (M)	AREA SQ MTS	TANK WIDTH	TANK LENGHT	TANK DEPTH	CAPACITY CUBIC MTS	EFFECTIVE CAPACITY WITH 200 FREE BOARD	TOTAL EFFECTIVE CAPACITY
									0.0
2 Stage Weaner hse No 1	31.4	8.8	276.32	8.8	31.4	1.525	421.4	366.1	366.1
1Stage Weaner Hse No 2	20.0	11.0	220	11.0	20.0	0.45	99.0	55.0	421.1
Farrowing Hse No3	35.0	15.5	542.5	15.5	35.0	0.9	488.3	379.8	800.9
2 Stage Solari Pen No 4	13.1	4.0	52.4	4.0	13.1	0.3	15.7	5.2	806.1
~~Gilt House No 5~~	~~16.0~~	~~15.6~~	~~249.6~~	15.6	16.0	~~0.45~~	~~0.0~~	~~0.0~~	~~806.1~~
~~Abstraction Tank No 5~~	-	-	-	0.0	0.0	~~3.35~~	~~0.0~~	~~0.0~~	~~806.1~~
~~2 Stage solari Pen No 6~~	~~31.0~~	~~5.2~~	~~161.2~~	5.2	31.0	~~0.3~~	~~0.0~~	~~0.0~~	~~806.1~~
Dry Sow Hse No 7	36.3	12.5	453.75	12.5	36.3	0.45	204.2	113.4	919.6
Dry Sow Hse No 8	41.9	12.5	523.75	12.5	41.9	1.2	628.5	523.8	1443.3
Dry Sow Hse No 9	17.5	12.5	218.75	12.5	17.5	1.2	262.5	218.8	1662.1
Fattening Hse No 10	42.0	10.0	420	10.0	42.0	1.8	756.0	672.0	2334.1
Fattening Hse No 11	50.8	20.0	1016	20.0	50.8	1.8	1828.8	1625.6	3959.7
Fatteniing Hse No 12	54.6	10.0	545.6	10.0	54.6	1.8	982.1	873.0	4832.6
~~Open tank A~~	~~10.3~~	~~6.2~~	~~63.86~~	~~6.2~~	63.9	~~1.5~~	~~0~~	~~0.0~~	~~4832.6~~
~~Covered Tank B~~	~~16.0~~	~~10.0~~	~~160~~	~~10.0~~	160.0	~~1.8~~	~~0~~	~~0.0~~	~~4832.6~~
					0.0				
Farrowing House 5(N)	20.1	10.8	216.29	10.8	20.1	0.84	181.7	138.4	138.4
Farrowing House 6(N)	38.3	6.6	252.78	6.6	38.3	0.84	212.3	161.8	300.2
Dry Sow House 8(N)	42.7	13.4	572.3388	13.4	42.7	0.84	480.8	366.3	666.5
Dry Sow House 9(i)	23.8	12.7	300.8016	12.7	23.8	0.84	252.7	192.5	859.0
Fattening House 12 Exten.	12.3	10.0	123	10.0	12.3	2	246.0	221.4	1080.4
Fattening House 13	71.2	11.6	824.1486	11.6	71.2	0.98	807.7	642.8	1723.3
Fattening House 14	81.1	11.6	938.9064	11.6	81.1	0.98	920.1	732.3	2455.6
Weaner House 15	51.0	18.6	948.6	18.6	51.0	0.84	796.8	607.1	3062.7
Collection Tank 16	27.5	3.0	82.35	3.0	27.5	5.035	414.6	398.2	3460.9
Digested Biomass Store	36.2	18.3	662.643						
Biogas Reception Building	24.6	20.6	506.76	10.4	Diam	3	254.87904		
Biogas Homoginising Tank	20.4	Diam	325.613	20.4	Diam	4.85	1579.2231		
Vertical Biogas Digester	14.1	Diam	155.28047	14.1	Diam	14.5	2251.5668		
Horizonal Biogas Digester	31.5	Diam	778.42296	31.5	Diam	6.505	5063.6413		
Digestate Storage Basin II	37.5	37.5	1406.25	33.9	33.9	4.2	4826.7	4596.8	4596.84
Digestate Storage Basin I	37.5	37.5	1406.25	33.9	33.9	4.2	4826.7	4596.8	9193.68
Hot Water Tank	2.5	Diam	4.909375						
Feed tank1	2.5	Diam	4.909375						
Feed tank2	2.5	Diam	4.909375						
Feed tank3	2.5	Diam	4.909375						

Gas Purifier	1.8	Diam	2.54502						
Pasteurising Tank 1	2.5	Diam	4.909375						
Pasteurising Tank 2	2.5	Diam	4.909375						
Pasteurising Tank 3	2.5	Diam	4.909375						

3.6 REQUESTS TO USE PIG MANURE DIGESTATE AS FERTILISER

The most BATNEEC system for dealing with manure disposal is by means of landspreading.

Traditionally, John Sheridan has supplied and in some cases spread the organic arising from the pig farm on neighbouring farms in a fertiliser substitution system. Grass is the predominant crop in the south east Mayo area. The slurry is spread in early spring replacing inorganic nitrogen and phosphorous fertilisers. Silage re-growth areas receive a top dressing in the June/ July period. The autumn application is generally combined with the farmers own bovine slurry. The nutrient requirement for each sample area has been calculated on the basis of the test results and current recommendations from Dept of Agriculture and Food.

John Sheridan will supply digestate to customer farmers in the area, upon request, and all deliveries will be documented on site. A copy of this register format is included in Attachment 14, and same will be available on site for inspection by Mayo County Council, and Agency inspectors. All customer farms are now required to comply with the Nitrate Directive regulations (S.I. No. 101 of 2009), and will thereby have to record these manure imports on site

3.7 PLANT & EQUIPMENT AVAILABLE

The method of slurry spreading for land application has been by vacuum tanker, low trajectory splash plate. The equipment available to John Sheridan for land application of pig manure is as per the table below,

Owner	Tanker capacity	Tractor HP
John Sheridan, Ballinrobe	5	90
Desmond Walsh, Milford, Cloghan Hill, Tuam	2 x 9.1, 1x 13.6	150 x 2, 170 x 1
Michael Crishel, Lecarrow, Hollymount	1 x 10.6	120

3.8 LANDSPREADING AGREEMENTS.

This facility will supply manure to customer farmers in the area, upon request, and all deliveries will be documented on site. A copy of this register format is included in Attachment 14, and same will be available on site for inspection by Mayo County Council, and other Regulatory inspectors. All customer farms are now required to comply with the Nitrate Directive regulations (S.I. No. 101 of 2009), and will thereby have to record these manure imports on site.

3.9 SERVICES

Water & Power

Present power usage.
Electricity: 250,000 units annually.
Mains electricity exists on site with a three phase supply at 220 and 380 volts. The electricity is currently used for the following:

- Automatic feed augers
- Automatic ventilation systems.
- All artificial lighting to pig housing, offices and outside yards
- Power for slurry pump.

On the pig production unit when the expansion is complete the estimated electrical consumption will be in the order of 450,000 units
The Parasitic electrical load on the biogas plant is estimated at 200,000 units
A 500 KVA CHP unit will be installed as part of the biogas facility and exporting electricity and returning heat to the pig farm substituting oil boilers.

Water

Water for the farm is already supplied by means of Cregduff Group Water Scheme via header tank system
There are two water storage tanks on site with a combined storage capacity of 72.72m3
This will allow for 3day's supply in the event of shortages.

Water will provide for the following:

(a) Drinking water for livestock.
All animal drinking appliances are regularly maintained to ensure that there is no leakage to the waste storage structures.

(b) High pressure wash down systems (3,000 psi)
Each section of the farm is power washed and disinfected as the pigs are moved in an "all in / all "out" system through their growth cycle. The pressure of the power washer is 3,000 psi. Water throughput 15 litres/minute. The power washer is in use for 6 hours per week. A weekly total of 3 m3 of water is required.

Present water usage.

The total water consumption on the farm complex both for pig production and biogas plant and vehicle washing is expected to be approximatly 600 m3 per week

3.10 MAXIMUM SOIL CONTAMINANT CONCENTRATION

The pig manure currently applied, does not add any contaminant to the lands whereupon it is used. The elements in the pig manure comprise chiefly carbon, oxygen, hydrogen and nitrogen with lesser amounts of phosphorus, sulphur and copper. At an application rate of 15 m3/hectares, the application rate of 0.45kg/hectare Cu is less than 3% of that permitted in EC Directive 86/278 on the application of sewage sludge to agricultural land.

4. DESCRIPTION OF ALTERNATIVES CONSIDERED

4.1 Alternatives sites considered

John Sheridan engaged NRGE (Nutrient Recovery to Generate Electricity Ltd), to carry out a feasibility study for the development of an anaerobic digester at this site. The existing site is in a secluded rural indented valley location ensures low visual impact. Over the years he has developed this farm to its current size, i.e. 200 sow integrated unit. An alternative site would not be financially viable. To date there has been no recorded complaints of odour, traffic or noise from this site. The existing pig production unit provides an on site source of biomass for gas production and a host for heat recovery

4.2. Alternatives Site Layout & Designs

Alternative site layouts and designs were considered. The optimum depth of tank was decided upon on the basis of air draughts, capacity, emission reduction and costs etc. Generally the most economical and efficient layout for pig production and pig movement was designed for, with a view to reducing environmental impacts, and providing a safe and healthy environment for staff and livestock.

4.3 Alternative Processes Considered

There is no other satisfactory alternative process for pig production. The proposed anaerobic digester will utilise the pig manure from the adjacent pig farm to generate gas. In the process solids will be removed including 70% of P. The digested material is stabilized by the process so it is almost odour free. Much of the carbon has been removed from it and has been homogenized during the process so it becomes thinner and of an even consistency and the nutrient it contains has become plant available so it is a valuable fertiliser. The method proposed (low trajectory splash-plate/band spreading) is very practicable for applying this product.

5.0 DESCRIPTION OF EXISTING ENVIRONMENT

5.1 Location of Structures

The site location map (Ordnance Survey map sheet No Mo110 &MO118 County Mayo) is included in Appendix 1, and the drawings and site plans for this development are included in Attachment 2. The unit is located in the Townland of Levelly Ballinrobe, Co Mayo and approximately 2.5km Northeast of Ballinrobe, and is accessed via an access road km off the R311, at an elevation of meters. This facility is located in a wholly agricultural area. Site excavations occurred originally during the construction of the initial underground tanks in the mid eighties. Depths of 3 metres were reached with no bedrock encountered. The present structures are in existence from the period 1987/1997 with no settlement cracks.

5.2 Deliveries to Customer Farms of pig manure which is currently used as a fertiliser & where it is proposed to apply manure

The application of animal manure to farmland is now regulated Under S.I. 101 of 2009 and distribution of manure from the site will comply with those Regulations. The Applicant is entitled to give Manure to any local farmer who wants it and is obliged to record all Despatches from the holding and the farmers acquiring manure are obliged to record all consignments acquired and to use it in compliance With the Regulations.

Animal manure produced in the existing facility is currently distributed to local farmers in response to their demand and for their use on their farmland. The manure that would be produced by animals to be housed in the proposed development would be similarly distributed. Local demand for pig manure is buoyant. The applicant has more customers and more demand than can be satisfied from the existing herd. The applicant is entitled to supply it to his customer farmers who want it and are not prohibited from using it. The use of animal manure to fertilise farmland is subject to statutory control under S.I. 101 of 2009.

Manure from the site would be supplied in response to customer farmers' demand and in compliance with law. The calculation of expected manure production is shown in Appendix 11, and of the manure storage capacity which is calculated on the Farm Structures Table in Appendix No3.

5.3 GENERALISED DESCRIPTION OF THE EXISTING ENVIRONMENT

5.3.1 Land Use and Cropping History

The lands whereupon it is proposed to recover pig manure, consist mainly of grassland, for grazing / silage production. Farm management standards on all these farms are good.

5.3.2 Water Quality Analysis

Water samples were taken from upstream and downstream of the stormwater runoff points. Full analyses results from an independent laboratory are included in Appendix 4. This south-eastern comer of county Mayo has Lough Mask as its south-western border and is drained by the River Robe flowing westwards to Lough Mask. Water quality status in the eleven lakes of County Mayo are continually monitored. The latest Phosphorous Regulations National Implementation Report, 2001 classifies Lough Mask as being of satisfactory quality, mesotrophic.

Elemental phosphorous is the nutrient associated with surface water pollution. The implementation of the Phosphorus Regulations (S.I. No.258 of 1998) in July 1998 has for the first time established statutory Environmental Quality Standards for Phosphorus. The water quality targets set by the government are ambitious and will require a wide range of abatement measures, focusing on the main sources of pollution sewage, industry and agriculture, further enhanced by European Communities (Good Agricultural Practice for Protection of Waters) Regulations (S.I. 378 of 2006) and European Communities (Good Agricultural Practice for Protection of Waters) Regulations (S.I. 101 of 2009.)

5.3.3 Air Quality

Currently emissions to air from the site are not an issue, and would be mostly attributable to the animals that are currently on the site. The odour associated with this site does not and will not cause annoyance and will not interfere with amenity outside the boundary of the site. The nearest dwelling to this site is at a distance of 40 metres which belongs to one of the developers Mr John Sheridan. In addition this development will reduce current emissions by use of modern house designs, and ventilation systems.

The development is in an entirely agricultural hinterland where typical farm odours are to be found and expected. These odours arise from farmyards and lands during the day to day operations such as silage feeding, slurry agitation and land spreading. The existing unit, using best available practices, is already operating without a significant effect on the environment and without any odour complaint from the stakeholders in the locality of the Pig unit or in the vicinity of the customer farmers for the manure. The construction of the proposed anaerobic digester will greatly enhance the environmental performance of this facility

5.3.4 Noise Levels

A simple definition of noise is "unwanted sound". The major noises associated with a pig unit are animals at feeding time, ventilation fans, feed unloading and tractors loading pig manure.

Noise levels are measured in decibels and a weighting factor (A) is applied to approximate the frequency response to the human ear. This weighted decibel scale, dB (A) correlates well with human sensations of loudness, disturbance and annoyance.
Noise emissions from this pig farm are not audible, at the site boundary. Noise levels are generally low and typical of a quiet rural area during daytime A noise assessment has been carried out on the facility by J. McEniry BE and a report does not indicate any excessive noise from the facility and is within the boundary limits generally imposed on industrial facilities. The report is included as Appendix 5.

5.3.5 Traffic Levels

The traffic on the R331, servicing the pig farm, is mainly domestic and agricultural i.e. livestock lorries, bulk milk tankers, silage and harvesting machinery. Traffic is generated by the development under the following headings: Details are set out below of the current and proposed traffic movements of this development.

They come under the following headings.

1. Staff transport
   There will be 4 movements to and from work daily.
2. Stock Deliveries
   There will be 1 deliveries of gilts per annum.
3. Feed Deliveries
   There currently are approx 2.5 deliveries of feed per week (Compounded Feed sourced from AW Ennis).
4. Stock sales & Carcasses
   There are currently a maximum of 4 traffic movements weekly from this site and this will remain the same post this development. Carcasses are currently removed fortnightly from this site a
5. Service staff, sales, inspectors, etc.
   There is currently and will be an average of 2-4 car visits per week for service men, salesmen, and inspectors from all regulatory authorities to this facility
6. Delivery of manure to customer farmers.
   There is 3380 M3 approx of pig manure to be delivered to customer farmers per annum. This will require 11 loads per week over the spreading period from 15 January to 15 October assuming the average load size of the Vacuum tanks available at 10.5m3.

5.3.6 Flora and Fauna

The proposed development is to be carried out adjacent to an existing pig farmyard complex. The Flora and Fauna associated with this site and surrounding lands has developed in line with the agricultural activities carried out. There are no specific habitats, flora or fauna on this site that require specific protection. See appendix 7 for a detailed flora and fauna report.

Animal manure produced in the existing facility is currently distributed to local farmers in response to their demand and for their use on their farmland. The use of animal manure to fertilise farmland is subject to statutory control under S.I. 101 of 2009. Pig manure is only applied to agricultural lands where a crop response is anticipated.

6.0 DESCRIPTION OF IMPACTS AND MITIGATION MEASURES

6.1 Human Beings

The facility employs 4 full time staff and a manager. These staff reside locally with a significant positive economic impact on the area. The unit will also indirectly lead to another 35 jobs in pig meat processing, feed compounding and the service sectors. The nearest dwelling is 40m from the proposed development which is John Sheridan's dwelling. The development does not have a detrimental effect on the living standards of these residents. The traffic increases associated with the development are minor.

6.2 Flora and Fauna

The pig rearing enterprise is to be carried out adjacent to an existing pig farmyard complex. The Flora and Fauna associated with this site and surrounding lands has developed in line with the agricultural activities carried out there. There are no specific habitats, flora or fauna on this site that require specific protectionFlora and Fauna is described in the report attached in appendix 6

6.3 Soils & Geology

The site lies within an area of Dinantian Pure Embedded Limestone. The bedrock geology in the catchment is in the main pure limestone with a small portion of muddy limestone. These are described in the "Strategies For Source Protection in Counties Galway, Mayo and Roscommon" (H. Price & T. Johnston, TCD.) The pure limestone bedrock is described as medium grained, pure, medium to thick bedded limestones with subordinate intervals of shale. These rocks consist of less than 10% shale or argillaceous limestone and they may include chert. The muddy limestone rocks are dark grey, fine grained, well bedded limestones with calcareous mudstones and occasional Oolitic lenses. They consist of 30-40% mudstones or strongly argillaceous limestones.

Subsoils - (Quarternary Geology)

The main groups in the catchment are Till, Undifferentiated subsoil, Gravels, Bedrock Near Surface, Outcrop, Peat, Lakes/Rivers, Turloughs. Till is a group of sediments that range between a high clay content group to a clast supported stony group. They are the sediments of glacial action. They are subdivided by particle size into six categories; clayey till, silty till, sandy till, gravelly till, stony till and till with gravel.

Undifferentiated subsoil hither to known as --drift and shallow drift" are the glacial deposits laid down by melting icebergs which drifted across a ice age sea. Gravels and sands were laid down by glacial melt waters as the ice sheets melted. Some were deposited as river gravels and others in ice dammed lakes. These have little or no silt or clay fraction.

Bedrock Near Surface - This group refers to soils with bedrock at or near « 1m) surface.

Outcrop - Bedrock appears above ground level.
Peat is post-:glacial in origin. This organic soil or deposit can be subdivided into six categories;

- Raised Bog Undifferentiated
- Blanket Bog Undifferentiated
- Raised Bog Intact
- Raised Bog Cutover
- Blanket Bog Intact
- Blanket Bog Cutover

In the west of Ireland, groundwater accounts for approximately 22 % of the total public water supply. The figure for Mayo is 18% with a significant proportion of it used for drinking water rather than industrial or agricultural use. The spreadlands are based on a regionally important limestone aquifer. The risk of groundwater pollution depends on the interaction between the natural vulnerability of the aquifer and it's pollution loading.
Groundwater vulnerability is an intrinsic characteristic of an aquifer which is determined by factors such as the type of subsoil and the depth of overburden. Other features such as turloughs, springs, caves, swallow holes and rock outcrops can affect the pollution risk to the aquifer.

6.4 Water

On Site During Construction Stage

Soil, waste concrete and toxins in runoff from construction sites or fuels, accidentally spilled during storage or delivery, can enter watercourses. Fine sediments from the bottom or sides of streams can be mobilised during in-stream construction. These pollutants can impact aquatic habitats, plant life, invertebrate and all life stages of fish.

Mitigation Measures

- Ensure silt is not directly released into watercourses, keep activities away from river and stream banks where possible.

On Site During Operational Stage

The main potential treat to ground water in the vicinity of the pig farm site is due to the storage of a relatively large volume of animal on the farm. In order to nsure that the proposed development does not impact on the groundwater adjacent to the pig farm site the following measures will be implemented.

(i) All tanks are constructed to Department of Agriculture, Food and Rural Development Standards for construction of farm buildings.
(ii) The provision of a substantial amount of excess manure storage capacity, well above the 6 month minimum requirement will ensure that organic fertilizer is managed to the highest possible standard on the pig farm site. The table included at 3.5 calculated the volume of Manure and biomass processed per annum at 25830m3and the structures table 3.6 calculates the manure storage capacity at 14405m3 which is more than 6 months manure storage.

This proposed development will further reduce the potential impacts at this site, due to the following mitigation measures,

(i) The removal of raw pig manure on a regular basis from the existing storage tanks and channels under the houses will reduce the loading pressure on these tanks.

(ii) A leak detection system will be provided under all new structures and facilities in this proposed development.

Customer Farmlands

Pig Manure can cause serious water pollution if discharged directly to groundwater or surface waters. The manure will be spread in accordance with the Nitrate Directive Regulations (S.I. No. 101 of 2009) reduces the risk of groundwater contamination. To reduce the risk to groundwater, All pig manure on site will be stored in underground concrete tanks, built to Dept of Agriculture specifications. All manure on site will be stored in covered storage tanks, constructed according to Dept. of Agriculture specifications. A freeboard of 200mm has been allocated to all tanks under slats to contain gasses. There will be no impact from these on surface or ground waters. The pig manure will be abstracted from dedicated abstraction points from the tanks under the pig houses by vacuum tank. All new structures will be provided with leak detection systems which will be visually inspected regularly, and samples analysed quarterly for COD/BOD.
There has been no historical contamination of groundwater at this site. This development will minimise the potential impacts at this site, due to the following mitigation measures,

(a) subject to sub-article (5), 200m of the abstraction point of any surface watercourse, borehole, spring or well used for the abstraction of water for human consumption in a water scheme supplying 100m3 or more of water per day or serving 500 or more persons,

(b) subject to sub-article (5), 100m of the abstraction point (other than an abstraction point specified at paragraph (a)) of any surface watercourse, borehole, spring or well used for the abstraction of water for human consumption in a water scheme supplying 10m3 or more of water per day or serving 50 or more persons,

(c) subject to sub-article (5), 25m of any borehole, spring or well used for the abstraction of water for human consumption other than a borehole, spring or well specified at paragraph (a) or (b),

(d) 20m of a lake shoreline,

(e) 15m of exposed cavernous or karstified limestone features (such as swallow-holes and collapse features), or

(f) subject to sub-articles (8) and (9), 5m of a surface watercourse (other than a lake or a surface watercourse specified at paragraph (a) or (b)).

(g) The application of digestate from the proposed facility, which will replace the current practice of application of raw pig

manure, will greatly reduce the risk of nitrate-nitrogen contamination of groundwater, due to the alteration of nitrogen which occurs in the process, rendering it more suitable for plant uptake.

(h) AD increases the proportion of nutrients immediately available for uptake by plants, due to the mineralization of nutrients during the digestion process.

6.5 Air

There are two aspects to the development relating to air quality: on site issues and off site land spreading.

On Site.

The pig farm is located in an agricultural area where typical levels of farm odour are to be found and expected. This odour arises from farmyards and lands during the day to day operations such as silage feeding manure agitation and manure spreading. The existing farm using the best available practices, is already operating without significant effect on the environment and will continue to strive to minimise all environmental impacts. |Well maintained, properly ventilated slatted floored pig farm low odour impacts. There are no odour sensitive locations within 200m of the farm facility other than the Applicants dwelling. The surrounding undulating topography helps to mitigate the odour potential.

The standard of management in good animal husbandry mitigate the odour generating potential. The houses will be continuously washed, disinfected and rested between batches, stocked at optimum levels and adequately ventilated ensuring minimal odour emissions. Should technical advances be made in odour reduction the farm operations will adopt any economically viable practices. Odours and emissions from modem well-managed pig farms are insignificant outside the confines of buildings and adjoining yards. Since manure will be removed only by vacuum there will be no odours created during manure withdrawal.

As protection against odour nuisance on site during ordinary operation including delivery and tipping of biomass into the reception area, an exhaust system will be established from the proposed reception building to two bio filters located outside the building. The purpose of the exhaust system is to ensure that significant escape of odour from the building does not occur. The system will be designed to ensure the required number of air changes per hour is achieved. In order to maintain negative pressure within the building all exits will be closed during tipping of biomass into the reception area. All material delivered to the site can be tipped inside the proposed building under negative air pressure which will reduce emissions to air.

Customer Farmlands.

The odour impact of land application of liquid digestate vv pig manure will be reduced by 80% approx, based on studies undertaken in Denmark on the actual application of liquid digestate replacing pig manure applications. The nett result of this proposed development will be a major reduction of the current level of emissions from the associated pig farms, in the order of at least 50%, and the resultant land application operations, in the order of 80%. The proposed customers lands whereupon it is proposed to use pig manure digestate are entirely located in a farming area where the air quality is determined by odours emitted from manure, animals and foodstuffs (e.g. Silage). Nevertheless, every effort is being made to reduce offensive odours to insignificant levels. The following mitigation measures will be in place,

- All manure will be spread from tankers fitted with a low trajectory splash plate or band spreader to minimise aerosol formation and dispersion.
- Customer farmers will be advised not to apply pig manure digestate nearer than 100 meters of any dwelling house save with the express approval of the inhabitants in writing.
- No spreading of pig manure will be permitted in windy weather close by dwelling houses or main roads.
- The proposed development of the anaerobic digester and the application of digestate rather than pig manure will significantly reduce impacts on air quality.

6.6 Climatic Factors

Mean annual precipitation for south east Mayo, as recorded by Met Eireann, is about 1200mm, with a Dec / Jan monthly high of 130mm to a low for July of 65mm. The adequacy of storage of 29 weeks will ensure that slurry is spread only at times that are acceptable.

The proposed development will create an increase in traffic thereby increasing pollutant emissions from traffic. However, the biogas produced is a renewable energy source and whether used as a transport fuel or to produce electricity, it displaces fossil fuel energy. Consequently, there is an overall reduction in emissions of greenhouse and acidifying gases from the overall development.

6.7 Landscape

Visual impacts are a sub set of landscape impacts They relate solely to changes in available views of the landscape and the effects of those changes on people.
The significance of landscape and visual impact is a function of the sensitivity of the affected landscape and visual receptors and the magnitude of change that they will experience.

The Farm
The potential visual impact of the extension to this farm could be described as perceptional vulnerability. It attempts to measure the advantage or disadvantage provided by the landscape for observation thus how critical is the view. Visual vulnerability of the landscape regarding this extension can be considered as :

- Highly vulnerable if the development is on open countryside or in an amenity/recreational Area or above the existing ground level.
- Vulnerable if it is in an area where the development is only partially screened by trees and hedgerows.
- Not vulnerable when at ground level away from public amenity areas and screened by trees and hedgerows.

Conclusion The visual vulnerability rating for this development is regarded as not vulnerable.
The pig farm is located in a natural dip in the rural landscape. Some of the structures on the Biogas Plant are up to 16m tall. These are difficult to mitigate. Careful consideration will be given to the final colour of the high structures to minimise the visual impact.

6.7.1 Effects on Landscape Character

- External Finishes
  The external walls of the buildings are coloured to blend with the surrounding landscape as much as possible.
- Building Heights
  The buildings are designed to keep ridge heights to the lowest possible level. This is achieved by minimizing roof slopes and groundfloor to eaves levels.
- Roofs and Feed Silos
  The colour of the roof cladding is dark grey or green It is planned to tone all silos to muted greys or dark green.
- Screening
  The site has no visual impact on travellers on the 331Ballinrobe/Claremorris public road. It is located in a natural dip in the landscape and screening is not required and could be out of place

In order to determine whether the proposed anaerobic digester would have significant landscape character effects within the local area, it is necessary to establish:

a) Whether it would be so dominant within an area as to give rise to a new landscape type.

b) Where the development is noticeable but not a characterising element of the landscape and therefore have no impact on landscape character.

c) At locations where the development would be a noticeable but not a characterising element of the landscape, there may be a change in the view, i.e. a visual effect when looking out from an area, but the landscape.

The development being long established and blends well into the landscape

6.7.2 Landscape Impacts

Landscape impacts likely to arise from the construction and operational stages of the proposed development are:

1. Stripping of topsoil and subsoil.
2. Construction of screening bunds from soils and overburden.

6.7.3 Landscape Receptor Sensitivity

Landscape receptors are areas of landscape, categories of vegetation, wildlife habitat or landform that would experience effects arising from the development. The sensitivity of receptors is a measure of the ability of each to accommodate change without undue detriment to its size, character or significance within its local context. Sensitivity can be determined by assessing the following:

- The importance of a landscape element or feature within the site.
- The importance of the landscape of the site within the local area.
- Its status in terms of landscape designations.
- Its wildlife or heritage value. Its scenic qualities and the presence or absence of detractors.
- Its uniqueness and "replaceability".

The sensitivity of landscape receptors affected by the development is discussed below:

- The existing farmland is of low to medium sensitivity.

6.8 Materials Assets.

The Heritage Service were visited and the consultation revealed that the spreadlands are not within sensitive areas for conservation ie .S.P.A's, S.A.C's F arm reference Plots2 -4 border an N .H.A. Farm1 5,plot 1 also borders an N.H.A.
Buffer zones are applied to the features listed below. Substitution of pig slurry for inorganic, commercial fertiliser will have no impact on earthen work features such as forts. Please refer to Appendix 4 for the assessment

6.9 Traffic.

The traffic on the R331, servicing the pig farm, is mainly domestic and agricultural i.e. livestock lorries, bulk milk tankers, silage and harvesting machinery.
Traffic is generated by the development under the following headings:
Details are set out below of the current and proposed traffic movements of this development.

They come under the following headings.

1. Staff transport
   There will be 4 movements to and from work daily.
2. Stock Deliveries
   There will be 1 deliveries of gilts per annum.
3. Feed Deliveries
   There currently are approx 2.5 deliveries of feed per week (Compounded Feed sourced from AW Ennis).
4. Stock sales & Carcasses
   There are currently a maximum of 1 traffic collection fortnightly from this site and this will remain the same post this development. Carcasses are currently removed fortnightly from this site a
5. Service staff, sales, inspectors, etc.
   There is currently and will be an average of 2-4 car visits per week for service men, salesmen, and inspectors from all regulatory authorities to this facility
7. Delivery of digestate to customer farmers.
8. Deliveries of Co-digestion biomass approximately 11 deliveries per week

Table 2: Traffic Movements to Service this Site

Existing Situation.

The entrance to the proposed Biogas Plant is located at on a local road off the R331. The proposed entrance will be located on the local road and will have adequate sightlines. The local road intersects the R331 approx 600m from the proposed site. The existing Pig Farm facility is located 300m further along the laneway. The road Speed limit is 80Km/Hr.

The proposed development consists of expansion of the existing pig enterprise and a biogas plant to process the manure with additional biomass. Imported Biomass for the proposed digester plant will be in the order of 11 loads of Feedstock per week. The additional materials proposed are currently landspread in its undigested form which has lead to odours during land application.

The pig manure produced on the pig farm is currently exported off the farm to customer farmers , the route taken from the farm in all cases is up to the junction with the R331 and from there on any of 3 direction .

The Traffic associated with the Currently Approved Biogas Plant is set out in the Schedule below

No	Vehicle Type Car/Lorry etc	Details	Capacity	Weekly Units	Annual Units
1	Car	Staff to work		13	676
2	Lorry	Gilt deliveries			
3	Lorry	Feed deliveries	24 Tonne	2.5	104
4	Lorry Lorry	Fat Pigs to Factory Carcasses to rendering	200 15 Tonne*	1 0.5	50 26
5	Car	Service staff; sales men; Inspectors		4	208
6	Tractor/Vacuum Tanker	Manure to customer farmers	10 m3	10	320
Totals				248	12877

Expected Traffic Movements with the proposed Additional Biomass to and from the Farm and also from Expansion of the Pig Unit.

No	Vehicle Type Car/Lorry etc	Details	Capacity	Weekly Units	Annual Units
1	Car	Staff to work		20	1040
2	Lorry	Gilt deliveries			
3	Lorry	Feed deliveries	24 Tonne	8.5	104
4	Lorry Lorry	Fat Pigs to Factory Carcasses to rendering	200 15 Tonne*	7 0.5	350 26
5	Car	Service staff; sales men; Inspectors		4	208
6	Lorry or Tractor/Vacuum Tanker	Liquid Digestate to Customer Farmers	15.5 m3*	10	320
	Lorry	Fiberous Digestate to Customers	25 tonnes	248	12877
		Imported Organic Biomass	20 tonnes	22.5	1170
Totals				320.5	16095

*The Liquid Digestate exporting from the Biogas plant will be transported with lorries as well as Tractors.

The volume of traffic to occur on site during the construction phase will be similar to the current levels as set out in the tables above. The site lines at the entrance of this facility is indicated on Drsawing No 27 in appendix 2 and details of the junction with R311 Ballinrobe-Hollymount road, both are more than adequate (See report included in Appendix 14).

6.10 Noise.

Noise levels are measured in decibels and a weighting factor (A) is applied to approximate the frequency response of the human ear. This weighted decibel scale, dB (A). Correlates well with human sensations of loudness, disturbance and annoyance. Background noise level in rural areas of Ireland are in the 45-50 dB (A) range.

The peak noise periods on pig farms are at feeding times. Since all growing / finisher pigs are ad libitum fed with computerised probe feeding systems, these peaks in noise levels will be avoided. The gestating sows are the only animals on a restricted diet, however these animals make up a small proportion of the entire herd of pigs on the farm. They will be fed under supervision, during the normal working hours. These animals will have free access to roam in their pens and are less likely to make noise at feeding time. All gestating sows will be fed to individual requirements via a computerised system that recognises each sow via transponders in the sow's ear tag. This farm will have state of the art buildings with high insulation standards. Due to its remote location and the low population density in the area, this pig farm will not create a disturbance or annoyance to anyone

The results of a number of noise surveys that were carried out by J McEniry BE are contained appendix 5. These results confirm that noise emissions from pig farm as developed have no detrimental. impact on the surrounding environment. There has been no noise complaints from the activities on the farm facility and it is not expected that the management practices will give rise to noise nuisance.

Apart from the noise source outlined above, noise levels at other times are insignificant. Environmental noise resulting from activities at the site should not exceed 55 dB (A) Leq during daytime (08.00 to 22.00hrs) and 45 dB(A) Leq during night-time (22.00 to 08.00hrs). Due to its remote location and the low population density in the area, this facility will not create a disturbance to anyone. All traffic into and out from the facility will occur during normal working hours.

7.0 INTER-RELATIONSHIP BETWEEN FACTORS

	Human Beings	Flora & Fauna	Soils & Geology	Water	Air	Noise	Climate	Land-scape	Traffic	Cultural Heritage
Human Beings				√	√	√	√	√	√	
Flora &Fauna				√				√		
Soils & Geology				√				√		√
Water										
Air							√		√	
Noise									√	
Climate										
Land-scape										
Traffic										
Cultural Heritage										

7.1 Inter-Relationship between Human Beings and Water

The Prevention of water polluting from fertilisers and certain activities is discussed in detail in section 6.4 of the EIS.

The proposed development will not result in any new potential surface water or groundwater impacts relative to those predicted for the existing piggery. Surface water and roofwater will be diverted to an existing stream west of the site boundary. The storm water can be monitored prior to it entering the existing watercourse.

Groundwater

Pig Manure/Digestate can cause serious water pollution if discharged directly to groundwater or surface waters. The manure will be spread in accordance with the Nitrate Directive Regulations (S.I. No. 101 of 2009), this coupled with the alteration of nitrogen in the digestion process means the proposed development reduces the risk of groundwater contamination.

7.2 Inter-Relationship between Human Beings and Air

There are two aspects to the development relating to air quality: on site issues and off site landspreading.

As protection against odour nuisance on site uses the best available practices, is already operating without significant effect on the environment and will continue to strive to minimise all environmental impacts. Well maintained, properly ventilated slatted floored pig farm low odour impacts.

The odour impact of land application of is mitigated by adherence to Teagasc Code of Good Practice , SI 378 of 2006 and SI 101 of 2009 maintaining a good working relationship with neighbours. The application of organic fertiliser in accordance with SI 378 of 2006 and SI 101 of 2009 will ensure that excessive application of manure is avoided, the use of low trajectory splash plates, and the proper and even allocation of organic fertilisers, all customer farmers receiving organic fertiliser from the pig farm are advised not be applied to lands adjacent o neighbouring dwellings/potential odour sensitive locations, A recommended set back distance of 100 meters from an isolated dwelling and for 200 meters from a potential odour sensitive area/group of dwellings will be recommended.

7.3 Inter-Relationship between Human Beings and Noise

The major noises associated with a facility of this nature is pigs at feeding times. All growing / finisher pigs are ad-libitum fed with computerised probe feeding systems, these peaks in noise levels will be avoided. The gestating sows are the only animals on a restricted diet, however these animals make up a small proportion of the entire herd of pigs on the farm. They will be fed under supervision, during the normal working hours. These animals will have free access to roam in their pens and are less likely to make noise at feeding time. All gestating sows will be fed to individual requirements via a computerised system that recognises each sow via transponders in the sow's ear tag. This farm will have state of the art buildings with high insulation standards.

The major noises associated with a facility of this nature will be delivery of organic material to the reception tank and collection of the liquid digestate from the geomembrane lined manure storage basins. The CHP Unit will operate within a Concrete Enclosure, specifically constructed for this purpose. Apart from these, noise levels at other times are insignificant.

A secondary source is vehicles accessing and leaving the facility, these are between the hours of 8.00 and 18.00 normally, vehicles delivering to and collecting from the facility are maintained to the highest standard.

7.4 Inter-Relationship between Human Beings and Climate

The pig unit has operated at its current capacity since 1989. Agriculture is the dominant source of both methane and nitrous oxide emissions in Ireland Non-ruminants, pigs contribute to a lesser extent than ruminants. Increasing sizes of Tractor – Tanker sizes used to transport manure from the farm to customer farmers optimises the fuel consumption per m3 delivered.

The proposed development will involve an increase in traffic in comparison to what is already servicing the existing piggery. The increase in Imported Biomass for the proposed digester plant will be in the order of 9 loads of Feedstock per week. The additional digestate produced to be exported off site would be in the order of 9 loads per week. This additional traffic will increase the greenhouse gas emissions on site.

The biogas produced is a renewable energy source and whether used as a transport fuel or to produce electricity, it displaces fossil fuel energy. Consequently, there is an overall reduction in emissions of greenhouse and acidifying gases, both of which Ireland has international commitments to reduce.

7.5 Inter-Relationship between Human Beings and Landscape

The facility is located in a natural depression in the landscape, the external finishes on the structures are plaster which blends with the surrounding landscape. The houses are low profile buildings with minimal pitch roofs to limit the visual impact.
The development being long established and blends well into the landscape. It is not intrusive on the landscape and the site has no visual impact on travellers on the R 331Ballintobe/Claremorris public road, further screening would be out of character with the landscape

A landscaping proposal consisting of planting between Animal Byprodcts Standard Fencing and external stock proof fence surrounding the biogas plant using native spices trees. It proposes to create a burm around the perimeter of the site with specimen trees placed on top. It will not be possible to completely hide the development from view as the tallest structure on site is the primary digester which is 16m in height.

Mitigation Measures

External Finishes

All new buildings and re-cladding to be in selected colour/colours to blend with the surrounding landscape as much as possible. It is proposed to discuss and agree with Mayo County Council a scheme prior to commencement.

7.6 Inter-Relationship between Human Beings and Traffic

The inter-relationship between humans and traffic is detailed in section 6.9. It is considered that the existing road network is capable of taking the traffic volumes generated from the pig farm.

7.7 Inter-Relationship between Flora and Fauna and Water

A flora and fauna report was prepared for the proposed development and is included in attachment 6.
The spreading of digestate has the potential to impact on water quality. It is essential that the recommendations for landspreading outlined in section 6.4 of the EIS are followed to minimise the risk to any watercourse

7.8 Inter-Relationship between Flora and Fauna and Landscape

The development does not result in the loss of surface vegetation through the stripping of soils. The soils were used to create a burm around the perimeter of the site which over time has been colonised creating areas of habitat and promoting biodiversity . The site is in a topographical depression and is partially screened by the surrounding landscape.

7.9 Inter-Relationship between Soils and Geology and Water

The site lies within an area of Dinantian Pure Embedded Limestone. The bedrock geology in the catchment is in the main pure limestone with a small portion of muddy limestone. There are no adverse or unacceptable impact on the geological environment as a result the development.

7.10 Inter-Relationship between Soils and Geology and Landscape

The works involved the removal of soil in preparation for the construction of the buildings The overburden was used to construct a burm on which have recolonised which help mitigate the visual impact of the development and provides a habitat for flora & fauna.

7.11 Inter-Relationship between Soils and Geology and cultural heritage

There are no archaeological sites within the vicinity of the development.

7.12 Inter-Relationship between Air and Climate

The traffic associated with the development has been consistent for many years, recent improvements in vacuum tanker technology increases the size of the tankers which leads to more efficient use of fuel in delivery of manure. The farm buildings are insulated to a high standard reducing the requirement for heating and fossil fuel consumption.

Computerised temperature control systems maintain the ventilation of the houses at optimum air movements within the pig houses which mitigate any odour potential.

7.13 Inter-Relationship between Air and Traffic

The maximum impacts on ambient air quality will be experienced within about 10m of the roadside where the vehicles are passing. The impacts at distances further removed from the roadside will be insignificant since the pollutants will be rapidly and effectively dispersed as the distance from the roadside increases.

7.14 Inter-Relationship between Traffic and Noise

The traffic associated with the pig farm has been consistent over the years, however the delivery trucks, tractors and cars and these will not have a significant impact beyond the site boundary. There will be an increase in traffic to the proposed development, however these will be delivery trucks and cars and these will not have a significant impact beyond the site boundary. The proposed development will not be a source of noise nuisance to neighbouring dwellings. Road-going vehicles are maintained to the highest standard with exhausts regularly attend to.

	Category	Potential Environmental Issues / Effects	Potential Impacts - Site	Potential Impacts - Customer Farms	Duration	Mitigation	Residual Impact
Human Beings	Agriculture and Land	Hydrocarbon - Mineral Fertilizer Substitution	Neutral	Positive	Long term	Organic fertilizer to replace Hydrocarbon - Mineral Fertilizer. Increase profitability by cost reduction in fertilizer	None
	Neighbours	Application of Digestate	Neutral	Positive	Long term	Lower odour impacts from landspreading than from undigested organic fertilizers	Slight
	Climate	Contribution of Greenhouse gases	Positive	Positive	Long term	Conversion of Methane to electrical/heat energy with reduction in GHG,	Positive
	Traffic	Contribution of Greenhouse gases	Negative	Negative	Long term	Minimise traffic volume by optimising load sizes.	Slight
	Noise	Biomass deliveries and digestate removal	Negative	Neutral	Long term	Biomass deliveries and digestate removal during working hours.	Slight
	Air	Generation of Odours	Neutral	Positive	Long term	Exhaust system built into reception building, replacing pig manure with digestate significantly reduces odour impact.	Positive
	Water	Risk of Contamination	Neutral	Negative	Long term	On site storage tanks bunded, underground tank with leak detection system. Code of good practice applied SI 378 Customer Farms, Buffer Zones, Fertiliser Planning.	Slight

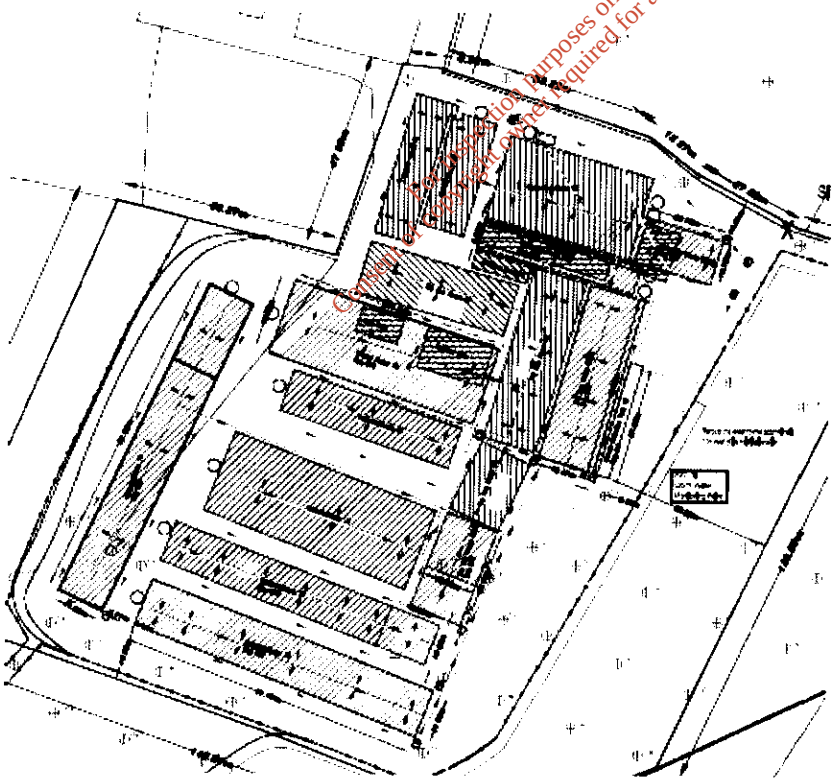
	Category	Potential Environmental Issues / Effects	Potential Impacts - Site	Potential Impacts - Customer Farms	Duration	Mitigation	Residual Impact
Natural Environment	Flora and Fauna	Habitat Loss	Neutral	Neutral	Long term	Existing site of no significant ecological importance.	None
		Eutrophication	Neutral	Neutral	Long term	On site storage tanks bunded, underground tank constructed to Dept of Agriculture Specification. Code of good practice applied SI 378 Customer Farms, Buffer Zones, Fertiliser Planning.	Slight
	Landscape	Visual Impact	Negative	Neutral	Long term	The facility located in Topographical depression, Buildings with minimal ridge height, Walls of buildings plastered to blend to the surroundings.	Slight
	Archaeology	Disturbance of archaeological finds	Neutral	Neutral	Long term	Site not located near any archaeological sites.	Slight

8. MONITORING

8.1. DRAINAGE FROM THE SITE

The Site is within the catchment of the Robe River. A drainage ditch forms the eastern boundary of the Pig farm complex and extends for approximately 200m to the Robe River

Uncontaminated roof water from the pig unit is collected via the proposed stormwater collection system as identified on site layout plans 001 and 002 included in Appendix 2, to a monitoring points identified SW1(N) to the east of the pig unit, where it then flows into the adjacent watercourse to the Robe River. The stormwater collection system in the Biogas Plant will be routed to a single monitoring point SW2(N) located at theNorthern Boundary of the Biogas Plant where the the storm water is piped from the monitoring point to the OPW drainage network to the north of the facility. A sample will be taken from this watercourse annually and analysed for COD at an independent laboratory. All soiled water from the site is diverted to the storage tanks. A visual inspection of this monitoring point will be made and recorded weekly A copy of the stormwater visual inspection register is included in Appendix 12.



Water samples have been taken both upstream (ITM Co-ordinate 521236, 766640) and downstreams (ITM Co-ordinate 521296, 766595) of the confluence of the watercourse and the Robe River.

Analysis of this sample indicate that the water quality both upstream and downstream of the confluence of the watercourse and the river are similar also the parameters analysed are in the range of the Analysis from the Bridge at Ballinrobe between 1991 and 2003. Therefore there is no negative impacts on surface from the pig farm on surface water quality.

8.2. GROUNDWATER AND SURFACE WATER

The water supplying for the farm facility is provided by the Local Cregduff Group Water Scheme. The water source is located from a protected well ITM 522447, 763221 with the adjacent spring indicated on the Historic Ordinance Survey Maps. The borewell data for the spreadlands included in Appendix 8 obtained from the Geological Survey of Ireland 2002 indicate the depth to bedrock. The townland location of the wells tabulated are in close proximity to or on the spreadlands townlands as tabulated in the Customer List in the Nutrient Management Plan (See Appendix 4) . The depth of soil as logged indicate that there is adequate surface to the bedrock to protect the groundwater resource.

8.3. PIG MANURE/DIGESTATE USE

The pig manure/digestate storage capacity on site will be monitored and recorded monthly, and a record of this register will be kept on site for inspection by Mayo County Council, and any other regulatory officials at any reasonable time.

A register of all pig manure delivered from the facility will be kept on site. This will record the date, quantity, destination, N and P content of pig manure supplied to customer farmers. This will be available for inspection by Mayo County Council, and any other regulatory official's at all reasonable times.

8.4. OTHER WASTES

A register of all other wastes (i.e. carcasses, veterinary waste, fleurocent tubes, and refuse) will be maintained on site, recording the date, volume and destination. A copy of these registers will be available on site for inspection by Mayo County Council, and any other regulatory officials at any reasonable time.

- Carcass Register.
- Veterinary Waste Register
- Refuse Register

8.5. ACCIDENTAL SPILLAGES

Pig manure and imported biomass are the only material of concern, as feed and oil storage tanks on site will be locally bunded. Since tankers must be pressurised for delivery of liquid digestate, the risk of any sizeable leakage or spillage is minimal. In the case of an accidental spillage occurring, the developer will notify Mayo County Council & the EPA, and any other regulatory officials and will take the necessary measures to clean up such a spillage. An Emergency Response Procedure has been put in place to deal with such a situation. This procedure is included in Appendix 12. Separate Procedures are also included in Appendix 12 to deal with the Removal of Pig Manure from the pig houses to the Storage tanks, and in the event of any Emergency situation developing on site which may create an environmental risk. All tankers will be kept clean.

8.6 CONTROL OF RODENTS

Staff members successfully carry out the control of rodents on the site. Management insures that this work is carried out professionally and that proper records are maintained.

9.0 ENVIRONMENTAL MANGEMENT PROGRAMME

9.1. INTRODUCTION

The applicant will implement and maintain a comprehensive monitoring programme on site to provide maximum protection for the environment. This plan will involve maintaining an organic fertiliser register and visual inspection of all storm water outlets and leak detection monitoring points.

9.2. MANAGEMENT OF CO-PRODUCT USE

The area available for use of pig manure is much greater than that required. Pig manure will be applied at the rates provided for in the Nitrate Directive Regulations (S.I. no. 101 of 2009). A delivery register will be maintained on site showing the date, amount of pig manure delivered the owner and farm code of the land and the volume of N and P delivered. This register will be available for inspection by Mayo County Council, and any other regulatory official's at all reasonable times.

9.3. PERIODS AND RATES OF USE OF PIG MANURE

This issue is regulated by the Nitrate Directive Regulations (S.I. No. 101 of 2009), which provides for application of pig manure in this area between 15 January to 15 October, in accordance with a fertiliser plan. John Sheridan is committed to ensuring that the use of pig manure from this facility, is carried out in accordance with these regulations, and will advise all customer farmers to comply.

9.4. REDUCTION OF RISK OF DESEASE SPREAD

The economic viability of a pig production unit at going rates depends primarily on feed conversion ratio and low mortality. High standards of hygiene will ensure that disease is controlled and contained. Access to the unit is strictly restricted, to control the spread of disease to the pig herd. The procedures for dealing with dead animals as set down in Section 3.4.2 are standard for the industry.

9.5. De-Commissioning/Life Span of Development

All pig units require a major capital investment every 10-20 years to keep them efficient and pleasant places to work. So long as this investment is made there is no reason that a unit of this type could not operate for up to 40 years. However, if for economic reasons or technical reasons this does not occur decommissioning will take place. All pig manure and organic matter will be thoroughly removed from the site. All equipment and materials of value will be salvaged. Unused feed, medication, and fuel will be returned to suppliers. It is then proposed that the unit be left standing after making it safe and secure. It is highly unlikely that this scenario would ever develop due to the high initial capital investment in the unit.

9.6. Depopulation

Depopulation of a unit occurs when a disease such as atrophic rhinitis or haemophilus pneumonia becomes so rampant on a unit that pig production becomes uneconomic. In this event, services cease and pigs are sold so that within 6 months the unit is empty of stock. The unit is left idle for 6 weeks, thoroughly washed and disinfected. After this 6 week period repopulation commences.

Destocking of a unit or complete slaughter of stock on a unit because of a notifiable disease has not happened in Ireland for more than 40 years. In the unlikely event of such a disease outbreak, the Department of Agriculture takes total control. In this event a licensed contractor, will be engaged, to remove all carcasses from the site in sealed containers, and delivery of same to a licensed rendering plant.