Amendment to

ENVIRONMENTAL IMPACT STATEMENT

In respect of the development of an Anaerobic Digester for

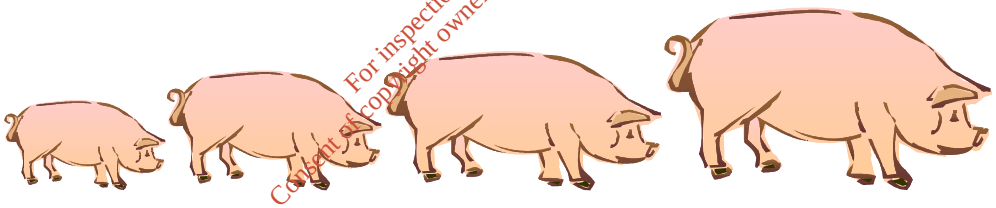
FUTURE PIGS LTD

AT

GORTEEN LOWER,

NURNEY,

CO. KILDARE



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For

FUTURE PIGS LTD
GORTEEN LOWER, NURNEY, CO. KILDARE.

Date MAY 2010
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1. NON-TECHNICAL SUMMARY OF PROPOSED DEVELOPMENT BY FUTURE PIGS LTD, AT NURNEY CO KILDARE

1.1 This proposal for an Anaerobic Digester adjacent to the existing pig farm at Gorteen Lower, Nurney, Co. Kildare (Grid Ref E7130, N0309), is being put forward by NRGE (Nutrient Recovery to Generate Electricity) Ltd, whose registered office is at Mooresfort, Lattin, Co. Tipperary. This application has been prepared and submitted by NRGE on behalf of Future Pigs Ltd, (Site Owners), whose registered office is at Kiltimagh, Co. Mayo to improve the environmental performance of the existing facility. This facility is fully compliant with planning regulations, and the proposed development has the benefit of full planning permission (Planning File Ref No 09/1058), which was granted on 22/04/09, with 10 conditions. The purpose of this application is to provide for an increase of the volume of organic material to be imported, to mix with the pig manure on site for treatment, to ensure the viability of the project. In addition it also proposes improvements to the entrance. The facility will conform to the highest standards. This application also complies with the requirement of the IPC Licence Reg No P0420-01, issued by the Environmental Protection Agency 15 May 2001, which required "*The investigation of the possibility of alternative treatment technologies such as digestion for the disposal of slurry*".

1.2 The development will occupy a landscaped site of approximately 11.17 hectares, (27.601 acres). The proposed works will reduce net emissions from the 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 by their IPC Licence. A map (Scale 1:2500) is attached which clearly outlines the site boundary marked red.

1.3. 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 clean-water from the site, is collected via the storm-water collection system (See Site Layout Plan, in Appendix 3), and directed into the monitoring points identified as SW1, SW2, & SW3 which is marked on said drawing. These monitoring points are visually inspected weekly, and sampled quarterly. All soiled water is diverted into the adjacent pig manure storage tanks. Each of the proposed structures will have an independent leak detection system, with individual inspection chambers, which will be connected to a site inspection chamber at the southern end of the site identified as LD1, on the site layout plan.

1.4. This proposed development complies fully with the conditions of IPC Licence Reg P0420-01, issued by the Environmental Protection Agency on 15th May 2001, in respect of this pig farm. This IPC Licence is being reviewed by the

Agency (Ref No. P0420-02) to incorporate the proposed Anaerobic Digester. The main components of this proposal are;

(i) Provision of new animal houses providing area compliance with Animal Welfare Regulations.
(ii) Provision of covered pig manure storage to replace existing open Pig Manure Storage tanks.
(iii) Provision of independent leak detection systems under all proposed structures on site
(iv) Covering of all passageways used by pigs.
(v) Removal of pig manure from under pig houses to anaerobic digester for treatment within 2-4 weeks of production.
(vi) Bunding of all feed tanks and fuel tanks on site.
(vii) Treatment of pig manure in anaerobic digester adjacent to site.

1.5 The estimated annual production of pig manure from this pig farm is 24,287 M3.

1.6 The pig farm and anaerobic digester will give direct employment to 18 staff members, and a trained manager. It will also give rise indirectly to another 80 jobs in the pig meat processing, milling and service sectors.

1.7 The application of animal manure digestate to farmland is now regulated under S.I. No. 101 of 2009 and distribution of manure digestate from this site will comply with those regulations. This facility is entitled to supply manure digestate 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 digestate will not be supplied to customer farms between 15th October and 31st 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.

1.8 It is planned to import an additional 23,900 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, Kildare 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.

1.9 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.

1.10 Following a detailed review of all available alternative technologies, to treat pig manure, as required by IPC licence P0420-01, 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 50% of the required biomass for this anaerobic digester
(ii) The additional biomass waste required will be sourced, and transported to the facility by lorry, at a rate of 20-25 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 70-80% of the P.
(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.

1.11 An Environmental Impact Assessment was carried out in support of this application. These entailed surveys of water for quality analyses, geohydrological surveys, Flora & Fauna, Archaeological, etc.
This facility is located at an elevation of approximately 70 m0D, and the Finnery River which is a tributary of the River Barrow flows within 300m of the site. The ground falls form the site towards the river. The geological information available indicates that the site is underlain by rocks of Carboniferous age known comprising Dinantian Lower Impure Limestone. The groundwater vulnerability is considered to be moderate to low.
Flora & Fauna, archaeological monuments and traffic levels were also noted. The following statements may be made.

(a) The quality of the surface and groundwater leaving the area is good.

(b) The impacts from traffic, noise and odours at the pig unit are insignificant
after all practical steps have been taken to mitigate them.

1.12 Proposals for monitoring surface and ground waters at the site are set down in this Environmental Impact Statement, in accordance with the conditions of IPC Licence Reg No P0420-01. A register of digestate quantities, date of delivery and name and farm code of landowner will be maintained for inspection by Kildare County Council, and the EPA at all reasonable times.

1.13 An Ecological Survey was undertaken by Carl Dixon in November 2007 of Dixon.Brosnan environmental consultants. A full copy of this report is included in Appendix 25. It is intended to fully implement the mitigation measures outlined.

1.14 There will be no damage to any site of archaeological or historic interest as a result of the development or digestate applications.

1.15 Disturbance of the landscape will be minimal during the construction period.
The site will be suitably landscaped, with the planting of trees etc., in a manner sensitive to the environment.

1.16 There will be no negative effects on tourism in the area.

1.17 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 bandspreader, and adhering to the Code of Good Practice for Spreading of Slurry.

The potential odour impact of this proposed development is discussed in a separate report (Full copy attached). 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.

1.18 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"*

1.19 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.

1.20 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.

1.21 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.

1.22 An assessment of sightlines at the entrance to this facility, at Gorteen Lower Nurney, Co Kildare, was undertaken 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 26.

1.23 A Tank & Pipeline assessment proposal has been prepared for this entire facility, in accordance with the requirements of the IPPC Licence issued by the EPA. This report is included in Appendix No 24.

2 INTRODUCTION

2.1 Relevant Regulations for Environmental Impact Statements (EIS)

The proposed development will result in the development of an installation that belongs in a class listed in Schedule 5 Part 2 of the Planning and Development Regulations 2001, and so the submission of an Environmental Impact Assessment is 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"*
The proposed facility will operate as a 3200 sow breeding unit. This statement is drafted with particular regard to Article 94 and schedule 6 in the 2001 regulations, and is submitted to provide information which may be helpful to the planning authority in making its decision on the application for permission to construct this new facility.

2.2. NATIONAL AND E.C. POLICY

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.

2.3. ORGANISATIONS AND BODIES CONSULTED

The scoping exercise of the EIS was carried out in line with previous submissions to Kildare County Council. Other organisations and bodies consulted include: -

Geological Survey of Ireland
Met Eireann

Central Fisheries Board
Office of Public Works
Department of Agriculture
Department of the Environment
National Parks and Wildlife Service
Teagasc, Johnstown Castle
Environmental Protection Agency

2.4 FORECASTING METHODS USED TO ASSESS THE EFFECTS ON THE ENVIRONMENT

Forecasting of the traffic and other impacts are forecast on the basis of the proposed Electrical Export Capacity of 1MW which sets the threshold for the operating parameters of the facility. All of the forecasted impacts from substrate importation and export from site is forecast on the basis of the Gas Yields from the identified Biomass sources.

Predictions of the impacts are proportion to the volumes of substrates processed both imported to the facility or produced on the farm as in the case of the pig manure.

2.4.1 BASELINE CONDITIONS

2.4.1.1 GAS YIELD

The energy yield for the Identified Biomass Sources have been calculated based upon Sustainable Energy Authority of Ireland published "Digestion Substrates" Table (http//www.seai.ie/Renewable/Bioenergy/Bioenergy/Anaerobic_Digestion /Substrates/) , South Denmark University published "Biogas Handbook" and International Biogas & Bioenergie Komperenzzentrum "Biogas aus Biomasse". The energy yield calculations dictate the volumes of Substrates required to achieve the energy output, and the intended electrical export capacity of 1MW from the biomass identified. The substrates quantities to achieve the yield calculates the Traffic impacts.

2.4.1.2 TRAFFIC

Forecasting methods used in assessing the Traffic Impacts were based upon the existing traffic volumes to the existing adjacent Pig Farm and the additional traffic movements associated with the co- digestion of imported biomass, are based upon the volumetric and weight capacities of the suitable road vehicles for the delivery of the biomass to the facility and for transportation of digested biomass to customer farmers.

2.4.1.3 ODOUR

Baseline odour assessment are based upon the EPA's commissioned OdourNet UK "Odour Impacts and Odour Emission Control Measures for Intensive Agriculture. Part 1 A: Odour annoyance assessment and criteria for intensive livestock production in Ireland".

2.5 TECHNICAL DEFICIENCIES ENCOUNTERED BY THE DEVELOPER IN COMPILING THE REQUIRED INFORMATION.

No significant difficulties were encountered in the preparation of the EIS, The developer operates a similar Biogas Plant on his farm in Germany. The operation of that biogas plant is similar to the proposed plant. The German Plant has operated since 2004 and a great deal of the operational experience and methods of handling of substrates and digestate has been amassed in the intervening time, this information has been made available in the preparation of the EIS

2.6 THE EXPERTISE, EXPERIENCE, INDEPENDENCE AND OBJECTIVITY OF ENVIRONMENTAL SPECIALISTS COMPILING THE EIS

NRGE - Nutrient Recovery to Generate Electricity Ltd - specialises in the environmental; management and maintenance of regulatory compliance for clients in the Food Production and Intensive Agricultural Sectors for a multiple of clients in those sectors.
GES- Geotechnical and Environmental Services Ltd – Ground and Water Environment Consultants
Dixon Brosnan – Noise Dust,
DBFL- Traffic Impacts
AML Archaeology - Archaeology

3. DESCRIPTION

3.1. Overall Description

The proposal envisages the development of an Aerobic Digester adjacent to an existing facility for the existing herd capacity of 725 farrowing sows, 2475 dry sows, 14400 weaners, 300 gilts and 20 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, and conditions of IPC Licence Reg No P0420-01 which will have to be reviewed to incorporate the new site layout, and anaerobic digester. It is planned to submit this IPPC License review application shortly. Drawings of the proposed new structures are presented in Appendix 3.

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 Future Pigs Ltd on site. 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; 2475 dry sows, 725 suckling sows with bonhams, 14400 weaner pigs, 300 gilts and 20 boars. Pigs will be moved off site at 23kgs live weight.

3.3. SITING, DESIGN, CONSTRUCTION AND STRUCTURAL DETAILS

The proposed development is situated on the site of an existing pig unit facility. Development involves the construction of an Anaerobic Digester to comply with Animal Welfare Regulations, and Nitrate Directive Regulations. It is also proposed to replace the existing over-ground pig manure storage tank, with an engineered covered storage basin. Details of siting and design are shown in Appendix 3.

3.3.1. CONSTRUCTION DETAILS

A site location map and planning notice and a site plan are provided as part of Appendix 3.

3.3.2. DESIGN

In arriving at an overall design of new buildings, consideration is given to colours of external facing materials to ensure maximum compatibility with the surrounding landscape. Also, features such as minimising ridge heights are an important element of the design process.

3.4. CO PRODUCT & WASTE PRODUCTION

The co-products produced are digestate manure, gas, and fiberous material. The wastes produced are animal carcasses, foul water, odour emissions, veterinary waste, fluorescent tubes and general refuse.

3.4.1. TYPES AND QUANTITIES OF CO PRODUCT & WASTE

The major co product from the proposed facility is pig manure; the yearly production of which amounts to 24,287 M3. All pig manure will be diverted fresh to the mixing tank where other organic materials will be mixed, and pumped at regular intervals to the anaerobic digester for gas production. The resultant digestate is then pumped to a centrifuge for removal of solids, with the final liquid odourless digestate, transferred to the covered storage tanks, for export to customer farms as fertiliser.

TABLE 1: Pig manure Production

PIG TYPE	NUMBER OF STOCK	NEAT excreta Pig/week (litres)	Total Litres	Total M3
Farrowing Sows	725	115	83375	83.38
Dry Sows	2475	53	131175	131.18
Boars	20	53	1060	1.06
Gilts	300	44	13200	13.20
Weaner	14400	15	216000	216.00
Total Pig Manure per week			444810	445
Total Pig Manure per annum			23130120	23130
Extraneous water 5%			1156506	1157
Total annual production pig manure			**24286626**	**24287**

In addition to the 24,287 M3 of pig manure produced on the pig farm, it is proposed to import 8500 Tonnes of Dairy Sludge, 10000 Tonnes of Bellygrass, 3800 tonnes of Biofuel residue, 100 Tonnes of Mill waste, and 1500 Tonnes of Chicken Litter, to bring the total volume of organic material to be treated at the proposed anaerobic digester to 48,187

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 60% reserve capacity. This is the same customer farm list that has been approved by the EPA under condition of IPPC License Reg No P0420-01, for the recovery of the pig manure being produced on this farm this year (2010). This list was approved by the Agency under cover letter issued on 3 March 2010.

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 Kildare 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.

TYPE	ESTIMATED VOLUME M3	KGS N/M3	KGS P/M3
PIG MANURE	24287	4.2	0.8
DAIRY SLUDGE	8500	5.5	3.7
BELLYGRASS	10000	5	1
BIOFUEL RESIDUE	3800	4.5	1
MILL WASTE	100	4	0.05
CHICKEN LITTER	1500	11	6
TOTALS	**48187**	**4.8**	**1.5**
VOLUME REDUCTION DUE TO GAS EXTRACTION @ 10%	**4818.7**		
ACTUAL VULUME DIGESTATE PRE SEPERATION	**43368.3**	**5.4**	**1.7**
PROPOSED SEPERATION PROCESS TO REMOVE MIN 70% P & 15% N WITH FIBRE			

TYPE	ESTIMATED VOLUME M3	KGS N/M3	KGS P/M3
PRESEPERATION	**43368.3**	**5.4**	**1.7**
LIQUID DIGESTATE	**39031.47**	**5.07**	**0.6**
FIBEROUS DIGESTATE	**4336.83**	**8.1**	**11.9**

LIQUID DIGESTATE FOR LAND APPLICATION AS FERTILIZER		
		TOTAL KGS
VOLUME M3	39031.47	
KGS P/M3	0.6	22105.4
KGS N/M3	5.1	197842.1

FIBEROUS DIGESTATE FOR USE OFF SITE		
		TOTAL KGS
VOLUME M3	4336.83	
KGS P/M3	11.9	51579.2
KGS N/M3	8.1	34913.3

Farm Code	Townlands in which manure may be used	Area ha	No Plots	P kg/yr	Digestate m³/year
3	Gorteen upper, Gorteen Lower	16.00	1,2	240.00	320.00
4	Gorteen Lower, Mylerstown, Boghall, Cloneybeg	126.99	1 to 13	2549.85	2500.00
6	Frontstown Lower	47.00	1 to 4	705.00	590.00
7	Boghall	52.90	1 to 6	842.50	690.00
8	Balkinstown, Gorteen, Ironhills	37.90	1 to 8	1083.50	1052.00
9	Nurney, Balkinstown	56.00	1 to 7	840.00	500.00
10	Nurney Demense	56.00	1 to 7	1400.00	1850.00
11	Walterstown, Duneany	27.00	1 to 3	635.00	850.00
12	Ballygreany, Duneany	100.00	1 to 10	2300.00	3000.00
13	Ballygreany, Walkerstown	258.80	1 to 26	5870.00	7000.00
14	Shanacloone, Kildoon	84.96	1 to 8	1274.40	2000.00
15	Ballyvarney, Duneany	90.00	1 to 8	2140.00	1800.00
16	Newtown	30.00	1 to 3	450.00	240.00
17	Brallistown, Ballygreany	43.00	1 to 4	645.00	350.00
19	Gorteen Upper	33.99	1 to 3	509.85	700.00
20	Gorteen Upper	89.80	1 to 9	1927.00	2200.00
21	Balkinstown	14.00	1,2	310.00	350.00
22	Fennor	36.90	1 to 3	553.50	380.00
24	Coolagh, Pullagh	34.98	1 to 3	524.70	250.00
25	Pullagh, Mylerstown	50.00	1 to 5	750.00	500.00
26	Coolyphullagh	140.00	1 to 13	2900.00	3060.00

28	Kilbeggan	62.00	1 to 6	1550.00	2000.00
29	Skerries North	66.00	1 to 7	1650.00	2000.00
30	Kildoon, Eaglehill	10.00	1.00	150.00	120.00
31	Youngstown	95.00	1 to 9	2015.00	870.00
32	Derrynire	99.97	1 to 9	1749.55	2100.00
33	Balkinstown	39.00	1 to 4	585.00	440.00
34	Harristown, Nurney	24.00	1,2	360.00	44.00
35	Nurney	17.00	1,2	255.00	91.00
36	Rathconnellwood	38.00	1 to 4	570.00	96.00
37	Grangebeg	32.00	1 to 3	480.00	205.00
38	Bushypark	15.00	1,2	255.00	70.00
39	Bushypark	27.00	1 to 3	405.00	199.00
40	Rathmuck, Silliohill, Newtown, Nurney	24.10	1 to 3	602.50	800.00
41	Skerries Sth, Gearldine, Smallford	90.00	1 to 10	2010.00	2100.00
42	Kilmead	16.20	1,2	405.00	535.00
43	Rathconnellwood	23.00	1 to 3	345.00	158.00
44	Rathconnellwood	9.50	1.00	142.50	76.00
45	Clarey	43.00	1 to 5	785.00	970.00
46	Oghill, Duneany	50.00	1 to 5	1250.00	1650.00
47	Bohergoy Lower	20.40	1,2	306.00	102.00
48	Ardellis Upper, Ardellis Lower	47.60	1 to 4	714.00	440.00
49	Ironhills	13.00	1,2	195.00	156.00
50	Derrynine, Collyphullagh, Bushypark	29.70	1 to 4	699.50	600.00
51	Boleysgreat	35.20	1 to 4	766.00	1118.00
52	Clarey	16.20	1,2	405.00	500.00
53	Kildoon	16.00	1,2	240.00	0.00
54	Ballybarney, Narraghmore, Mullamast, Kilmead, Ballyshannon Demense	221.00	1 to 23	7090.00	0.00
55	Bullhill, Tippeenan Upr, Kilrush	64.93	1 to 7	2574.75	1700.00
56	Heath, Bray Lower, Ardree	52.28	1 to 10	1623.95	1700.00
57		79.09	1 to 10	2255.30	502.00
58	Maganey Lower,Dunbrin Lwr.,Crowland, Newtownbert, Bray Lower, Tomard	135.36	1 to 10	3371.60	4500.00
59	Lackagh	9.16	1 to 10	137.40	202.00
60	Boleybeg, Monatore,	50.44	1 to 10	756.60	504.00
61	Kildangan, Duneany, Boherbaun Lower	77.01	1 to	1487.75	928.00

			10		
62	Kingsbog Common	5.50	1	82.50	99.00
63	Newtown	20.59	1,2	308.85	412.00
64	Fearmore, Lughill	7.03	1,2	105.45	160.00
65		0.00		0.00	0.00
66	Oghill	23.00	1,2	345.00	520.00
67		0.00		0.00	0.00
68	Youngstown	29.21	1 to 4	730.25	935.00
69	Tullygorey	89.33	1 to 10	1889.20	2434.00
70	Blackditch, Nurney bog	50.45	1 to7	756.75	605.00
TOTAL		**3299.47**		**70855.7**	**62823**

TABLE 1(b): Customer Farm list for recovery of liquid digestate from this farm

3.4.2 ANIMAL CARCASSES

The anticipated number of animal carcasses for disposal due to mortalities on an annual basis is estimated as follows:-

Sows	@	4% =	140
Piglets	@	8% =	7000
Weaners	@	1.5% =	1000

Carcasses will be temporarily stored in a covered sealed metal skip for transport and disposal to a licensed rendering plant at regular intervals. A signed agreement to this effect is given in Appendix 5.

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 the Future Pigs Ltd 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 back up 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%.

Proposed Measures to further Minimize and Abate Odour on site

1. Continued incorporation of low protein diets on site in line with recommendations from P.J. Rea of Inform Nutrition Ltd. It is estimated that 30% reductions have already been achieved, in line with recent research (See Report included in attachment 4).
2. All pig manure will be delivered fresh to the anaerobic digester, thereby greatly reducing emissions from under floor storage tanks. The fresher the pig manure is delivered to the digester the greater the gas production levels that will be achieved. Removal of pig manure regularly from the storage tanks under the pig houses will effectively qualify these houses as low emission housing. This process is described in detail in a document that is publicably available on the internet, at http://www.infomil.nl/luch/index.htm.

3. 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.
4. The development of this anaerobic digester will negate the requirement of agitation of raw pig manure in open storage tanks, which we know is a major source of emissions from this site currently, as all pig manure leaving this facility is agitated in one of the four existing over-ground storage tanks. Odournet UK Ltd who have acted as the Agency's experts on a number of sites to date have referenced in a report prepared for another pig farm that *"The specific emission rate of an open storage tank, is assumed to increase from 150 ouE`m⁻².s⁻¹ to 500 ouE`m⁻².s⁻¹, when the slurry is being agitated"* this is stated in page 10. Section 2.2, of a report prepared by Odournet UK titled '**Review of Odour impact of two pig production units and options for improvement'.**
5. The construction of a portal frame structure, to enclose all major handling components of the proposed anaerobic digester plant.
6. As protection against odour nuisance 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 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.

The nett result of this proposed development will be a major reduction of the current level of emissions from this facility, in the order of at least 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.

3.6. PIG MANURE TANKERS OWNED AND AVAILABLE

The developer will provide one tanker for the purpose of delivering the digestate to customer farms.

3.7. REQUESTS TO USE PIG MANURE DIGESTATE AS FERTILISER

This facility 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 10, and same will be available on site for inspection by Kildare 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.

3.8. DETAILS OF SERVICES REQUIRED

The estimated annual water requirement of the unit in full production is 20,800 m3. Bored wells provide water and these wells have sufficient capacity for the new development. The analyses of water samples taken from these wells are included in Appendix 16, along with location map.

A 200 KVA transformer, adjacent to the site provides electricity supply. A generator on site provides the back up supply with a 450 KVA capacity. The existing pole infrastructure servicing this site will be sufficient to deal with export of power, required for this development.

An Energy Efficiency Audit of the current site will be undertaken by the end of 2007.

3.9 DETAILS OF FEEDSTUFFS

About 5,200 tonnes per annum of a balanced meal mixture will be consumed on the unit by all categories of pigs. This feed is milled on site on a least cost basis using the following raw materials (barley, wheat, soyabean meal, sugar beet pulp, pollard, Soya oil, molasses, minerals and vitamins). All feeds are prepared on a low protein basis, which is a process that has been introduced slowly, with proper assessment of ongoing performance. This work is supervised on site by P.J Rea, of Inform Nutrition Ltd. All pigs will also have access to drip free nipple drinkers.

Copper is added to the meal mixture at the rate of approx. 0.5 kg of copper sulphate (CuS04 5H20) per tonne of meal for growing and finishing pigs. This gives rise to pig manure with a copper content of 30 mg/L. It is not proposed to supplement the meals with zinc.

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. The proposed development of an anaerobic digester on site will greatly reduce the nutrient content, and environmental impact of the digestate to be spread as liquid fertiliser on customer farms.

4. DESCRIPTION OF ALTERNATIVES CONSIDERED

4.1. Alternative Sites Considered

Future Pigs Ltd 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 also has a mill facility on site. As the existing pig production unit is operative on site, and has been since 1964, the only suitable site for this development is adjacent to same.

4.2. Alternative Site Layout and 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. DESCRIPTION OF EXISTING ENVIRONMENT

5.1. Location of Structures

The site location map (Ordnance Survey map sheet No 031-07 County Kildare) is included in Appendix 1, and the drawings and site plans for this development are included in Attachment 3. The proposed unit is located in the Townland of Gorteen Lower, Nurney, and approx. 2.2 km to the south of Nurney village on the regional road R415 at an elevation of 70 meters. This facility is located in a wholly agricultural area.

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

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 Attachment 10, and of the manure storage capacity which is calculated on the Farm Structures Table in Attachment No 15.

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 tillage, and 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 the wells supplying the unit, and from the stormwater runoff points. Full analyses results from an independent laboratory are included in Appendix 16, along with a map showing their locations. The wells will be analysed annually, and the stormwater monitoring points will be visually inspected weekly, and water samples taken quarterly, as required by IPC Licence Reg No P0420-01.

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 150 metres. In addition this development will reduce current emissions by use of modern house designs, and ventilation systems.

The proposed development will take place 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 this situatation will be greatly improved as a direct result of this development. The covering of all passageways and open yard area where pigs have access, along with the covering of existing open storage tanks, will reduce the environmental impacts of this facility. In addition to these measures the installation of the 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.

5.3.5 Traffic Levels

Existing Situation.
The entrance to the Biogas Plant is currently located slightly west of centre of the site's Northern Road Frontage. The entrance is 10m wide opening onto the Public road which is 5m wide at their intersection. There is a small cottage to the west of the entrance which is surrounded by mature evergreen trees. There is an existing hedgerow along the front roadside boundary of this cottage which currently restricts the sightline to the west (left) on exiting the site. The road to the east of the site curves gently to the left and then sweeps around a bend to the right, this bend currently restricts the sightline in this direction. The road Speed limit is 80Km/Hr.

Future Pigs Ltd operating under IPC licence Reg. P0420-01

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 are currently eight movements to and from work daily. On completion of this development staff numbers will increase to 18 total with 9 staying in accommodation adjacent to the site. This will result in staff movements remaining the same.
2. Stock Deliveries
   There will be 24 deliveries of gilts per annum. This figure will reduce on completion of the new development.
3. Feed Deliveries
   There currently are approx 5 deliveries of feed per week (wheat and barley, locally sourced) and this volume will increase to 6-7 deliveries approx per week on completion of this proposed development.
4. Stock sales & Carcasses
   There are currently a maximum of 2 loads of weaners delivered to the ferry for export weekly from this site and this will increase by one third on completion of this development. Carcasses are currently removed fortnightly from this site and this will remain the same on completion of this development.
5. Service staff, sales, inspectors, etc.
   There is currently and will be an average of 2-3 car visits per week for service men, salesmen, and inspectors from all regulatory authorities to this facility.
6. Deliveries of imported organic waste to proposed anaerobic digester.
   There will be 23900 Tonnes of additional organic waste delivered to this site annually for the proposed anaerobic digester which is currently being processed under planning Reg. No. 787. This will require 23 lorry loads per week.
7. Delivery of liquid digestate to customer farmers.
   This liquid digestate will replace current practice of pig manure deliveries. There will be 39031.47 M3 approx of liquid digestate to be delivered to customer farmers per annum. The total volume of pig

manure to be treated is 24287 M3, along with 23900 Tonnes of organic waste imported. The extraction of gas will reduce volume by 5% approx and separation of the fibrous material will further reduce the liquid volume by 8% approx. Therefore the resultant estimated liquid digestate volume is 39,031.47 m3 approx. This will require 27 lorry loads per week if all liquid digestate will be transported off site by lorry tanker, which will be the preferred practice going forward. Currently all of the pig manure being transported off site is carried by tractor tankers with 3,000gal capacity. The current practice requires 1417 tractor movements per annum to transport pig manure off site. It is proposed to cease use of tractor tanker movements off site thereby reducing overall traffic movements

8. Delivery of solid digestate to customers.
   There will be 4337 Tonnes of fibrous material produced per annum, which will require 217 lorry loads to be delivered to customers, or 4 loads per week, on average.

Table 2: Current Traffic Movements Servicing this Site

No	Vehicle Type Car/Lorry etc	Details	Capacity	Weekly Units	Annual Units
1	Car	Staff to work		80	4160
2	Lorry	Gilt deliveries	Jeep & Trailer		48
3	Lorry	Feed deliveries	20 Tonne	10	520
4	Lorry Lorry	Weaners to Ferry Carcasses to rendering	260 15 Tonne	4 1	208 52
5	Car	Service staff; sales men; Inspectors		6	312
6	Lorry Tractor	Pig manure to customer farmers	13.6 M3	56	2912
Totals				137	8212

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 25 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. DESCRIPTION OF IMPACTS AND MITIGATION MEASURES

6.1 Human Beings

In full production the pig unit will employ 17 full time staff and a manager. These staff will reside locally with a significant positive economic impact on the area. The unit will also indirectly lead to another 80 jobs in pig meat processing, feed compounding and the service sectors. The nearest dwelling is 480m from the proposed development. The proposal will not have a detrimental effect on the living standards of these residents. The traffic increases associated with the proposal are minor.

6.2 Flora and Fauna

This topic is discussed in the flora and fauna report and the ecological report attached in appendix 25 and 27 respectively of this EIS. The Natura 2000 Site in the environs of this development at Gorteen Lower, Nurney, Co. Kildare is River Barrow & River Nore SAC (002162) proposed development site is adjacent to but not included in the SAC so no land area will be taken from the SAC. The land area used is of low ecological value and the site is surrounded by similar grassland habitats. The removal of the hedgerow between the site and the public road is necessary for road safety purposes but this is mitigated by its replanting back a few metres from its original position. The construction of permanent buildings will allow for small scale habitats such lichens development on walls etc, these can be seen on the current piggery walls and can be used as an indicator of air quality.

6.3 Soils & Geology

The site lies within an area of Dinantian Lower Impure Limestone. There will be a slight level of soil disturbance during the preparatory works for the buildings. The vast majority of which will comprise of the removal of topsoil (agricultural soils generally 0.3 – 0.5m thick). The excavated materials and excess spoil will where appropriate be incorporated into the screening banks onsite. The vast majority of the excavated overburden will be engineered into permanent landscaped locations which will act as new screening banks for the proposal. There will be no adverse or unacceptable impact on the geological environment as a result of either the construction phase or the operational phase of the proposed development.

6.4 Water

On Site

All surface water from the roof of the proposed reception building will be directed to Rain Water Gully to an attenuation tank and then to the nearby watercourse as indicated on the revised site plan No 001A. It is intended not to pave the access roads and turning areas to the digester with impermeable surface dressing, rather to leave as a hardcore finish, which will allow rain-water to infiltrate through the paved surface and into underlying layers allowing gradual release of water after periods of heavy rainfall. It is proposed to direct the stormwater from the proposed development to the stream to the west of the proposed site where it will be monitored prior to entering the stream. 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 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. The digestate 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. To reduce the risk to groundwater, All pig manure on site will be stored in underground concrete tanks, built to Dept of Agriculture specifications, from where it will be transferred fresh to the anaerobic digester. All digestate 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. All new storage tanks will be provided with independent leak detection systems, which will have independent inspection chambers. There will be no impact from these on surface or ground waters. The pig manure will be diverted directly from the tanks under the pig houses to the anaerobic digester and after treatment back to the covered storage

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

(i) 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.

(ii) A detailed proposal to assess the integrity of all tanks and pipelines on site on an ongoing basis, by means of monitoring groundwater quality on site , has been prepared in consultation with Michael McEniry B.E. and Mr Jer Keohane, of GES Ltd. This proposal is included in Appendix 24. These reports conclude that the integrity of the existing under-house tanks can be monitored by groundwater monitoring of the wells at the periphery of the pig unit and that the new tanks and storage structures will have a leak detection pipe network under them

(iii) Anaerobic Digestion reduces the organic pollution potential of animal slurries. Tests of animal slurries from pilot and farm scale digesters show a reduction of 55% of BOD for cattle slurry, 75% for pig slurry, and 80% for poultry slurries.

(iv) An appreciable portion of the geology of the country is of a karst limestone composition which makes groundwater particularly vulnerable to pollution. The lower pollution potential of AD processed slurries will provide additional protection to groundwater.

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

Organic fertiliser or soiled water shall not be applied to land within

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

(e) 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)).

6.5 Air

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

On Site.

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/digestate 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

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

The site occupies a rectangular parcel of land orientated in a North – South direction. It is located in the townsland of Gorteen Lower, approximately 2.5 Km to the south of Nurney Village. The area concerned is flat with the closest elevated area being the Church Mountain approximately 25 Km to the East. The site is located in a low-lying area and is approximately 400 metres north of the River Finnery, a tributary to the Barrow River. The soil present at this site is a free-draining grey-brown podzolic type soil in parts thus this site has mainly been used as grassland for cattle rearing. The northern boundary if the site is currently part of the grassland field. Hedgerow surrounds the site on the north south and eastern boundary of the proposed site. The hedgerow on the northern boundary separates the site from a public road (R415), part of this hedgerow will have to be removed due to planning conditions but the length removed will be replanted. The western boundary of the site contains a mature Leyland hedge which divides the site from the piggery roadway. The dominant land use in the surrounding area is grassland. The field adjacent to the site on the south western boundary already contains a

slurry lagoon and the perimeter of this has already been colonised by local species. To the southwest and west of the site is the pig unit made mainly of concrete and steel structures and behind this unit is a semi-natural ash plantation adjacent to the Finnery River which is a tributary to the Barrow River.

6.7.1 Effects on Landscape Character

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 proposal would be a noticeable but not a characterising element of the landscape and therefore have no impact on landscape character.

c) At locations where the proposal 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.

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 proposed 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.

6.7.4 Visual Impact

Due to the height of the digester and reception building it will not be possible to completely hide them from view. It will be possible to see these structures from a number of viewpoints. There are elements to be incorporated into the design in order to reduce the visual impact,

- The use of overburden and soils to create screening bunds, and the planting of trees as detailed in the landscaping proposal in appendix 7 of the EIS.

- 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 Kildare County Council a scheme prior to commencement.

6.8 Materials Assets.

There are no known archaeological sites located within or close to the development site. An archaeological report prepared by AML Archaeology in included attachment 8. This report concludes that there was no visible evidence of RMP KD031:034 and the ringfort RMP KD031:003 has been levelled and no trace of its bank or ditch is now visible. The ditch to the south of this rise, marked on the 1st and 2nd ed. 6 inch OS maps and the 25 inch OS map, had been removed and it is possible that the ringfort may have been levelled at this time. The current landholder had no memory of the monument. it is considered that the proposed development will have no impact on the cultural landscape of the area, either directly or visually, and should therefore be allowed to proceed without further archaeological involvement

6.9 Traffic.

Introduction

An assessment of the entrance to the Biogas Plant at Gorteen Lower, Nurney, Co Kildare was made in May 2010 in order to ascertain that adequate sight lines were available to support an increase level of traffic movement due to an increase in the level of biomass material to the biogas plant.

Proposed Improvements

In order to improve the sightlines to the west on exit it is necessary to remove the existing Hedgerow along the front of the existing cottage and a new hedgerow planted behind the sightline. In order to further improve the road to the west it is proposed to remove the existing hedgerow directly across the road from the existing cottage and replace same with post and rail fence. This work would be carried out in conjunction with the neighbouring landowner and County Council Area Roads Engineers Office. This would give vehicles travelling east room to pass on the inside should a vehicle be turning right into the biogas plant. To improve the sightlines to the east it is proposed to remove the hedgerow for 12m to the immediate right on exit and replace same with a post and rail fence. Where the road sweeps to the right it is proposed to cut back the hedgerow by 0.75m for a distance of 18m. This section of hedgerow is outside the landowner's property and would have to be carried out with the consent of the neighbouring landowner. These alterations will achieve a horizontal sightline of 160m in both directions.
The desirable Stopping Distances for a vehicle travelling at 85Km/hr as per Table 3, Design Speed Related Parameters NRA TD 9/07 is 160m this can be achieved at the realigned entrance. The attached Sightline Plan, Sections and Elevations show how the sightlines

The increase in Imported Biomass for the proposed digester plant will be in the order of 16 loads of Feedstock per week. The additional materials proposed are currently landspread in its undigested form which has lead to odours during land application, as far as can be determined at this stage the majority of these materials are currently transported passed the gate of the proposed Biogas facility so the traffic movements generated to and from the Biogas Plant are substitution of similar traffic movements currently involved in land application already impacting on the area.

The additional digestate produced to be exported off site would be in the order of 9 loads per week. It is our opinion that there is little or no additional impact from importation of the feedstock because this material is already landspread in the area, therefore processing through the biogas plant could be regarded as an intermediate stop between the source of the biomass and the final recovery (ie landspreading).

The estimated Traffic count passing by the entrance is 1400 vehicles per day based upon the traffic counts taken at the entrance gate to the facility. The Traffic impact for the incorporation of additional biomass into the facility would be in the order of 6% of the traffic passing the entrance would turn into the facility which from 5% already approved.

Table 2a: Proposed Traffic Movements to Service this Site

No	Vehicle Type Car/Lorry etc	Details	Capacity	Weekly Units	Annual Units
1	Car	Staff to work		80	4160
2	Lorry	Gilt deliveries			48
3	Lorry	Feed deliveries	20 Tonne	14	728
4	Lorry Lorry	Weaners to Ferry Carcasses to rendering	260 15 Tonne	6 1	312 52
5	Car	Service staff; sales men; Inspectors		6	312
6	Lorry	Imported Organic waste	20 Tonne	46	2392
7	Lorry	Liquid digestate to customer farmers	27.3 M3	56	2912
8	Lorry	Fibrous digestate to Customers	20 Tonne	9	416
Totals				217	11332

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, to the R415 are more than adequate. Upon completion of this proposed development the volume of traffic will in fact decrease due to the use of larger tankers transporting the liquid digestate, as set out in Tables 2 and 2a above. A traffic audit carried out by DBFL concurs with the proposed sightlines improvements.

6.10 Noise.

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. 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 site will occur during normal working hours.

7.0 INTER-RELATIONSHIPS BETWEEN FACTORS

	Human Beings	Flora & Fauna	Soils & Geology	Water	Air	Noise	Climate	Landscape	Traffic	Cultural Heritage
Human Beings				√	√	√	√	√	√	
Flora &Fauna				√				√		
Soils & Geology				√				√		√
Water										
Air							√		√	
Noise									√	
Climate										
Landscape										
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 can cause serious water pollution if discharged directly to groundwater or surface waters. 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. The digestate 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 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.

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%.

Dust

It is highly unlikely that dust will become an issue as any biomass material will be tipped directly into the underground reception tank. All liquid digestate will be transported off site by lorry tanker, the solid digestate will also be transported off site by lorry thus reducing the possibility of dust becoming an issue.

7.3 Inter-Relationship between Human Beings and Noise

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.

7.4 Inter-Relationship between Human Beings and Climate

The proposed development will involve a minor 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 16 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

A landscaping report has been included in attachment 7 of the EIS. 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 Kildare 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 5.3.5. The increase in Imported Biomass for the proposed digester plant will be in the order of 16 loads of Feedstock per week. The additional digestate produced to be exported off site would be in the order of 9 loads per week. It is considered that the existing road network is capable of taking this increase in traffic levels.

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 25.

7.8 Inter-Relationship between Flora and Fauna and Landscape

The proposed development will result in the loss of surface vegetation through the stripping of soils. These soils will be used to create a burm around the perimeter of the site. Native trees will be planted along this burm to supplement the screening effect over time and to provide habitat enhancement on site. These measures will help to minimise residual impacts on the landscape, whilst also creating new areas of habitat and promoting biodiversity.

7.9 Inter-Relationship between Soils and Geology and Water

The site lies within an area of Dinantian Lower Impure Limestone and the interim vulnerability rating of moderate to low. There will be no adverse or unacceptable impact on the geological environment as a result of either the construction phase or the operational phase of the proposed development.

7.10 Inter-Relationship between Soils and Geology and Landscape

The proposed works will involve the removal of soil in preparation for the construction of the reception building and the geomembrane lined manure storage basins. The reception building and the digester will change the landscape within the site. The overburden will be used to construct a burm on which screenplanting will be placed to help mitigate the visual impact of the development.

7.11 Inter-Relationship between Soils and Geology and cultural heritage

There are no known archaeological sites located within or close to the development site. An archaeological report was submitted with the EIS in attachment 8 which states that there is no archaeological reason to prohibit the landspreading of pig manure on the proposed spread lands, provided no pig manure is spread on the archaeological sites.

7.12 Inter-Relationship between Air and Climate

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.

7.13 Inter-Relationship between Air and Traffic

The proposed development will increase traffic slightly as discussed in Section 5.3.5. 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

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.

	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
	Neighbors	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 with leak detection system. Code of good practice applied SI 378 Customer Farms, Buffer Zones, Fertilizer Planning.	Slight
	Landscape	Visual Impact	Negative	Neutral	Long term	Construction of burm with screen-planting to help reduce the visual impact.	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

Uncontaminated roof water from the pig unit is collected via the proposed stormwater collection system as identified on site layout plan included in Appendix 3, to monitoring points to the north of the unit, identified as SW1, SW2, and SW3 on the site layout plan. A sample will be taken from these points quarterly and analysed for COD at an independent laboratory. All soiled water from the site is diverted to the pig manure 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 6.

8.2. GROUNDWATER AND SURFACE WATER

The well supplying water to the site will be analysed annually and results will be maintained for inspection by Kildare County Council, and EPA officials, at all reasonable times. The location of this well is marked on the site location maps. (See Appendix 1).

8.3. PIG MANURE/DIGESTATE USE

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 Kildare County Council, and EPA officials at all reasonable times.

8.4. PIG MANURE/DIGESTATE STORAGE

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 Kildare County Council and EPA officials at any reasonable time.

8.5. 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 Kildare County Council, and the EPA at any reasonable time.

- Carcass Register.
- Veterinary Waste Register
- Refuse Register

8.6. ACCIDENTAL SPILLAGES

Pig manure/Digestate is 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 the pig manure, the risk of any sizeable leakage or spillage is minimal. In the case of an accidental spillage occurring, the developer will notify Kildare County Council & the EPA 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 Attachment 13. Separate Procedures are also included in Attachment 10 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.

8.7. CONTROL OF RODENTS

Staff members successfully carry out the control of rodents on the site. Future Pigs Ltd insures that this work is carried out professionally and that proper records are maintained. A copy of the format used to record this procedure is included in Appendix No. 21.

9.0 ENVIRONMENTAL MANAGEMENT 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/digestate is much greater than that required. Pig manure/Digestate 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 digestate 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 Kildare County Council, and EPA official's at all reasonable times. A copy of this register is included in Appendix 10.

9.3. Periods and Rates of Use of Pig Manure/Digestate

This issue is regulated by the Nitrate Directive Regulations (S.I. No. 101 of 2009), which provides for application of pig manure digestate in this area between 15 January to 15 October, in accordance with a fertiliser plan. Future Pigs Ltd is committed to ensuring that the use of pig manure/digestate 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 Risk of Disease 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 6.1.6. 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 notifable 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 Future Pigs Ltd have an agreement with College Proteins, to remove all carcasses from the site in sealed containers, and delivery of same to a licensed rendering plant (See Appendix 7).

10.0 Measures envisaged in order to avoid, reduce and if possible, Remedy significant adverse effects.

The measures considered necessary are:

(i) Provision of sufficient and safe access to the site and measures to avoid excessive soiling of the public road during construction on the site.

(ii) A secure fence around the site and effective landscaping, comprising hedging, trees, and landscaped earth embankments where necessary, to screen the installation from obtrusive view from the public road and to blend it into the rural landscape.

(iii) Provision of a storm water drainage system to properly collect and discharge to field drainage all clean rainwater from roofs and clean surfaces via monitoring points BS1, BS2 & BS3 as identified in Site Layout Plan, included in Appendix 3.

(iv) Provision of soiled water drains to properly collect any effluent or soiled water and diverts it to the nearest manure tank.

(v) The collection and the removal from the site of all pig manure digestate to be used by local farmers and fertiliser on their farmlands.

(vi) The collection and the removal from the site of hazardous waste materials (spent fluorescent lighting tubes, empty aerosol containers and veterinary waste) generated on the site. Such wastes removed from the site are to be removed only to sites authorised or agreed as appropriate for the disposal or recovery of the waste concerned.

(vii) The collection and the removal from the site of all dead animals and all animal tissues. Collections are currently undertaken by a licensed contractor, and transport the carcasses for disposal or recovery at an authorised rendering plant.

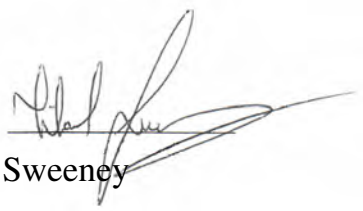
(viii) Ensure connection of animal tissue from the site is in appropriate watertight and covered containers, and timely removal so as to ensure minimal generation or release of odours either at the site, or during transit to the disposal/recovery destination.

(ix) Monitor and maintain records of all monitoring of storm water discharged from the site.

(x) Record and maintain required records of all consignments of waste despatched from the site.

(xi) Maintain all operation facilities in and adjacent to the anaerobic digester, intake area, and the reception building in a clean and tidy manner.

Implementation of the above will ensure that significant effects on the environment will be avoided and the risk of incidents of environmental significance will be near zero.

Signed: 

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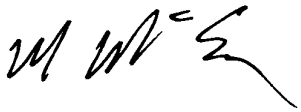
Signed: 

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DATE: _3rd December 2010__

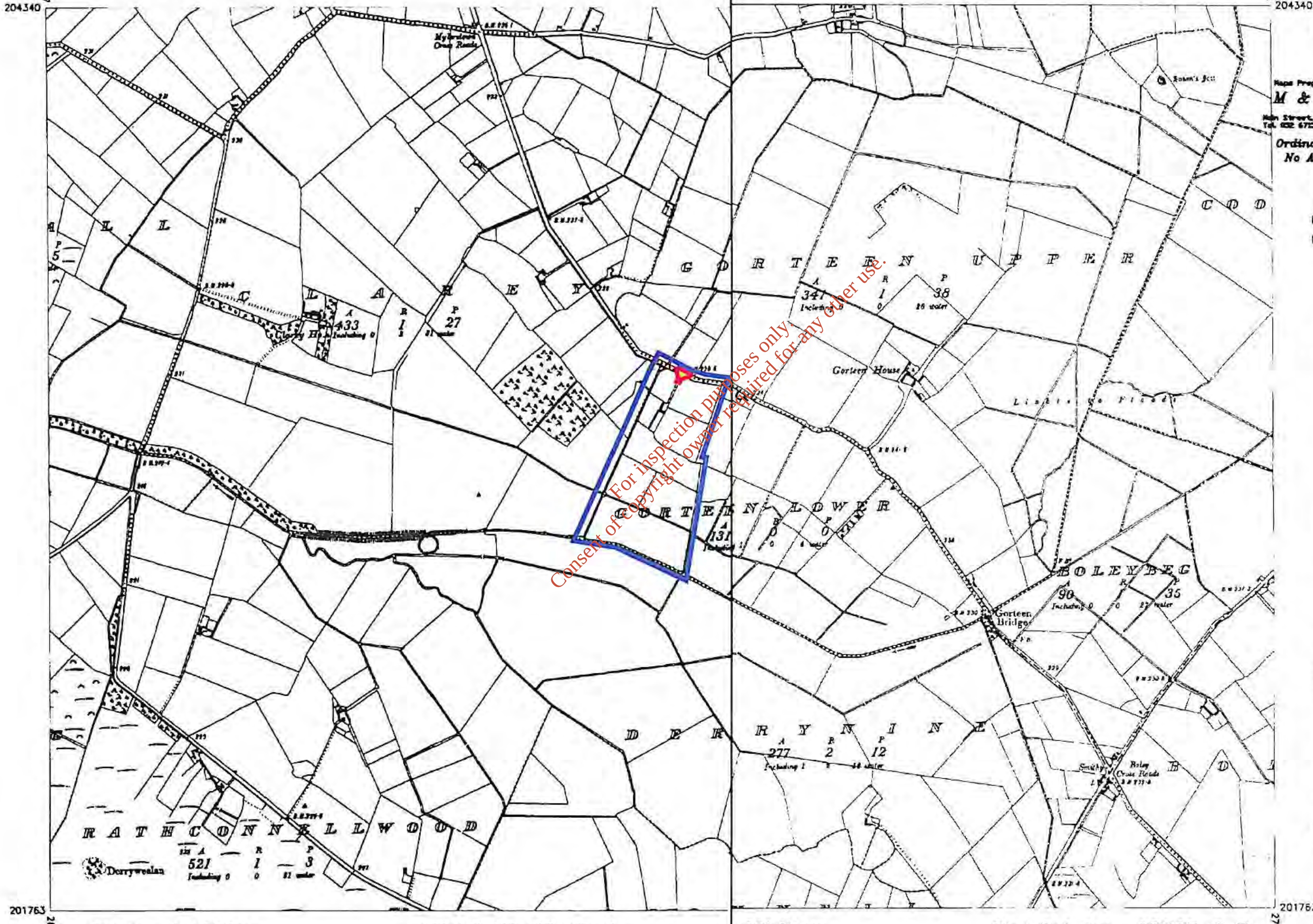
APPENDIX NO. 1

LOCATION MAPS

Surveyed 1837
Revised 1909 - 1939
Levelled 1942

Record PLACE Map

osi



DESCRIPTION

Maps Prepared By:
M & J. Mc Eniry
Main Street, Ballyporeen, Co Tipperary.

Ordnance Survey Licence No AR 0068910

MAP SCALES

6inch
KE027 KE031

osi Authorised Sales Agent

Produced by Central Bureau Services, Cork
On behalf of Ordnance Survey Ireland, Phoenix Park, Dublin 8

Scale:- 1:10560
Scála:- 1:10560

500 400 300 200 100 0 500 Metres
1000 500 0 1000 Feet

Plot Ref. No. 23367_3_7
Plot Date 22-APR-2003

Surveyed 1837
Revised 1909 - 1939
Levelled 1942

Record PLACE Map

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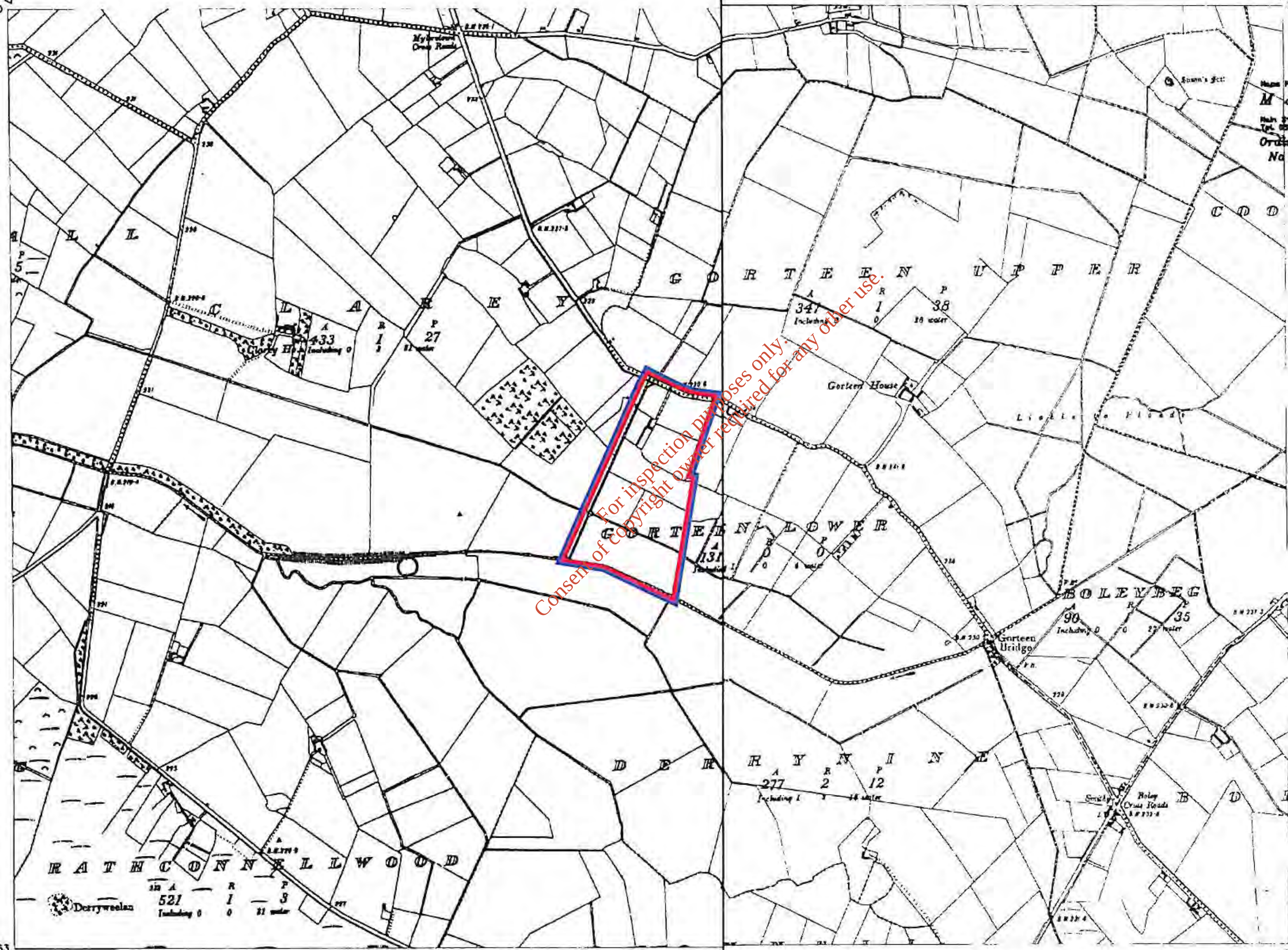

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Plot Ref. No. 23367_3_7
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MAP SCALES

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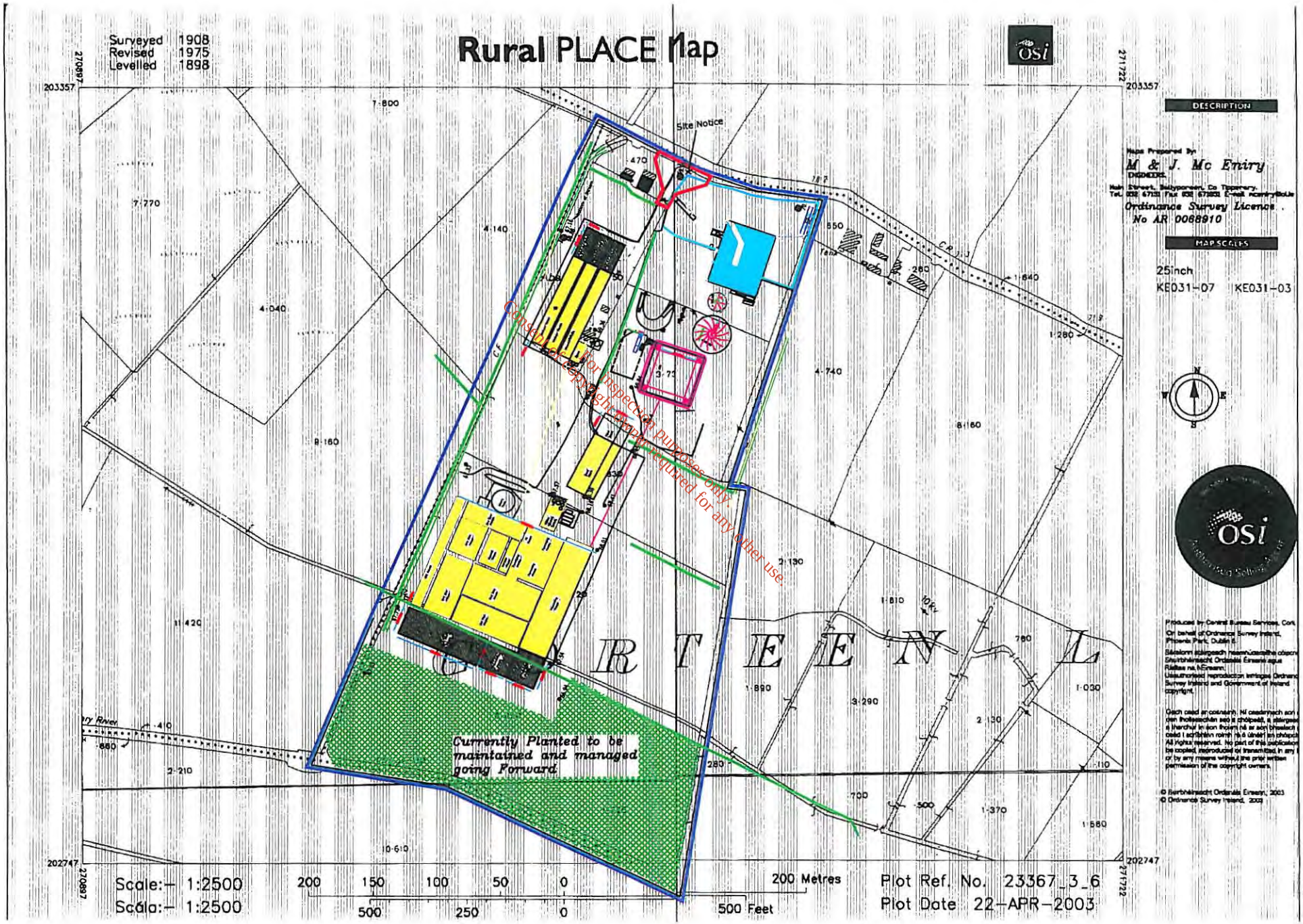

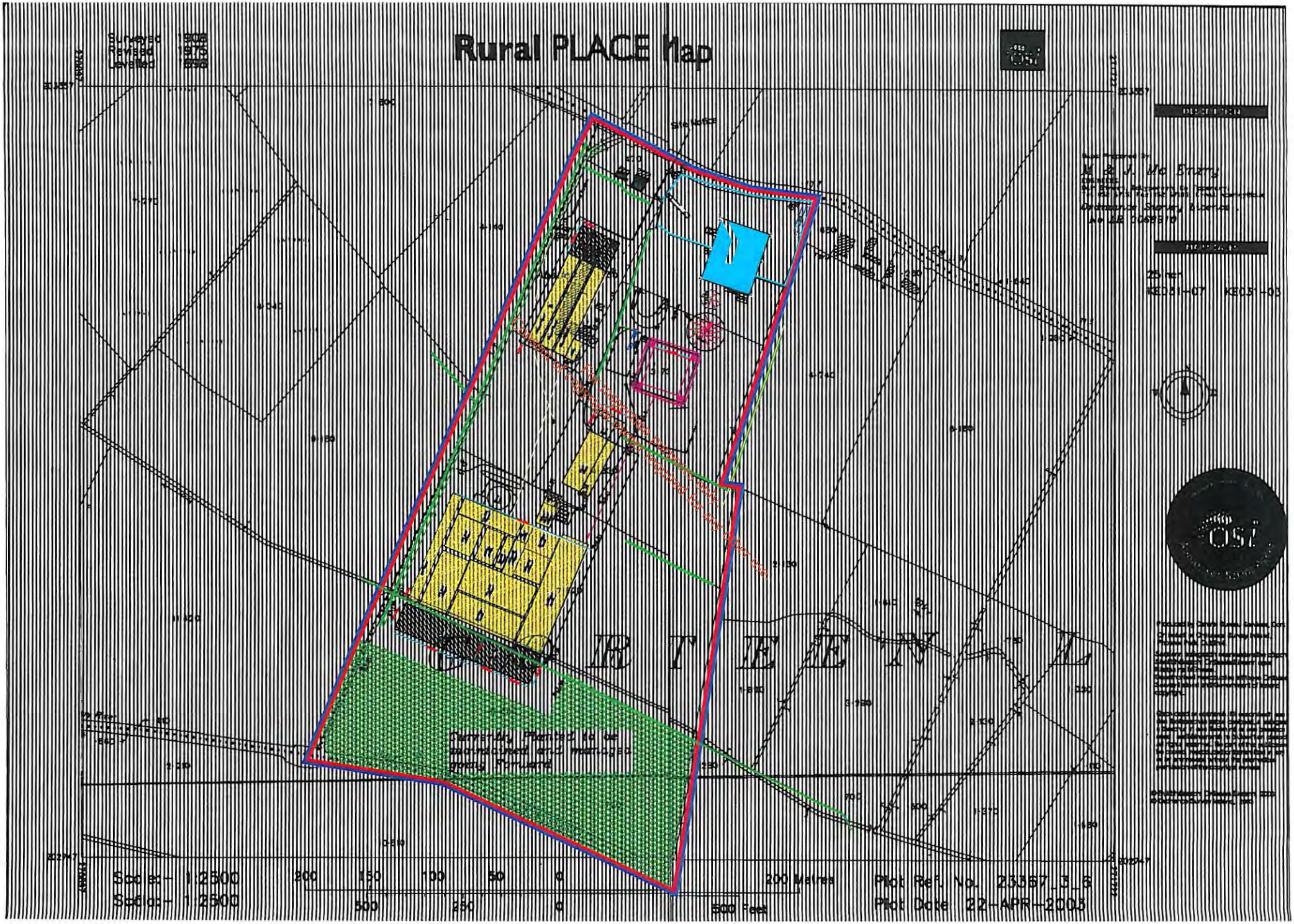

APPENDIX NO. 10

PIG MANURE DIGESTATE REGISTER

MAY 2010

NRGE LTD, MOORESFORT, LATTIN, CO. TIPPERARY

PIG MANURE REGISTER			FUTURE PIGS LTD, NURNEY, CO. KILDARE P0420-01				
DATE OF DISPATCH	PIG MANURE DELIVERED BY	PIG MANURE SPREAD BY	FARM CODE	FARMER NAME	VOLUME PIG MANURE DELIVERED M3	KGS N	KGS P
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
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TOTALS					**0**	**0**	**0**

APPENDIX NO 11.

CODE OF GOOD PRACTICE FOR PIG MAUNRE SPREADING & BUFFER ZONES

MAY 2010

NRGE LTD, MOORESFORT, LATTIN, CO. TIPPERARY

TEAGASC CODE OF GOOD PRACTICE
(A) FOR SLURRY SPREADING AND (B) TO REDUCE ODOUR EMISSIONS

A. Code of Good Practice for Slurry Spreading

A concise summary of the guidelines is the Teagasc Code of Good Practice for Slurry Spreading.

* Spread slurry at rates which take account of the crops nutrient requirements. Limit annual applications of cattle and pig slurry to 55 and 35 t ha.

* Where possible spread slurry earlier rather than later in the growing season.

* Avoid spreading slurry (a) on wet or waterlogged soils, (b) on frozen or snow covered soils, (c) in areas near watercourses or wells

* Check weather forecast before spreading. If heavy rain is forecast within 48 hours avoid spreading on heavy wet soils.

* Avoid direct contamination of surface and ground water by leaving a sufficient margin.

* Use Teagasc Code of Practice to Reduce Odour Emissions.

B. Teagasc Code of Practice to Reduce Odour Emissions at Spreading Time

A sensible approach to spreading minimises the impact of odour

* Direct slurry downwards towards the soil using a low trajectory splash plate.

* Switch off the vacuum pump immediately the tanker empties to minimise mist production.

* Avoid using rain guns to spread slurry

* Avoid spreading slurry when the wind direction is towards population centres or neighbours houses.

* Avoid spreading slurry at times when the risk of causing odour nuisance to the public is greatest, e.g. weekends or public holidays.

* Spreading in damp or light rain conditions will minimise smell drift.

* Where slurry is spread on tilled soil or land that is to be ploughed it should be incorporated into the soil as quickly as possible following application.

APPENDIX NO. 12

LANDSCAPING REPORT

MAY 2010

NRGE LTD, MOORESFORT, LATTIN, CO. TIPPERARY

Liam O'Connor, Forest and Tree-care Services,
West End,
Kilfinane,
Co Limerick.

12-06-07

KILDARE COUNTY COUNCIL
ARAS CILL DARA
NAAS
CO KILDARE

Subject: Future Pigs Ltd, Nurney, Co. Kildare.

I inspected the above site at the request of NRGE Ltd, Mooresfort, Lattin, Co. Tipperary. I found that the site is located on a level site on the right hand side of the R415 half way between Nurney village and Fontstown Cross roads at the junction with the N78. The site is partially visible from a number of locations on the adjacent public roadway. There is some existing screening, but this proposed development, with an earthen burn adjacent to the proposed New House's, provides an ideal opportunity to screen this site. The site is well screened on the western side down to the Finnery River.

In order to mimimise the visual impact of the site I propose the planting of a minimum of three rows of native species Holly (Ilex Aquifolium), Alder (Alnus Glutinosa), Hazel (Corylus). These native species trees will act as a screen around this site.
The proposed specifications for the planting schedule are;

1. **Planting to take place in October (as soon as transplants become available.**
2. **Use 60 - 90 cm transplants.**
3. **Spray the site with round up pre-planting to eliminate competing weeds at 4 litres/Ha.**
4. **Pit plant all trees at 2.5m spacings for good silvacultural practice.**
5. **Three rows will be adequate to achieve screening i.e. 2 deciduous and 1 evergreen.**
6. **Some specimen plants to be planted at site entrance.**

Liam O' Connor
Forester

APPENDIX NO. 13

EMERGENCY RESPONSE PROCEDURE

MAY 2010

NRGE LTD, MOORESFORT, LATTIN, CO. TIPPERARY

FUTURE PIGS LTD
NURNEY, CO. KILDARE
IPC LICENCE REG No P0420-01

PHONE: **BILLY COSTELLOE** **045-526880**
DECLAN PRENDERGAST **086-8590896**

EMERGENCY RESPONSE PROCEDURE

In the event of any emergency situation developing on site which may create an environmental risk, make contact with the following:

NOTIFY THE ENVIRONMENTAL PROTECTION AGENCY:

Wexford Office Phone: 053-60600 Fax: 053-60699

1. **NOTIFY KILDARE COUNTY COUNCIL (ENVIRONMENT SECTION)**
   During office hours Phone: 045-980588 Fax: 045-980587
   Emergency Number: 1890-500333

2. **NOTIFY THE REGIONAL FISHERIES BOARD**
   Phone: 052-80055 Fax: 052-23971

*** IF JCB's or Excavating machinery are required make contact with**

NAME: John Hanlon Phone: 086-2610548

*** If Slurry tankers are required to move slurry, make contact with**

NAME: John Howard Phone: 086-2480661
John Hanlon Phone: 086-2610548

*** If Structural damage has occurred to any buildings on site, contact**

NAME: John McCarthy Phone: 086-2226331

*** In the event of a problem with the ventilation system contact**

Brendan Donnelly Phone 087-2514010

Doctor: Kildare Medical Centre/Caredoc 045-521361
Fire Brigade: 999
Garda Station 999

APPENDIX NO. 14

REFUSE WASTE REGISTER

MAY 2010

NRGE LTD, MOORESFORT, LATTIN, CO. TIPPERARY

LICENCEE FUTURE PIGS

LICENCE NO. 420

WASTE DOMISTIC REFUSE

CONTRACTORS ADVANCED ENVIRONMENAL REMOVEL

DESTINATIONS

DATE	COMPANY	BINS	SIGNED		
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APPENDIX NO. 15

FARM STRUCTURES TABLE

FARM STRUCTURES TABLE Rev 1

Future Pigs Nurney

*Covered Structures to Stormwater System
Paved Areas to Stormwater System only
Paved Areas to Foul/Stormwater System
Paved Areas to Foulwater System Only
Unpaved Areas

TITLE	STATUS	CLASS	STRU LGT (M)	CTURE WTH (M)	AREA SQ MTS	TOTAL AREA B/F		TANK WIDTH	TANK LENGHT	TANK DEPTH	CAPACITY CUBIC MTS	TOTAL CAPACITY	EFFECTIVE WITH 200 F. B.	TOTAL CAPACITY
Weaner House A	Existing		74.5	10.5	782.3	782.3	*	10.5	74.5	2.0	8713.9	8713.9	7842.5	7842.5
Weaner House B	Existing		74.5	10.5	782.3	1564.5	*	10.5	74.5	2.0	8713.9	17427.8	7842.5	15685.0
Weaner House C	Existing		74.5	10.5	782.3	2346.8	*	10.5	74.5	2.0	8713.9	26141.7	7842.5	23527.5
							*							
Gilt House H	Existing		92	7.5	690.0	3036.8	~	7.5	92	1.7	11295.2	37436.9	9966.4	33493.9
Store	Existing		16	7.7	123.2	3160.0	~							
DrySow House I	Existing		47	22.5	1057.5	4217.5	~	22.5	47	1.7	2947.9	40384.8	2601.1	36095.0
DrySow House G	Existing		28	22.5	630.0	4847.5	~	22.5	28	1.4	861.6	38298.5	738.5	36833.5
DrySow House E	Existing		56.5	21	1186.5	6034.0	~	21	56.5	1.7	4260.1	42558.6	3758.9	39853.8
DrySow House F	Existing		56	26	1456.0	7490.0	~	26	56	1.7	4185.0	44569.8	3692.6	40526.1
DrySow House J	Existing		49	13	637.0	8127.0	~	13	49	1.7	3204.1	47773.9	2827.2	42681.0
							~							
Service House L	Existing		27	15	405.0	8532.0		15	27	1.4	801.2	48575.1	686.7	43367.7
Service House E	Existing		27	6.5	175.5	8707.5		6.5	27	1.7	972.9	49547.9	858.4	44226.1
Farrowing House P	Existing		29	9	261.0	8968.5		9	29	2.4	1584.4	51132.4	1452.4	45678.5
Farrowing House M	Existing		22	22.5	495.0	9463.5		22.5	22	1.1	417.9	48993.0	341.9	46020.5
Farrowing House N	Existing		22	19.2	422.4	9885.9		19.2	22	1.4	531.9	50079.9	455.9	46476.4
Farrowing House D	Exisitng		92	22	2024.0	11909.9		22	92	1.4	9301.9	60434.3	7973.1	54449.5
A.I Room Q	Existing		15	8	120.0	12029.9		8	15	2.4	423.9	60858.2	388.6	54838.1
Office	Existing		27	12	324.0	12353.9		12	27					
Feed Store	Existing		47	23.5	1104.5	13458.4		23.5	47					
Drysow House R	Approved		66.5	21.4	1423.1	14881.5		21.4	66.5	0.6	2082.9	62941.1	1388.6	56226.7
Farrowing House S	Approved		22.5	21.4	481.5	15363.0		21.4	22.5	0.6	238.4	63179.5	159.0	56385.6
Farrowing House T	Approved		22.5	25.7	578.3	15941.2		25.7	22.5	0.6	238.4	63418.0	159.0	56544.6
Weaner Extension I	Approved		25.0	10.0	250.0	16191.2		10	25	0.9	441.6	63382.7	343.4	56888.0
Weaner Extension I	Approved		25.0	10.0	250.0	16441.2		10	25	0.9	441.6	63621.1	343.4	57231.5
Weaner Extension I	Approved		25.0	10.0	250.0	16691.2		10	25	0.9	441.6	63859.6	343.4	57574.9
Reception Building	Proposed		50.6	40.0	2024.0	18715.2								
Digester	Approved	8	15.1	15.1	179.1	18894.3		15.1	15.1	18	3223.8			
Secondary Digester/GasHolder	Approved	7	31.0	31	754.9	19649.2		31	31	4	3019.5	66879.0	2868.4889	60443.4
Basin	Approved	7	40.0	40.0	1600.0	21249.2		40	40	4	6400.0	73279.0	6080	66523.4
Reception Tank 100m3	Approved	7	5.0	5.0	19.6	Inc		5	5	2.5	110.0	73389.0	100	66623.4
Reception Tank 300m3	Approved	7	7.5	7.5	44.2	Inc		7.5	7.5	3	330.0	73719.0	300	66923.4
Feed Tank 1	Approved	7	3.3	3.3	8.6	Inc		3.3	3.3					
Feed Tank 2	Approved	7	3.3	3.3	8.6	Inc		3.3	3.3					
Feed Tank 3	Approved	7	3.3	3.3	8.6	Inc		3.3	3.3					
Hot Water tank	Approved	8	3.3	3.3	8.6	Inc		3.3	3.3					
Gas Purifier	Approved	8	2	2	3.1	21252.3		2	2					
Fiber Store	Approved	7	19.2	22.55	399.4	21651.7								
Fiber Store	Proposed	7	36.2	18.3	263.1	263.1								

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APPENDIX NO. 16

WATER QUALITY ANALYSIS

MAY 2010

NRGE LTD, MOORESFORT, LATTIN, CO. TIPPERARY

Independent Analytical Supplies Ltd.

Kilcarrig Street, Bagenalstown, Co. Carlow.
Phone: (059)9721022/9721079. Fax: (059)9721897

Analytical Report

Client ID : FUTU.P1

FUTURE PIGS LTD.
NURNEY
CO. KILDARE

Card No	:	001/8
Report No	:	2774D
No. Of Samples	:	4
Aim	:	N/A
Received	:	21/06/07
Analysis Commenced	:	21/06/07
Issued	:	22/06/2007

Agent/IC : IAS1
Sampler :
Reference :
Delivery Mode : Client

Sample No : 2774D5
Sample Description : SAMPLE NO. 5

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	<1	mg/l O^2	Microdigestion and Colourimetry LPM 6.1.8/9

Sample No : 2774D6
Sample Description : SAMPLE NO. 6

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	<1	mg/l O^2	Microdigestion and Colourimetry LPM 6.1.8/9

Sample No : 2774D7
Sample Description : SAMPLE NO. 7

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	<1	mg/l O^2	Microdigestion and Colourimetry LPM 6.1.8/9

Sample No : 2774D8
Sample Description : SAMPLE NO. 8

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	<1	mg/l O^2	Microdigestion and Colourimetry LPM 6.1.8/9

Michael Hogan

MICHAEL HOGAN
LABORATORY MANAGER

Independent Analytical Supplies Ltd.

Kilcarrig Street, Bagenalstown, Co. Carlow.
Phone: (059)9721022/9721079. Fax: (059)9721897

Analytical Report

Client ID : FUTU.P1

FUTURE PIGS LTD
NURNEY
CO. KILDARE

Agent/IC : IAS1
Sampler :
Reference :
Delivery Mode : Client

Card No : 001/8
Report No : 2774D
No. Of Samples : 4
Aim : N/A
Received : 21/06/07
Analysis Commenced : 21/06/07
Issued : 22/06/2007

Sample No : 2774D1
Sample Description : SAMPLE NO. 1

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	<1	mg/l O^2	Microdigestion and Colourimetry LPM 6.1 8/9

Sample No : 2774D2
Sample Description : SAMPLE NO. 2

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	<1	mg/l O^2	Microdigestion and Colourimetry LPM 6.1.8/9

Sample No : 2774D3
Sample Description : SAMPLE NO. 3

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	<1	mg/l O^2	Microdigestion and Colourimetry LPM 6.1 8/9

Sample No : 2774D4
Sample Description : SAMPLE NO. 4

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	<1	mg/l O^2	Microdigestion and Colourimetry LPM 6.1.8/9

MICHAEL HOGAN
LABORATORY MANAGER

Independent Analytical Supplies Ltd.

Kilcarrig Street, Bagenalstown, Co. Carlow.
Phone: (059)9721022/9721079. Fax: (059)9721897

Analytical Report

Client ID : FUTU.P1

FUTURE PIGS LTD
NURNEY
CO. KILDARE

Agent/IC : IAS1
Sampler :
Reference :
Delivery Mode : Client

Card No : 17209/7
Report No : 1977D
No. Of Samples : 3
Aim : N/A
Received : 21/03/07
Analysis Commenced : 02/04/07
Issued : 04/04/2007

Sample No : 1977D5
Sample Description : REF.NO.6

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	21	mg/l O^2	Microdigestion and Colourimetry LPM 6 1 8/9

Sample No : 1977D6
Sample Description : REF NO.7

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	18	mg/l O^2	Microdigestion and Colourimetry LPM 6 1 8/9

Sample No : 1977D7
Sample Description : REF.NO.8

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	23	mg/l O^2	Microdigestion and Colourimetry LPM 6 1 8/9

MICHAEL HOGAN
LABORATORY MANAGER

Independent Analytical Supplies Ltd.

Kilcarrig Street, Bagenalstown, Co. Carlow.
Phone: (059)9721022/9721079. Fax: (059)9721897

Analytical Report

Client ID : FUTU.P1

FUTURE PIGS LTD.
NURNEY
CO. KILDARE

Agent/IC : IAS1
Sampler :
Reference :
Delivery Mode : Client

Card No : 17209/7
Report No : 1977D
No. Of Samples : 4
Aim : N/A
Received : 21/03/07
Analysis Commenced : 02/04/07
Issued : 04/04/2007

Sample No : 1977D1
Sample Description : REF.NO. 1

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	2	mg/l O^2	Microdigestion and Colourimetry LPM 6 1 8/9

Sample No : 1977D2
Sample Description : REF NO. 2

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	18	mg/l O^2	Microdigestion and Colourimetry LPM 6 1 8/9

Sample No : 1977D3
Sample Description : REF.NO 3

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	19	mg/l O^2	Microdigestion and Colourimetry LPM 6 1 8/9

Sample No : 1977D4
Sample Description : REF.NO 4

Test Description	Test Result	Unit	Method
Chemical Oxygen Demand	9	mg/l O^2	Microdigestion and Colourimetry LPM 6 1 8/9

MICHAEL HOGAN
LABORATORY MANAGER

APPENDIX NO 17.

CONTRACT FOR DISPOSAL OF VETERINARY WASTE

Initial
Healthcare

Initial Healthcare
Rentokil Initial Limited.
47 Terenure Road East Dublin 6

SERVICE AGREEMENT

MR MC SHEERIN TIA

Invoice Name FUTURE PROS LTD
Address CURTEEN LOWER
NURNEY
Co KILDARE
Postcode

Order No.

Commencement date 10/04/07

VAT rate

VAT exempt No (attach copy)

PRODUCT/SERVICE	QUANTITY	COST PER ~~WEEK~~ Annum	COST PER ANNUM	SERVICE FREQUENCY
Sharps	2 P.A.	105.10		2 Services PA.

1. The client agrees to pay a one off installation charge of € plus an annual charge of €105.10. All payments are subject to VAT at the appropriate rate. Initial charges are due on commencement of the agreement and subsequent payments annually in advance. In the event of late payment, interest may accrue, at the sole discretion of Rentokil Initial Limited, at a rate of 10% per month until payment is received. All payments are to be made to Rentokil Initial Limited at 47 Terenure Road East, Dublin 6, where this agreement shall be deemed to have been made. Rentokil Initial Limited reserves the right to increase charges following expiry of the first year.
2. This agreement may only be terminated or service deleted on an anniversary of the commencement date, provided that written notification is given by the party terminating it to the other at least 3 months prior to such anniversary date. Addition of a new service to this agreement automatically extends the anniversary date by 12 months after the addition date.
3. The person signing this agreement warrants that he/she has the authority of the client to make this contract on the clients behalf.

I clearly understand that this service agreement is for a minimum of 1 year.

Signed for client Declan Prendergast
Name in block capitals Declan Prendergast
Position Manager
Date 10/4/07

Signed for RENTOKIL INITIAL LIMITED
Rose Cunningham

Top Copy - Branch. Bottom Copy - Client

HC7(120301)

APPENDIX NO. 18

CARCASS REGISTER

MAY 2010

NRGE LTD, MOORESFORT, LATTIN, CO. TIPPERARY

LICENCEE FUTURE PIGS
LICENCE NO. 420

DEAD PIG REGISTER CODE O20102

CONTRACTORS COLLAGE PROTIEN NOBBER CO.MEATH

DESTINATIONS PREMIER PROTIENS POOLBOY BALLINASLOE CO.GALWAY

MONERY BY PRODUCTS CO.CAVAN

DATE	DK.NO	COMPANY	BINS*25	SOWS*150	SIGNED
		C.PROTIEN			
		C.PROTIEN			
		C.PROTIEN			
		C.PROTIEN			
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APPENDIX NO. 19

VETERINARY WASTE REGISTER

IPC LICENSE REG NO	P0420-01
LICENSEE	FUTURE PIGS LTD.
LOCATION	NURNEY, CO. KILDARE

WASTE MANAGEMENT REGISTER

WASTE: VETERINARY WASTE (Code No 18 02 01)
CONTRACTOR: HEALTHCARE INITIAL
DESTINATION: STERILE TECHNOLOGIES IRL

DATE	VOLUME	COLLECTED BY

APPENDIX NO. 2

DESCRIPTION OF ANAEROBIC DIGESTOER PROCESS

MAY 2010

NRGE LTD, MOORESFORT, LATTIN, CO. TIPPERARY

NRGE
Nutrient Recovery to Generate Electricity

Mooresfort,
Lattin,
Co Tipperary,
Tel 062 55385
Fax 062 55483
E-mail NRGE@iol.ie

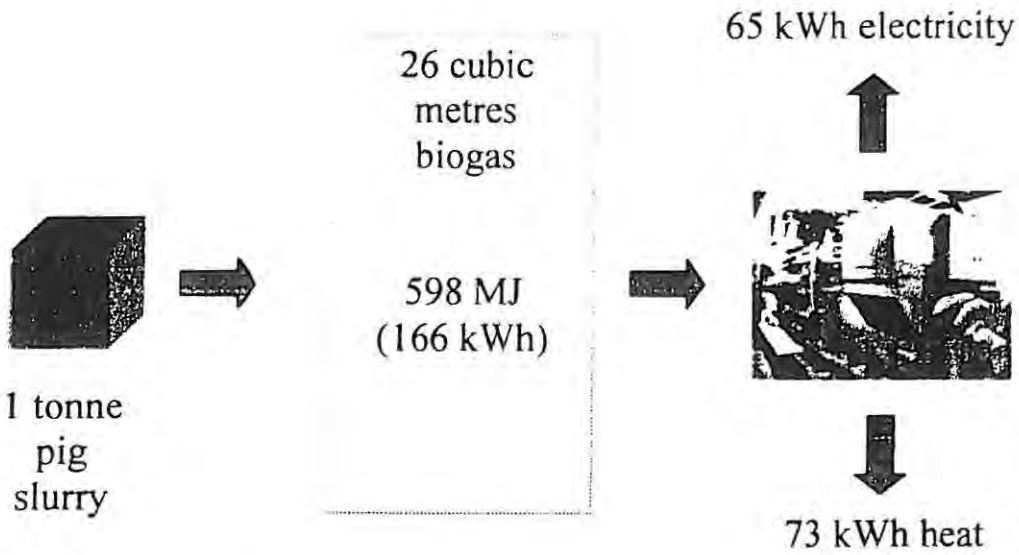
Description of the Anaerobic Digestion Process

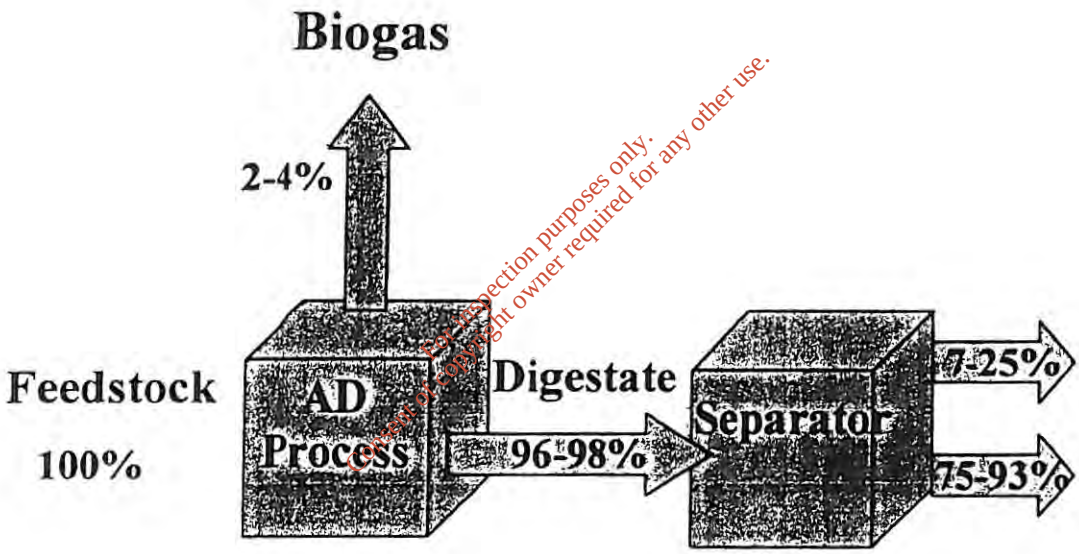
Anaerobic Digestion is the natural breakdown of organic matter by bacteria in the absence of air. It provides an effective method of turning residues from livestock farming and food processing industries, into biogas, fiber, and liquor. The Digester is a warmed, sealed, airless container, which creates ideal conditions for bacteria to ferment the organic material in oxygen free conditions. The biogas is 65% methane and can be used for heating and electricity generation.This process is widely used in other european countries, such as Denmark, Sweden and Germany. In fact the development of anaerobic digesters has increased dramatically in Germany over recent years due to a dramatic increase of the price paid for generated electricity. The max price achievable in Ireland at present is 7.3 Euro cent/KWh. In Germany at present the base price is 8.9 Euro cent/KWh, with a 4 cent bonus for energy crop usage, a 2 cent bonus for utilization of heat generated, and a further 2 cent bonus for utilisatuion of new technologies. This equates to 16.9 Euro cent/KWh, for a plant similar to what is planned. The table overleaf outlines the level of development of anaerobic digesters in Germany 1999-2005.

YEAR	NO OF AD PLANTS IN OPERATION	TOTAL MW CAPACITY
1999	800	198
2000	1000	240
2001	1750	390
2002	1850	420
2003	1900	440
2004	2450	550
2005	3900	890

The following is a flow diagram identifying the energy generating potential of 1 tonne of pig manure, and a mass balance diagram for a typical AD plant.

Energy Production from Biogas





Anaerobic Digestion Mass Balance

The annual pig manure production to be treated at the proposed AD plant at Reatagh & Curraghnagarraha, Carrick On Suir Co ,Waterford, is estimated at 20000 M3. All the pig manure from the farm will be transferred to the mixing tank for the digester via a 150mm diameter uPVC pipe which will be laid. This mixing tank will be a concrete circular tank 10 6m diameter x 5m deep with a mechanical agitation system

Pig manure from the site will be supplied to the mixing tank by gravity with air operated sluice gates on the pipe lines and controlled by high level and low level probes on the mix tank. A 150mm overflow pipe will be installed from the top of the mixing tank to the digestate basin as a fail-safe containment measure in the event of a failure of the level probes on the mixing tank or failure of the sluice gates to close.

Other organic material to be added to the mixing tank will be green crop (Maize, grass, oil seed, or corn) or alternatively will be belly grass from adjacent meat factories, cake sludge from Dairy effluent treatment plants, milk and colostrum, etc. It is anticipated that approximately 3000 tonnes of organic material will be imported per annum. This will be brought on sight by three or four trucks per week and tipped directly into the covered mixing tank or pumped into materials tanks 1, 2, or 3. The mixing tank will be maintained covered at all times. The organic material from the materials tanks 1, 2, and 3 will be transferred to the mixing tank at a 1:8 ratio to pig manure, having taken account of any deliveries directly into the mixing tank. The organic material will be transferred using a shaftless screw conveyor. The mixing ratios will be achieved by operating the screw on a timer when the required quantity of pig manure has charged to the mixing tank. Charging of the mixing tank with manure can only take place when the low level probe has been activated. Consistency of feed to the digester is achieved by a measured volume of manure charged to the mixing tank between the high and low level probes and a measured volume from the reception pit screw. The homogenised digester feed is pumped to the digester at regular intervals, controlled by computer. A meter will be installed on the line from the mixing tank to the digester. Liquid fatty material can be pumped directly into the digester form these material storage tanks adjacent to the plant room, a meter is also installed on these lines. The frequency of pumping to the digester is governed by gas recovery rates monitored by the computer control system both on the site and remotely at the control room of the equipment suppliers.

The operating temperature within digester one will be 55 degrees (Low Temperature Theromphelic Process) and a mechanical agitator will be effected by gas release. The digester will be constructed from Mild steel with the necessary heating coils fixed outside the digester walls. 100mm insulation and weather cladding will be fitted to provide weather protection. The expected holding time in digester one is fifteen days approx. Gas extracted from digester one will be diverted to the gas storage tank which will be located on top of the secondary digester, after passing through a gas purification unit to remove sulphur. After digester one the feedstock will be transferred to digester two where again the through put time will be fifteen days approx. The secondary digester will not have heating coils around the circumference for the digester.

Collected gas from digester two will be transferred to the gas storage tank also passing through the gas purification system which incorporated a condensate well to reduce the moisture content of the gas. The excess moisture from the condensate well will be discharged to the digestate basin. The gas purifying system is only intended to reduce the H_2S content in the biogas. The main purpose is to protect the engine, the second purpose is to lower the SO_2 content in the exhaust gas (and also the H_2S content in the exhaust gas as there will always be smaller parts of uncombusted H_2S in the exhaust gas; with a H_2S content in the purified gas at 400 ppm the content in the exhaust gas will be 1,09 ppm).

The gas purifying system does not influence the NO_x content in the exhaust gas, as the NO_x content is dependent on the combustion temperature.

Normally the H_2S content in the biogas before the gas purifying is 2000-2500 ppm

The gas purifying system is based on micro-organisms activity. The micro organisms colonise plastic balls with a high surface area with in the gas purification tank. The sulphide oxidising micro-organisms use carbon dioxide form the biogas to cover their carbon need. The products formed are predominantly elementary sulphur but also sulphate, which will be discharged to the digestate basin. For the microbiological oxidation of sulphide it is essential to add specific amounts of oxygen with a minute quantity of manure to the biogas. Depending on the concentration of hydrogen sulphide 2-5% air is added to the biogas. The quantity of air is monitered by the gas meter on the biogas digester and an oxygen meter on the outlet from the gas purifier to control the air quantities supplied by pump to the gas purifier.

A dual membrane gas storage dome will be constructed on top of digester 2. The construction will comprise of a rolled angle flange constructed on top of the tank. The gas tight membrane will be placed between the flanges and clamped. A blower unit will maintain the air pressure between the membranes constant allowing the accumulation of biogas under the inner membrane to be maintained at a level slightly higher than the air space between the membranes usually 0.5bar. The gas storage unit is an atmospheric pressure bag type gas collector contained within the dome. The gas will be piped to the engine-boiler room at the opposite end of the 5 span shed to the reception pit and mixing tank.

It is proposed to install one gas engine coupled to a generator. After digester two the digestate will be transferred via sealed pipe system to a centrifuge located within a bay of the adjacent shed. The liquid digestate will be transferred to the proposed storage basin, via a sealed pipe system. The pipework throughout the digestion process from mixing tank to the centrifuge will all be mild steel pipe. The pipework from the centrifuge to the digestate basin will be uPVC Pipe.

It is proposed to install one gas engine coupled to a generator. Hot water from the engine will be passed through a heat exchanger to provide heat for the digester process and the excess heat will be used within the pig unit, to replace the current use of heating oil. There will be additional heat available for possible alternative heating in the area. A dual fuel boiler 200KW capacity will also be installed in the shed. This boiler will provide the heat for the process when the system is initially started and to maintain the heat on occasions that the gas engine is out of service.

After digester two the digestate will be transferred via sealed pipe system to a centrifuge located within a bay of the adjacent shed. Following separation the liquid digestate will be transferred to the proposed storage basin, via a sealed pipe system. The pipework throughout the digestion process from mixing tank to the centrifuge will all be mild steel pipe. The pipework from the centrifuge to the digestate basin will be uPVC Pipe. The proposed digestate basin is a covered engineered basin.

The separation process will remove 70-80% of the phosphorus with the fiber material, and alter the form of nitrogen to make it readily available for plant uptake. Research at AARUS University in Denmark shows the availability of the liquid digestate nitrogen to be equivelant to chemical nitrogen (98 % and 99.5% availability respectively). This compares quite favourably with the availability of nitrogen from raw animal manures of 35-65% approx. Therefore this process will produce a high quality fertilizer for use by customer farmers on agricultural lands.

Water for the purpose of fire fighting will be provided from two sources on site

(a) The back up water supply storage tanks on site which have a minimum capacity of 8000 gallons.

(b) The proposed engineered storage basin has a cover upon which it is proposed to contain a volume of rainwater to a depth of 0.3m which would give a back up water supply and give stability to the floating cover. The volume of water thereon would be of the order of 120,000 gallons.

Other organic material to be added to the mixing tank will be green crop (Maize, grass, oil seed, or corn) or alternatively will be belly grass from adjacent meat factories, cake sludge from Dairy effluent treatment plants, milk and colostrum, etc. It is anticipated that approximately 3000 tonnes of organic material will be imported per annum. This will be brought on sight by three or four trucks per week and tipped directly into the covered mixing tank or pumped into materials tanks 1, 2, or 3. The mixing tank will be maintained covered at all times. The organic material from the materials tanks 1, 2, and 3 will be transferred to the mixing tank at a 1:8 ratio to pig manure, having taken account of any deliveries directly into the mixing tank. These organic materials will be brought directly on site and delivered into the premixing tanks or pumped into tanks 1, 2, and 3 as required.

In April 2003, A planning application was submitted to Kildare County Council on behalf of this facility, for the development of an Anaerobic Digester adjacent to the pig farm, namely,

"For a five span shed, 3 overground storage tanks and engineered storage basin and associated site works incorporating a digester to process pig manure ant other organic material to produce renewable energy and fertiliser,

Full Permission was granted by Waterford County Council in respect of this application on 9th March 2004, as per planning register 03/610.

On 29th December 2005, The Department of Agriculture issued the regulations for operation of a biogas plant titled "**CONDITIONS FOR approval and operation of composting and biogas plants treating animal by-PRODUCTS IN Ireland**". In the Introduction section of this document it states

"Regulation (EC) No. 1774/2002 of the European Parliament and of the Council of 3 October 2002 lays down health rules concerning animal by-products not intended for human consumption. This regulation defines animal by-products as "*entire bodies or parts of animals or products of animal origin... not intended for human consumption*" A distinction is drawn between the measures to be implemented in the use and disposal of the material concerned, depending on the nature of animal by- products involved.

Under the Regulation A **biogas plant** is defined as "*a plant in which biological degradation of products of animal origin is undertaken under anaerobic conditions for the production and collection of biogas*".

These regulations categorise all waste streams, and specifies those that can be treated in an anaerobic digester

Category 1 Material includes:

- BSE carcases and suspects
- Specified Risk Material
- Catering waste from international transport

This material must be destroyed and is completely banned from use as feedstock in composting and biogas plants.

Category 2 Material includes the following material and these may be used for composting or biogas production

- Manure
- Digestive tract content separated from the digestive tract
- Milk and colostrums

CATEGORY 3 MATERIAL **INCLUDES:**

- Catering waste – *meaning all waste food including used cooking oil originating in restaurants, catering facilities and kitchens, including central kitchens and household kitchens.*
- Food factory waste and waste food from supermarkets.
- Parts of slaughtered animals, which are fit for human consumption but are not intended for human consumption for commercial reasons.
- Parts of animals, which are rejected as unfit for human consumption but are not affected by any signs of diseases communicable to humans or animals and derive from carcasses that are fit for human consumption.
- Fish or other sea animals, except sea mammals, caught in the open sea for the purposes of fishmeal production and fresh by-products from fish from plants manufacturing fish products for human consumption. In the case of facilities where fish by-products are the only animal by-product being treated, applications for approval should be forwarded to the Department of Communications, Marine and Natural Resources.

Feedstock

The following materials may be used as feedstock in a biogas or composting plant;

- **CATEGORY 2 MATERIAL CONSISTING OF ONLY THE FOLLOWING:**
  - **Manure**
  - **Digestive tract content separated from the digestive tract, and**
  - **Milk and colostrum.**
- **CATEGORY 3 MATERIAL**

Following the issuing of these regulation's, we entered into discussion with the EPA with a view to review the existing IPC Licence to incorporate the development of an anaerobic digester adjacent to this site, for the treatment of pig manure and other waste, to generate electricity, and fertiliser. We advised them that planning permission has already been acquired for this development. We further advised that the current list of customer farmers utilising pig manure from this facility have sufficient capacity to utilise the resultant fertiliser, and therefore no additional customer farms have to be introduced, at this time This facility requires a licence for the following activities;

Schedule	Class	Description[Note 1]
New First Schedule to EPA	6.2	The rearing of pigs in an installation whether within the same complex or within

Act 1992 as amended by POE Act 2003.		100 metres of the same complex, where the capacity exceeds 2000 places for production pigs
New First Schedule to EPA Act 1992 as amended by POE Act 2003.	11 1	The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected, or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required.

Anaerobic Digestion is the natural breakdown of organic matter by bacteria in the absence of air. It provides an effective method of turning residues from livestock farming and food processing industries, into biogas, fiber, and liquor. The Digester is a warmed, sealed, airless container, which creates ideal conditions for bacteria to ferment the organic material in oxygen free conditions. The biogas is 65% methane and can be used for heating and electricity generation

The operating temperature within digester one will be 55 degrees (Low Temperature Theromphelic Process) and a mechanical agitator will be effected by gas release. The digester will be constructed from Mild steel with the necessary heating coils fixed outside the digester walls. 100mm insulation and weather cladding will be fitted to provide weather protection. The expected holding time in digester one is fifteen days approx. Gas extracted from digester one will be diverted to the gas storage tank which will be located on top of the secondary digester, after passing through a gas purification unit to remove sulphur. After digester one the feedstock will be transferred to digester two where again the through put time will be fifteen days approx. The secondary digester will not have heating coils around the circumference for the digester

Digestion 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. These naturally occurring bacteria then get to work to breakdown this material. There is a chain reaction of different bacteria, during the process some of which attack the carbon in the digesting material. The last group are the Methanongen bacteria, and they give off Methane gas as biogas (65% methane).

The digester is heated (to about 55 degrees Thermophylic) and this encourages the process by creating the right environment for the bacteria. The contents of the vessel are also mixed to ensure even distribution of heat and good process.

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 have become plant available so it is a valuable fertilizer.

The additional housing proposed in this application is required for compliance with animal welfare regulations.

I trust that this submission meets with your approval.

Yours Sincerely

Michael Mc Eniry
Director