Specialist Report

R322136_App1

Development	Construction of anaerobic digestion facility with all associated site works.
Location	Curraghnagarraha, Reatagh, and Curraghballintlea, Carrick-on-Suir, Co. Waterford
Planning Authority	Waterford City & County Council
Planning Authority Reg. Ref.	2460536
Applicant(s)	Mr. James Foran and Nephin Renewable Gas - Reatagh Limited
Type of Application	Normal Planning Appeal
Inspector	Matthew McRedmond
Scientist	Finbarr Quigley

Contents

1.0 Scope of Report

1.1.1. This note to the Inspector and available to the Commission is a written record of my review and examination of the submitted information provided by the applicant as it relates to environmental concerns around the development. In my capacity of Inspectorate Environmental Scientist, I have the relevant expertise to provide a professional opinion as to the adequacy of the information for the Inspector and the Commission to undertake a decision.

1.1.2. I have been requested to provide an opinion on the following aspects of the project:

- The Regulatory requirements of the proposed development
- Hydrological and hydrogeological assessment of the proposal.
- An Taisce observations relating to:
    - Renewable gas categorisation of biomethane,
    - WFD implications,
    - Use of digestate as fertiliser
    - Fugitive methane losses
    - Feedstocks and;
    - Storage of digestates

For the purpose of this technical note, I have reviewed the following documentation and reference material:

- The EIAR submitted with the application
- Further Information Technical Note
- WFD Application on EDEN
- The GSI Groundwater Dataviewer
- The National Biomethane Strategy
- Research papers (identified within this report)

2.0 Issues examined and suggestions for consideration

2.1. Regulatory requirements of the proposed development

2.1.1. Licensing Requirements

2.1.2. Before commencing operation, the proposed facility will require an Industrial Emissions Licence (IEL) to be issued by the EPA. The class and nature of the industrial emissions activity applicable to this new development in accordance with the First Schedule to the EPA Act of 1992 as amended will be as follows:

11.4 (b) Recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving one or more of the following activities, (other than activities to which the Urban Wastewater Treatment Regulations 2001 (S.I. No. 254 of 2001) apply):

(i) biological treatment

(c) Notwithstanding clause (b), when the only waste treatment activity carried out is anaerobic digestion, the capacity threshold for that activity shall be 100 tonnes per day.

The relevant activities as listed in Annex II of the Waste Framework Directive (2008/98/EC) are as follows:

Annex II Recovery Operations	
R03	Recycling /reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).

2.1.3. The proposed feedstocks to be imported into the facility are outlined as follows:

Feedstock	**Tonnes/Year**	**Waste (Y/N)**
Cattle Slurry	7,700	Y
Cattle Manure	1,400	Y

Pig Slurry	26,200	Y
Poultry Litter	12,200	Y
Vegetable Residues	1,000	Y
Food Production Residues	3,100	Y
Drinks Production Residues	7,700	Y
Dairy Production Residues	7,000	Y
Grass Silage	9,000	N
Whole Crop Silage	14,100	N
Total	**90,000**	

Of the proposed feedstocks to be imported, approximately 74% consists of waste materials and 26% consists of crops to be grown.

2.1.4. The applicants do not require additional authorisation in relation to the waste materials to be imported as the IEL application covers this activity.

2.1.5. The applicants applied to the EPA for an Industrial Emissions Licence (IEL) on 28th November 2024, and the application was given the register number P1218-01. No decision has been made on the application to date.

2.1.6. Animal By-Products

2.1.7. Animal by-products means the entire bodies or parts of animals; any product obtained from animals or products of animal origin which are not intended for human consumption. Licences for the processing of ABP are issued by the Department of Agriculture, Food, and the Marine (DAFM).

2.1.8. The proposed development will include an Anaerobic Digestion Facility which will be a 'Type 1' plant under the European Union (Animal By-Products (ABP)) Regulations (S.I. No. 187 of 2014). The facility will process Category 2 animal by-products, specifically farmyard manures i.e., cattle slurry, pig slurry and poultry manure. Approval will be required from the Department of Agriculture, Food, and the Marine

(DAFM) in accordance with Article 24(a) of Regulation (EC) No. 1069/2010, for the acceptance and/or treatment of animal by-products.

2.1.9. The applicant has advised that DAFM were consulted during the design phase and the Proposed Development has been designed in accordance with DAFM guidance *CN11: Conditions for approval and operation of biogas plants transforming animal by-products and derived products in Ireland.* The application process for approval and operation of the proposed facility by the DAFM occurs in three stages as follows;

- Application for approval in principle.
- Application for conditional approval to operate which allows an operating period of three months to test and demonstrate ABP compliance. This stage commences following the construction and handover of the facility.
- Full approval.

2.1.10. This applicant has indicated that the application process will only commence upon receipt of planning consent.

2.2. Hydrological and hydrogeological investigations

2.2.1. The applicants advised that the Hydrology & Hydrogeology Chapter of the EIAR was prepared with reference to the following guidance documents:

- EPA, (2022). *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*.
- EPA, (2004). *Land spreading of Organic Waste – Guidance on Groundwater Vulnerability Assessment of Land*.
- European Commission, (2017). *Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report*.
- Institute of Geologists Ireland, (2013). *Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements*.
- NRA, (2008). *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*.
- CIRIA, (2001). C532 - *Control of Water Pollution from Construction Sites – Guidance for consultants and contractors.*

2.2.2. The EIAR (Chapter 8-44) described how trial holes were excavated to investigate the bedrock and/or water table depths on site. It was noted that in Trial Pit TP03 which was located on the eastern side of the proposed site closer to the Tinnhalla stream,

groundwater was encountered at 0.9m bgl. This was to be expected given its proximity to the surface water. The report advised that excavations in this general area to a maximum depth of 4m bgl would be required to facilitate the desired ground level of the attenuation pond. The report concluded that In the absence of mitigation, predicted effects will have negative, significant, long-term effect on hydrogeology. In terms of mitigation measures relating to this issue, the report stated that further trial holes were recommended pre-construction to determine soil depth to the east/northeast of the proposed development.

2.2.3. The final finished floor level of the attenuation pond is a critical element of the proposal to attenuate storm water in a manner compliant with the criteria outlined in the GSDS. If the proposed finished floor level of the attenuation pond was excavated to 4m bgl and the water table in the area has been noted to be <1m bgl, there is a significant risk that groundwater infiltration into the pond area would occur. This could lead to a reduction in the available capacity of the attenuation pond to safely attenuate volumes of storm water predicted to fall on the site.

2.2.4. The report outlined that the applicants proposed to install an impermeable membrane liner under the attenuation pond to limit the percolation of contents of the pond into the underlying aquifer but made no mention of whether it will successfully limit infiltration of groundwater into the pond. The report did identify that further investigative trial pits were recommended pre-construction to determine soil depth to the east/northeast of the proposed development.

2.2.5. The PA sought additional information relating to these outstanding trial holes and the applicant was required to undertake the trial hole investigations in order to fully update the EIAR with the required level of detail on groundwater protection.

2.2.6. The applicant submitted details of new ground investigations in the E and NE part of the site in the area identified as requiring additional investigations carried out in response to the additional information request. A total of 23 Trial pits were excavated in the NE section of the site and the details of groundwater ingress depth, bedrock depth and soil profile recorded. A total of 21 dynamic probing heavy tests (DPH) exercises were also carried out as part of these ground investigations. The results from this DPH method can be correlated directly to a standard penetration test ‘N’

value thus providing an interpretation of the strengths and bearing capacity of the different soil strata encountered. The site investigations were carried out in accordance with Eurocode 7 Part 2 Ground Investigation and testing (ISEN 1997-2:2007) and BS 5930. An updated EIAR was not included in the further information submitted to the PA. The PA deemed that the additional ground investigations were acceptable.

2.2.7. The additional depth to bedrock data available as a result of these ground investigations have demonstrated that of the 8 sampling sites located within the area where the attenuation pond is proposed to be located, 7 had unsaturated soil depths >2m (most were close to 3m) with one trial hole encountering groundwater at 1m bgl and bedrock at 1.8m bgl.

2.2.8. Given the depths of unsaturated soils encountered in the majority of the investigations, the site can be considered suitable for the construction of the attenuation pond. The exact dimensions and shape of the pond can be tailored to fit the site and achieve the required retention volume/time. Therefore, the ground investigations carried out were completed to an appropriate standard with a clear conclusion that the sites hydrogeology has been assessed properly and will not be significantly impacted by the proposed development.

2.3. Bunding Arrangements

2.3.1. The issue of contaminants from the tank farm area discharging into either surface or groundwaters was raised in the appeal documents. The applicants have outlined that the tank farm area will be completely bunded and constructed to Eurocode standard (BSEN 1992-3:2006). BS EN 1992-3:2006 is a European standard, also known as Eurocode 2, that focuses on the design of concrete structures specifically for liquid retaining and containment structures. It provides detailed guidelines and specifications to ensure the safety, durability, and efficiency of these structures, including tanks, reservoirs, and silos.

2.3.2. This bunded area is to be connected to the attenuation pond through a pumped connection only. Therefore any contaminants that arise in the bunded area will not flow directly via gravity into the attenuation pond but will be collected in a sump that

will be pumped to the attenuation pond. In the event of a spillage occurring within the tank farm area, the resulting contaminated water can be retained and disposed of in a safe manner and avoid contaminating the water already contained in the attenuation pond. The bunded area has been designed to have 110% capacity of the largest tank in the farm.

2.3.3. Liquid digestate will be stored in covered, sealed tanks which will be subject to integrity testing, so the risk of digestate runoff entering the surface waters and groundwaters is not significant.

2.3.4. The provision of a bunded area in compliance with Eurocode 2 will eliminate the risk of contamination from this area seeping directly into groundwaters.

2.3.5. Given the above, I am satisfied that the proposed development has provided for the appropriate storage of feedstocks and digestate and in the event of spillages and/or accidental release of contaminated waters, the site will be bunded sufficiently to protect all adjacent surface and groundwater resources.

2.4. WFD Impact Assessment

2.4.1. No WFD Impact Assessment report was submitted with the application however, Chapter 8 of the EIAR provided a detailed description of the receiving water environment. The current WFD status of all hydrologically linked waterbodies was reported and all the potentially significant effects during the construction and operational phases of the development identified.

2.4.2. The list of mitigation measures required to avoid significant effects on the receiving waters was outlined in detail in Section 8.6 of Chapter 8. The mitigation measures include the development of an Environmental Management System (EMS) which will be prepared and implemented by the operator during the operational phase and accredited to ISO: 4001:2015. This will include detailed procedures to address the main potential effects on surface water and groundwater including site specific standard operating procedures pertaining to waste management and emergency response.

2.4.3. The overall impact anticipated during the construction phase of the project following the implementation of suitable mitigation measures was neutral to negative, imperceptible to slight, and temporary. I agree with this conclusion.

2.4.4. The overall impact anticipated during the operational phase of the project following the implementation of suitable mitigation measures was neutral to negative, slight, and short-term to long-term. The long-term impacts related to changes in the areas of permeable ground to hard-standing areas and impacts of the SUDS system to be installed.

2.4.5. The report details that surface water quality will be monitored routinely during the construction phase of the development in line with provisions of the Construction Environmental Management Plan. The operational phase monitoring programme for surface waters and groundwaters will be dependent on the outcome of the application to the EPA for an IEL.

2.4.6. Overall, I am satisfied that subject to the implementation of appropriate mitigation measures and adherence to best practice guidelines during the construction and operational phases that there would be no adverse impact on surface water and groundwater waterbodies from the facility itself. Therefore, the project will not impede compliance with Article 4(1) of the Water Framework Directive.

2.5. The use of digestate as a fertiliser

2.5.1. Chapter 8 of the EIAR also included details on the possible effects of the land spreading of digestate arising from the development on farmland as a fertiliser. The report stated that while some farms have already been identified to receive digestate, this will be subject to change on an annual basis. The landbanks proposed to receive digestate are in a wide geographical spread and cover several surface and groundwater waterbodies.

2.5.2. The transfer of organic fertilisers from the proposed facility to farmers and its subsequent application to lands is governed by the provisions of S.I. No. 113/2022 - European Union (Good Agricultural Practice for Protection of Waters) Regulations 2022 as amended. These regulations (Article 23(1)) require farmers importing organic fertilisers to keep records including quantities, type, dates and details of

exporters and importers, as the case may be, in a format specified by the Minister for Agriculture, Food and the Marine. The applicant has indicated that they will also maintain a record on the quantity of digestate provided to each farmer which will be made available on request to the planning authority and EPA.

2.5.3. The nutrient content of the digestate will be determined by the applicant and this information will be provided to each recipient farmer to allow them to determine the quantity of digestate required to meet the crops nutrient requirement in accordance with their nutrient management plan. Each recipient farmer will be required to ensure that the digestate is applied to lands in a proper manner having regard to digestate nutrient content, soil nutrient content, crop type, weather conditions, specified buffer distances from waters and time of year in accordance with the provisions of SI 113 of 2022 as amended.

The EIAR states that there are several potentially beneficial uses of applying digestate compared to the use of untreated manures and slurries. The applicant asserted that digestates pose a lower risk of nutrient leaching into watercourses, quoting from research by Möller and Müller, (2012)[1]. However, this research paper also concludes that significant positive effects (improved utilization efficiencies of slurry N) can only be expected if the digestates are applied directly with incorporation into the soil immediately after field spreading.

Riva, C et al (2016)[2] demonstrated that subsurface injection digestate and derived products at pre sowing and topdressing, gave crop yields similar to those obtainable by the use of urea. The study also found that subsurface injection allowed, also, the reduction of ammonia emissions to levels that were similar to those obtained by using urea. The impact of odours was also reported to be strongly reduced when the digestate products were used efficiently.

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[1]Möller, K., & Müller, T. (2012). Effects of anaerobic digestion on digestate nutrient availability and crop growth: A review. *Engineering in life sciences*, *12*(3), 242-257.

[2]Riva, C., Orzi, V., Carozzi, M., Acutis, M., Boccasile, G., Lonati, S., ... & Adani, F. (2016). Short-term experiments in using digestate products as substitutes for mineral (N) fertilizer: Agronomic performance, odours, and ammonia emission impacts. *Science of the Total Environment*,*547*, 206-214

2.5.4. The implication of the above is that while there are positive impacts from replacing untreated animal slurries and urea with digestate for fertilising lands, these benefits are dependent on the digestate being worked into the soil during or immediately after land spreading.

2.5.5. I am satisfied that subject to the proper implementation of the provisions of S.I. No. 113/2022 - European Union (Good Agricultural Practice for Protection of Waters) Regulations 2022 as amended, the use of digestate on agricultural lands will not lead to enrichment of waters.

2.6. Categorisation of biomethane and fugitive methane losses.

2.6.1. A submission raised the importance of ensuring that fugitive methane losses via leakage from Anaerobic Digestion plant infrastructure are monitored, recorded and reported

2.6.2. Balde et. al. (2022)[3] studied quantified fugitive methane (CH_4) losses from multiple sources (open digestate storages, digesters and flares) at two biogas facilities over one year, integrating all major loss pathways and changes over time. Losses of CH_4 were primarily from digestate storage, followed by leakage/venting and flaring.

2.6.3. Losses from digestate storage were linked to open stores, shorter hydraulic retention time and lack of a screw press. Fugitive emissions from leakage at one digester were reduced after the dome membrane was repaired. The report concluded that for biogas to have a positive impact on greenhouse gas emissions and provide a low-carbon fuel, it is important to minimize fugitive losses from digestate storage and avoid leakage during abnormal operation (leakage, roof failure).

2.6.4. Under the proposed development, all digestate stores are enclosed and digestate movement will be done automatically which significantly reduces the potential for CH_4 loss.

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[3]Baldé, H., Wagner-Riddle, C., MacDonald, D., & Vander Zaag, A. (2022). Fugitive methane emissions from two agricultural biogas plants. *Waste Management*, *151*, 123-130.

2.6.5. Under the proposed development, all digester tanks will be linked to a gas management system which includes the gas storage membranes, CHP, gas upgrading equipment and all interconnecting pipework. Under normal operating conditions all biogas will be directed through the upgrader for upgrading to biomethane. The gas storage membranes will, under normal conditions, be operated at 50% capacity; the spare storage capacity (ullage) providing an ability to accommodate any flow fluctuations or temporary loss of offtake capability, before resorting to emergency management procedures.

2.6.6. An emergency gas flare is included in the design to deal with abnormal operating situations where safe discharge of biogas to atmosphere is necessary. The function of the gas flare is to prevent overpressure within the gas holder (membrane).

The gas flare would only be required to operate if the CHP unit and the biogas upgrader are not in use due to unplanned maintenance. The flare is for safety reasons only and will not be used for routine operations.

2.6.7. The applicant has outlined that an EMS will be drafted prior to operation which will include procedures for integrity testing of liquid and gas retaining structures. The proper implementation of this integrity testing procedure is important in the overall performance of the proposed development with regard to fugitive CH_4 emissions.

2.6.8. With regard to the question of whether biomethane should be categorised as a renewable gas, Mignona et. al. (2023)[4] conducted a significant review of over 300 pieces of literature published between 2017 and 2023 and concluded that AD is an efficient process for the production of biogas from waste of different origins. Animal waste products provide nutrient-rich and highly valuable raw material for renewable fuel generation through the AD process. It was reported that Biogas is one of the solutions to global greenhouse gas emissions, and its importance in waste management is well established and will continue to develop in the future.

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[4]Mignogna, D., Ceci, P., Cafaro, C., Corazzi, G., & Avino, P. (2023). Production of biogas and biomethane as renewable energy sources: a review. *Applied Sciences*, *13*(18), 10219.

2.6.9. Ireland's National Biomethane Strategy (2024) outlines that for biomethane from AD plants to be classified as a zero-carbon renewable fuel, plants must be able to achieve increasingly strict sustainability criteria as outlined within the EU Renewable Energy Directive II ("RED") and RED III criteria. The RED II criteria stipulated that biomass fuels produced from agricultural biomass cannot be derived from raw material obtained from (1) land that was formerly peatland; (2) lands with a high biodiversity value; or (3) lands with a high carbon stock.

In addition, RED II required that all biomass fuels used for electricity, heating and cooling must achieve at least a 70% GHG emission saving, increasing to 80% for installations that start operating from 2026.

2.6.10. In summary, I am satisfied that the proposed development represents an activity which is in line with the National Biomethane Strategy.

2.7. An Taisce observation in relation to feedstocks

2.7.1. The submission from An Taisce (17th October 2024) referenced the environmental impacts of digesting slurry and cattle manure with energy crops such as silage in an Irish context. The study by Beausang et. al. (2021)[5] referenced in the submission found that the optimum environmental performance was observed at a Volatile Solids (VS) ratio of 0.4:0.6 silage:slurry (1,196 and 5,557 tonnes respectively which is a ratio of 1:4.7 by weight). This study assessed the impacts of using cattle slurry and silage only as feedstocks and did not include many of the proposed feedstocks for this proposal. The study found that higher environmental burdens were observed for mixes with a greater ratio of grass silage to slurry.

2.7.2. This proposed development has indicated that a total of 47,500 tonnes of animal slurries (pig slurry, cattle slurry, cattle manure and poultry litter) would be utilised per year. The remaining feedstocks would consist of silage (23,000 tonnes) and a variety of other food & drink production residues (18,800 tonnes).

[5]Beausang, C., McDonnell, K., & Murphy, F. (2021). Assessing the environmental sustainability of grass silage and cattle slurry for biogas production. Journal of Cleaner Production, 298, 126838.

2.7.3. For the purpose of comparison to the published data, the development proposed would be utilising 23,100 tonnes of energy crops and 66,900 tonnes of animal slurries and food & drink residues which is a ratio of 1:2.9 by weight. Due to the nature of the feedstocks involved in both scenarios, these ratios are not directly comparable and serve as indicative values only.

2.7.4. Higher proportions of grass silage as feedstock enables a higher specific methane yield to be achieved and improve the profitability of the Anaerobic Digestion process. There are concerns that using higher shares of grass silage may have negative environmental impacts.

2.8. Storage of Digestates

There will be 2 types of digestate produced as part of the proposed development; liquid concentrate digestate and digestate fibre. Concerns have been expressed about the suitability of the storage facilities for these digestate materials. The proposed storage facilities will be discussed in the following sections.

2.8.1. Digestate Liquid Concentrate Storage

2.8.2. The proposed development will have a total storage capacity of 7,832m^3 (2 no. Digestate Storage Tanks of 6,032m^3 and 1,800m^3 volume capacity) for digestate liquid concentrate. It is projected that ca. 17,000m^3 of digestate liquid concentrate will be produced annually after complete digestate separation and treatment. Both of the liquid digestate storage tanks are covered.

2.8.3. With onsite storage capacity amounting to 7,832m3, there is sufficient storage to accommodate volume for up to 24 weeks, surpassing the maximum requirement of 16 weeks set down by the Department of Agriculture, Food & Marine (DAFM). This will facilitate the safe storage of digestate during the period of the year when land spreading of organic matter on land is prohibited (1st October to 12th January in County Waterford).

2.8.4. Digestate Fibre Storage

Solid digestate fibre will be housed in the dedicated Digestate Storage Building. The building is vented to the Odour Treatment System which will recover and treat all odours arising from within. With no land spreading permitted during the closed period (1st October to 12th January in County Waterford), the storage building will have adequate capacity to store solid digestate fibre for over 16 weeks.

2.8.5. I am satisfied that the proposed development will have adequate storage facilities for all digestate materials arising which will allow the safe storage of the material in a manner which will not give rise to excessive CH_4 emissions, odour nuisances or lead to pollution of waters.

3.0 Conclusions

3.1.1. I consider that the Applicant has correctly identified the regulatory requirements for operating the proposed facility.

3.1.2. I consider that the hydrological and hydrogeological investigations undertaken by the applicant are sufficient to conclude that no significant impacts on the surface waters and groundwaters will arise as a result of the proposed development.

3.1.3. The applicant has demonstrated that adequate bunding will be provided in the tank farm area to protect water quality in the event of a spillage.

3.1.4. The applicant has demonstrated that the proposed development will not cause a deterioration in status in any waterbodies or impede any waterbodies from achieving good status therefore will not breach the provisions of Article 4 of the Water Framework Directive.

3.1.5. Subject to the proper implementation of the provisions of S.I. No. 113/2022 - European Union (Good Agricultural Practice for Protection of Waters) Regulations 2022 as amended, the use of digestate on agricultural lands will not lead to enrichment of waters.

3.1.6. I am satisfied that the proposed development represents an activity which is in line with the National Biomethane Strategy.

3.1.7. The applicant has demonstrated that the proposed development will have adequate digestate storage facilities which will not give rise to excessive methane emissions, odour nuisances or lead to pollution of waters.

Finbarr Quigley
Environmental Scientist

4th September 2025