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144342-14/11/2014-FI Environmen-Part 1

Date: 11/11/2014

Reference: 14/04342 Further information request 15/04/2014 Application by Mr Kieran O Regan c/o OMB Architects, Skibereen Co Cork.

Description of the Development: Agricultural development consisting of 4 No. Broiler Houses to house 50,000 broilers per house, waste storage shed incorporating biomass burner, office and changing facilities, service yard and storage shed, staff accommodation with wastewater treatment system and all associated site works. An environmental impact statement accompanies this application. This site application relates to a development which comprises or is for the purpose of an activity requiring an integrated pollution prevention and control licence at Knockbrown, Bandon, Co. Cork.

Scope of this response:

As requested by Mr Kieran O Regan and OMB Architects, RME Environmental having issued the Environmental Impacts Statement has been assigned the task of responding to certain environmental sections contained within the request for further information. The specific responses provided herein are in relation to sections: 1, 5, 6, 7, 8, 12, 13, 14, 15, 16, 17, 18, 25, 26, 27, 28, 29, 30, 31, 33 and 36. Please see associated responses below:

1. **EPA - BANTEEC Guidance notes for the Poultry Sector (1998)** sets out guidance on the minimum standards required in respect of new activity. Section 4.3 refers to the siting of Poultry Units, stating that *"poultry units should be sited a distance of preferably not less than 400m from the nearest neighbouring dwelling."* It is noted that the nearest dwelling to the proposed development is 160m away; please justify the current proposal in this context.

It is agreed that the BATNEEC Guidance notes for the Poultry Sector (1998) sets out guidance on the minimum standards required in respect of a new activity. It states that poultry units should be sited a distance of preferably not less than 400m from the nearest neighbouring dwelling". The applicant is cognisant of the guidance and what the guidance stands for. Best Available Technology Not Entailing Excessive Costs (BATNEEC). The applicant would make justifications in respect of the "preferably not less than 400m" from the nearest neighbouring dwelling. The term preferably introduces a notional option in relation to the distances and that option relates to the following

stipulation in BATNEEC that "all operations on-site shall be carried out in a manner such that air emissions and/or odours do not result in significant impairment of or significant interference with amenities or the environment beyond the site boundary." In the odour assessment and noise assessments accompanying this particular response it is clear that there will be no significant environmental impairment beyond the site boundary or indeed at the nearest sensitive receptor. The EIS (Section 4.0) refers to alternatives which have been addressed by the applicant in relation to the development and discusses the "Do Nothing Alternative" also. The applicant owns the site and therefore in the respect of same site selection process the idea that the environmental issues would not be significant and the issues surrounding road network, ESB availability, proximity to the processing facility, availability of natural screening etc have in our opinion been mitigating factors in respect of the "preferably" notional 400m separation distances.

In most categories of activities the BATNEEC concept has been replaced by BAT (Best Available Techniques" and BREF documents (Best Available Techniques Reference Documents) have replaced the BATNEEC Guidance notes in respect of most licensable activities. BREF or BAT reference document means a document resulting from the exchange of information organised pursuant to Article 13 of Directive 2010/75/EU, drawn up for defined activities and describing in particular applied techniques, present emissions, consumption levels, techniques considered for the determination of Best Available Techniques and any emerging techniques, giving special consideration to the criteria listed in Annex III to Directive 2010/75/EU. A similar definition was applicable under the IPPC Directive (2008/1/EC). BBREF/BAT was adopted under both the IPPC Directive (2008/1/EC) and the Industrial Emissions Directive (IED,2010/75/EU).

BREF for the associated sector was first issued in 2003 and a draft 2nd BREF document was published for review in October 2013. What is notable in both documents is that the specification of distance has been removed in lieu of the following statements:

REF: Integrated Pollution Prevention and Control (IPPC) Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs July 2003)

4.1.1 Site selection and spatial aspects

(Page 133 - Integrated Pollution Prevention and Control (IPPC) Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs July 2003)

Often the environmental impact of farms is partly due to an unfavourable spatial arrangement of activities on the farm-site. This can lead to unnecessary transport and additional activities, and to emissions close to sensitive areas. Good farming management can compensate for this to a limited extent, but is made easier if attention is paid to spatial planning of farm activities.

The evaluation and selection of a location for a new livestock farming facility, or the planning of a new installation on an existing site, can be considered as part of good farming practice, if:

- *unnecessary transport and additional activities are minimised or eliminated*
- *adequate distances are maintained in respect of sensitive sites requiring protection, e.g. maintaining adequate distances from neighbours to avoid conflicts arising from odour nuisance*
- *the potential future development capability of the farm is taken into consideration*

- *any requirements of outline construction planning or village development planning are satisfied.*

Apart from the technical appraisal, the evaluation would also consider local meteorological conditions as well as any specific topographic features, such as hills, ridges and rivers [107, Germany, 2001].

For example, for mixed livestock or pig breeding facilities, the low-emission production areas could be located closer to critical sensitive sites whilst housings producing higher emissions may be located further away from those same locations.

Ambient air pollution can be avoided at sensitive sites by effectively arranging, relocating or grouping emission sources, such as in central waste air shafts. For example, it may be possible to increase the distances of the emission source to any critical sensitive sites, or to relocate the sources so that they lie in a subsidiary wind direction, or to discharge waste air through ducting pipelines appropriate distances away [159, Germany, 2001].

This sentiment is also reciprocated in the DRAFT BREF Document for the Pig and Poultry Sectors as published August 2013 (Page 231 -not yet adopted)

4.1.1 Site selection and spatial aspects

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The evaluation and selection of a location for a new livestock farming facility, or the planning of a new installation on an existing site, can be considered ~~as~~ part of good farming practice, if:

- unnecessary transport and additional activities are minimised or eliminated;

- adequate distances are maintained from ~~in respect of~~ sensitive sites requiring protection, ~~e.g. maintaining adequate distances~~ from neighbours to avoid ~~conflicts arising from~~ odour and noise nuisance, and from waters to protect them from the emission of nutrients;
- prevailing climate conditions are considered, (e.g. wind);
- the potential future development capability of the farm is taken into consideration;
- any requirements of outline construction planning or village development planning are satisfied.

Apart from the technical appraisal, the evaluation would also consider, local meteorological conditions as well as any specific topographical features, such as hills, ridges and rivers. ~~[107, Germany, 2001]~~.

For example, for mixed livestock or pig breeding facilities, ~~the~~ low emission production areas could be located closer to critical, sensitive, sites whilst housings producing higher emissions ~~may be~~ are located further away from those same locations.

Ambient air pollution can be avoided at sensitive sites by effectively arranging, relocating, or grouping emission sources, such as in the case with the main air ducts that collect all the waste air from all sub-divisions of sheds ~~in central waste air shafts~~. For example, it may be possible to increase the distances of the emission source to any critical sensitive sites, or to relocate the sources so that they lie in a subsidiary wind direction, or to discharge waste air through ducting pipelines appropriate distances away ~~[159, Germany, 2001]~~.

It is decided prudent to avoid specification of set distances rather to stipulate that adequate distances are kept from sensitive sites requiring protection.

It is therefore demonstrated that in respect of the current adopted guidance document BREF 2003 and in the proposed BREF 2013 no specific stipulation on distances have been suggested. 160m in the case of this proposed development has been shown to have no significant adverse effect on the nearest sensitive receptor in the EIS as submitted and also in respect of the responses contained herein in respect of RFI questions 14 and 15 pertaining to site specific odour and noise assessments specifically.

5. While the application and the EIS refer to prompt removal of poultry litter off site for composting, the application also refers to on-site storage and incineration. Further information is required as to: -
   a. Transport of poultry litter off site and measures to prevent birds from having access to poultry litter while being transported.
   b. Amount of poultry litter to be stored on site.
   c. Length of time during which litter will be stored.
   d. Combustion rate of biomass burner in terms of tons per day.
   e. Biosecurity measures relating to stored litter and particularly as regards exclusion of vermin and flies.
   f. Premises operation and daily checks for full removal of all poultry carcasses from poultry houses and litter.

A: In respect of the requirements to transport poultry litter offsite the requirements of same will be governed by the operational requirements of the IPPC / IED licence as will be applied for and issued by the Environmental Protection Agency in due course and the relevant waste management legislation in this state.

In simplistic terms through the operation of the IPPC/IED licence the operator of a poultry facility must ensure that the material generated on his facility is recovered / disposed of in accordance with legislative requirements. The onus on importation of material has been placed however on receiving entities such as farmers or compost facilities and appropriate receipt documentation is provided by the collector in respect of this transaction. This facility like a number of other licensed facilities in the Shannonvale Growers group will avail of the services of a contractor to remove the material. The current operator is "MJ Keogh Transport Services Ltd" who removes the litter from the facility exactly on the day of cleaning out of the houses. This material is brought to compost facilities or to tillage farmers depending on the season and the Department of Agriculture are informed in December annually of the amount of material imported to each farm or facility. There is a duty of care on behalf of the poultry operator to establish that the correct methodologies are carried out in respect of same and this will be verified by receipt from the contracted haulier and maintained onsite as part of an organic waste register as will be prescribed in the Environmental Management System for the site.

In respect of measures to prevent birds having access to poultry litter while being transported it is important to clarify the processes on site. At the required weight/size the birds are first moved off site. They are transferred to transportation modules and loaded via a moffett mounty forklift onto the transporting flat bed trailer. This trailer has been fully washed down and disinfected at the processing facility and in the interest of bio-security only comes onsite disinfected and clean.

Only after al birds have been removed off-site does the process of clean out of the litter occur. Therefore the birds do not come in contact with the cleaned out litter after they leave the houses and site.

In the event that the cleaning of 1 house coincides with the emptying out of adjoining houses procedures would be in place in accordance with the Bord Bia Quality Assurance Scheme and with the requirements of normal practice that a set distance would be kept between both operations. It would not be normal practice for this to occur and it is also noted that the loading of the birds will only take a maximum of 2 hours to complete. This process normally occurs in early morning to facilitate processing schedules in the factory hence in most cases birds are removed prior to any house cleaning commencing.

b: In respect of the development itself there will be approximately 1385 tonnes of poultry litter generated on site annually. As a general rule this material will not be stored on site at all. Once removed from the houses at the end of each batch (7 batches per annum – 197.86 tonnes per batch) the material will be removed off site for appropriate recovery. In the normal operation of the site there may be cross over into additional days haulage but the material will remain within the poultry house until it can be transported to the removal lorry and taken offsite.

This is facilitated by the mix in availability of recovery options for the farm. The primary contractor Mr MJ Kehoe operates with both tillage farmers and composting facilities to provide a year round availability for the sustainable and economical recovery of the material. This process is currently in operation on 4 farms in the group and the methodology is acceptable to the EPA. The intention of Mr Kehoe to provide this service to the proposed development when operational is attached in letter form to this submission.

In respect of a need to provide storage, Schedule 3 of SI610 of 2010 and Schedule 3 of SI31 of 2014 provides for storage requirements for livestock manures etc within specific areas. They provide for a 16 week storage requirement in the Cork area. Further to this and superseding this requirement of same in the absence of available land on the holding Article 11 of SI 31 of 2014 refers to the requirement for 26 weeks storage. This in poultry terms is 3.5 batches or 693 tonnes of storage for this site. This is not applicable in this case given the ability to have an all year round collection option however a storage facility has been made available to the north of the site the dimensions of which are 53.7m x 20m x 5m. Given that we could stack poultry litter to a height of 1.5m – 2m this gives an available storage capacity of 1611m^3 stacked to 1.5m high.

It is the intention at some point in the future to install a heat recovery system for recovering residual energy present in the waste poultry litter. It is with this in mind that the applicant instructed for the application for planning permission to contain details of an available system. Critical analysis of the favoured biomass burner suggests that the ideal system would utilise 130Kg per hour of poultry manure to generate sufficient heat for the poultry system.

If we assume that every batch produces 198 tonnes of manure and that the length of every batch is 7.42 weeks (52 days / 1248 hours) The system can process 130kg per hour.

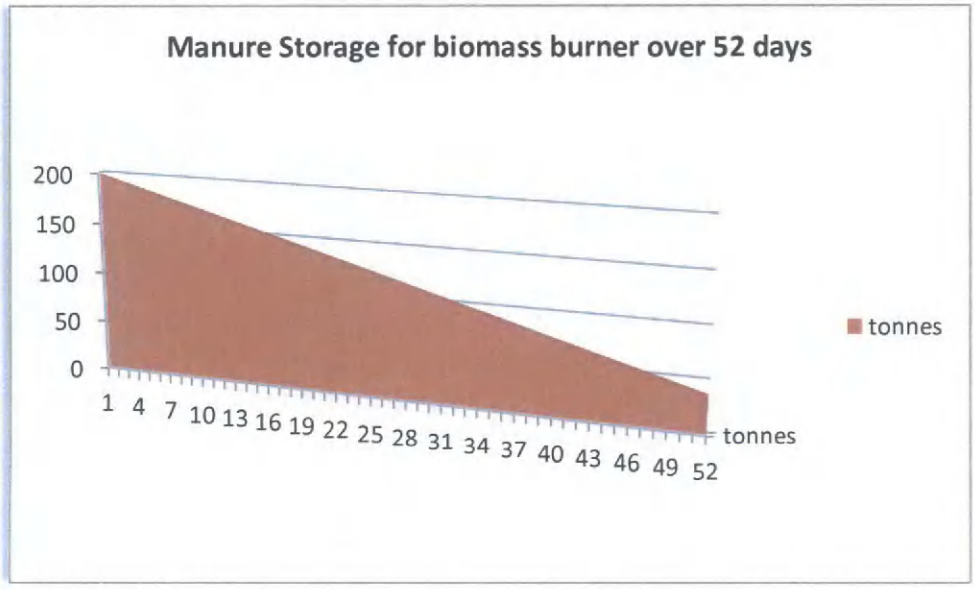
Therefore 1248 hours x 130 kg/hr = 162,240kgs per batch (162.2 tonnes)

The total foreseeable storage requirement for the poultry operation would be in the order of 162.2 tonnes maximum.

With the installation of the proposed biomass burner to be within the confines of the shed taking up an area of approximately 17m x 10m in footprint size there will be a storage area remaining of 36m x 10m x 1.5m = 540m^3 storage capacity for poultry litter with there being only a requirement for a maximum of 198 tonnes.

Note of clarification: The system is being designed based on heat requirements for the houses and not based on total assimilation of all poultry manure generated on site. Therefore the system will utilise 162.2 tonnes of the 198 tonnes approx generated per batch. It must be noted however also that the heat recovery system when operational would lead to a greater thermal balance within the houses and as a consequence there would be drier poultry litter. It is estimated that the litter may be of the order of 15% to 20% drier and at 20% drier the system would almost be in equilibrium with the amount of manure produced.

C: As per b: above it is not the initial intention to store any material onsite. All material will be removed directly upon cleaning out of the house. In the event that by years 2 or 3 of operation that a biomass burner is installed the maximum length of time the litter will be stored will be 52 days i.e. 1 batch. The volumes stored will be reducing from 198 to 36 over the 52 days.



D: The biomass burner specified at present is the Brookes Gasifier and it has a combustion rate of 130kg poultry litter per hour or 3120kg per 24 hour period. (3.12 tonnes per day)

E: In respect of the litter storage area and indeed the site itself the applicant currently contracts a specialist pest control team for the control of pests on site. The current contract for the group sites is with "Prevent a Pest" www.preventapest.ie and it would be the intention of the applicant to utilise these or a similarly experienced company to provide the service for the proposed site.

More specifically there would be a number of specified bait points located around and within the storage facility which would be inspected weekly and bait replenished where necessary. A log of activity and of the management of the bait system would be kept as standard on all Bord Bia Approved sites and in conjunction with the proposed site Environmental Management System.

Any windows / vents / cladding gaps will be covered with protective screens to abate flies and other insects and any doors will be maintained closed at all times where practicable. Advice will be taken from the pest control experts in this regard also in line with EPA and Bord Bia requirements.

F: As with all poultry facilities in the group the standard is one full daily inspections for mortalities within the houses. If the mortality is >2% in the first 7 days of a batch it must be reported to the group advisor / Veterinary inspector. After 7 days, mortality above 0.3% per day of initial placement must similarly be reported.

Mortalities are removed to dedicated storage bins located generally proximate to the house and these bins are collected by licensed collectors for thermal treatment on a weekly basis. On all other group sites the frequency of collection has not lead to any issues around odour or disease and this collection and storage methodology is representative of the national standard.

6. The application and the EIS refer to storage of carcasses and removal by contractor. Further information is required regarding the frequency of carcass removal off site and biosecurity measures with regard to disease control from carcasses within and off the site.

As per response in 5(F) above, in all poultry facilities in the group the standard is one full daily inspections for mortalities within the houses. If the mortality is >2% in the first 7 days of a batch it must be reported to the group advisor / Veterinary inspector. After 7 days, mortality above 0.3% per day of initial placement must similarly be reported.

Mortalities are removed to dedicated storage bins located generally proximate to the house and these bins are collected by licensed collectors for thermal treatment on a weekly basis. On all other group sites the frequency of collection has not lead to any issues around odour or disease and this collection and storage methodology is representative of the national standard.

The location of the storage bins will be identified within the pest control management plan and appropriate baiting and control methodologies intensified if required. There is no required standard for collection frequency in the Bord Bia Quality assurance scheme however a frequency of weekly collections on all group farms has insured that no disease issues have occurred. This will be similar to the proposed methodology for the proposed site.

In respect of bio security and the collection bins themselves the collection vehicle will self-disinfect prior to entry to the site. The collection personnel will do the same for boots in on-site foot washes and with disposable gloves. This ensures that there is no cross-migration of disease between sites. Again the systems work well in relation to the group structure at present and this is evidenced by the lack of disease outbreaks in the group. This will be reciprocated for the proposed development.

7. The issue of a major disease outbreak and depopulation of the unit as in the case of Class A disease is not addressed in the EIS. Further information is required regarding emergency control plans, including dealing with major disease outbreak and depopulation of the unit and carcass disposal on a large scale.

As described in sections 5 and 6 above there are initial quality checks done daily on the general stock and stock welfare and there are mortality counts done daily which give an indication of flock welfare. These indicators will be the first sense check as to the status of disease in the house. Upon reaching threshold mortality levels veterinary experts will be called which in turn will invoke specific Department of Agriculture protocols and ultimately the Department of Agriculture will roll out their own procedures for emergency control plans with the applicant ultimately having to take an observatory role. In respect of the site depopulation the following would be the residual disposal rates required for the site:

Live Birds: 200,000 birds at finishing weight of 1.8kg = 360,000 Kg (360 Tonnes)

Poultry Litter: 198 Tonnes per batch

Feed: 5 tonnes max (at end of cycle feed bins quite low)

Wash water: Disinfection volumes to be confirmed

The Carcass weight of 360 tonnes would be disposed through thermal destruction at a rendering facility under controlled conditions under the supervision of the Department of Agriculture. The Poultry Litter would also be disposed of via thermal destruction at a rendering facility of similar waste to energy facility where total destruction of all disease can be achieved in controlled circumstances. The feed could be disposed of in a similar manner to the carcasses and litter. Finally it is assumed that heavy doses of aqueous disinfection material would be utilised to wash down the houses following the event. This would be brought to a specialised water treatment facility (i.e. ENVA) for specialised treatment and disposal.

All of the above measures and ultimate control in this event would be taken over by the Department of Agriculture personnel. There would be a duty of care on behalf of the applicant and through the terms of the environmental management system to ensure the controls outlined in the Environmental Management system regarding Accident and Emergency procedures are adhered to and that environmental protection is prioritised in conjunction with the EPA licence.

8. Please provide: -
   a. Details of measures to be taken to protect groundwater & surface water from impacts from on-site activities during the construction phase.
   b. A map outlining/identifying the locations of the proposed wells on the site.
   c. A drawing showing the distance between all private wells and and surrounding land areas on which the liquid waste waters will be spread.

a: Ground water is to be protected during construction works by following the guidance of: "Control of water pollution from construction sites. Guidance for consultants and contractors" CIRIA

C532.Some of the issues that may cause damage to ground & surface water in the course of construction on a Greenfield site include:

- site clearance/fencing
- topsoil stripping
- drainage
- earthworks
- piling
- concrete works
- dewatering.

Prior to any construction work proceeding on site the following issues are to be addressed in a detailed plan:

- Provide temporary haul road bridges over watercourses to avoid vehicles fording streams contractor to avoid crossing streams if at all possible.
- All grading works to be kept back as far as possible from streams to avoid interfering with water flow.
- Runoff from site to be held in settlement ponds for sufficient tile to allow settlement of surface water.
- Minimise the length of haul roads on the site; minimise the gradients of the haul roads.
- Construct temporary haul roads using permeable material, perhaps laid on geofabric.
- Early instillation of proposed waste water treatment system & percolation area to service site toilet.
- Construct gullies/ditches adjacent to haul roads constructed with bunds or dams to reduce the drainage water velocity and allow sediments to settle before discharge to the drainage system.
- Install effective wheel washes with dedicated drainage and pollutant collection sumps and interceptors.
- Avoid mass overburden stripping on the site; expose only that part of the site essential for operation

- If topsoil is to be stored, avoid constructing stockpiles more than 2 m high. This will ensure anaerobic conditions do not occur and that the soil will remain fertile and capable of being re-seeded. It will also be less susceptible to erosion.
- Promote the travel of all tracked vehicles in straight lines wherever possible when moving around site. Encourage tracked vehicles to change direction at a limited number of locations, perhaps on prepared surfaces.
- Avoid unnecessary slewing of tracked vehicles and turning of large site plant. This will avoid excessive soil structure damage and will reduce the amount of material available for entrainment in site water.
- Place silt fences of geofabric or similar material around open or exposed ground and stockpiles.
- Re-seed any exposed ground and stockpiles to stabilise the ground and reduce erosion and gullying of such features.
- Stripped soils and imported fill materials can generate dust in dry weather. This can blow away and enter watercourses.
- Bowsers can be used to keep exposed earth damp and prevent dust generation.
- Any oil stored on site to be adequately bunded. Min 110% of volume.

Prevention measures spillage from plant.

- All foremen are to stress site pollution and damage sensitivity to their operatives, either in toolbox talks or directly on the site.
- All small plant such as generators and pumps will be stood in drip trays capable of holding 110% of their tank contents.
- All small plant shall be positioned as far as practicable from SSSIs or watercourses.
- Site foremen or gangers in each section will visually inspect all items of plant every day.
- All items of plant are to be monitored for leaks and drips while in operation, and drip trays are to be maintained and emptied at regular intervals.
- All faulty items of plant will be removed from site.

Fuelling procedures to be followed:

- Diesel will be delivered to plant on site in a delivery bowser dedicated to that purpose.
- The driver or the supervising foreman will check the delivery bowser daily for leakage.
- The bowser driver will be issued with, and will carry at all times, absorbent sheets and granules to collect any spillages that may accidentally occur.
- Where the nozzle of the fuel pump cannot be placed into the tank of the machine to be filled, a funnel will always be used.
- Each area of work shall have a designated fuelling area, which shall be as far as
- practicable from adjacent SSSIs or watercourses. Section foremen shall identify these areas to their plant operatives.
- The central fuel tank will be stored in a bunded area and constructed on solid slab. The standing area adjacent to the tank shall be constructed with falls to an interceptor, before outfalling to the foul sewer.
- Absorbent sheets and granules will be stored at the central fuelling location and be clearly signed.
- All mobile plant such as excavators, dumpers and back hoe excavators shall be refuelled at least 20 m from any adjacent watercourse and, where practicable, off the blacktop surface. Large plant, such as cranes and piling rigs, will be tracked to the edge of their platform farthest from the watercourse before fuelling.
- This procedure shall be issued to all site operatives, bowser drivers etc by their section foreman or controlling members of staff.

Placing of concrete – there are innumerable variations in the methods and locations in which concrete can be placed on site. To prevent pollution it is important that all concrete pours are planned and that special procedures are adopted where there may be a risk of surface or groundwater contamination. These may include:

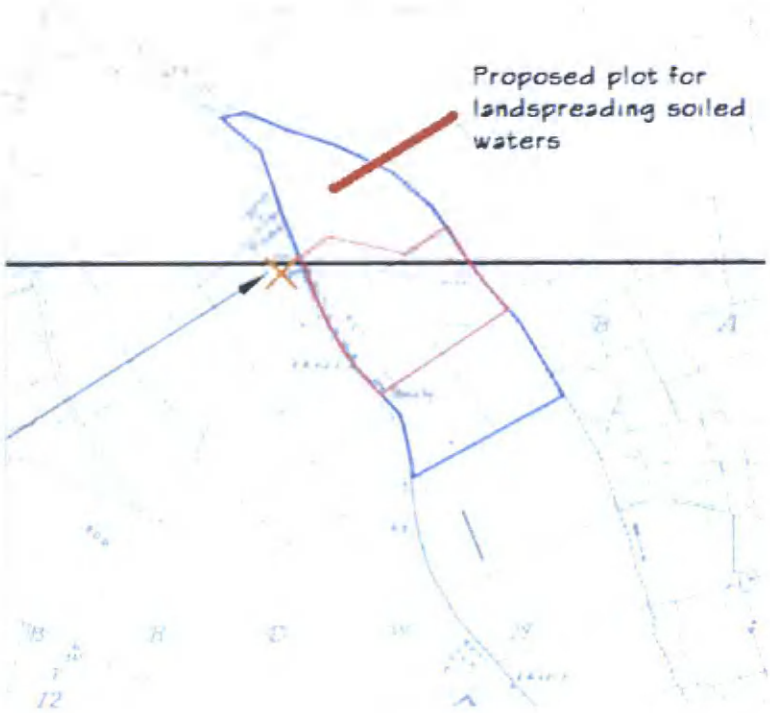
- washing-out of plant and equipment in agreed controlled wash-out areas
- preventing grout loss from shuttered pours
- reducing the amount of concreting above or adjacent to watercourses by investigating alternative construction techniques (for example, pre-cast or permanent formwork)
- where possible, preventing concrete skips, concrete pumps and machine buckets from slewing over water while placing concrete
- ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets. However, care must be taken to isolate fresh concrete from the dewatered ground as grout can be drawn out and through the dewatering system, particularly with high slump concrete

- ensuring that covers are available for freshly placed concrete to avoid the surface washing away in heavy rain
- disposing of surplus concrete after completion of a pour in agreed suitable locations.

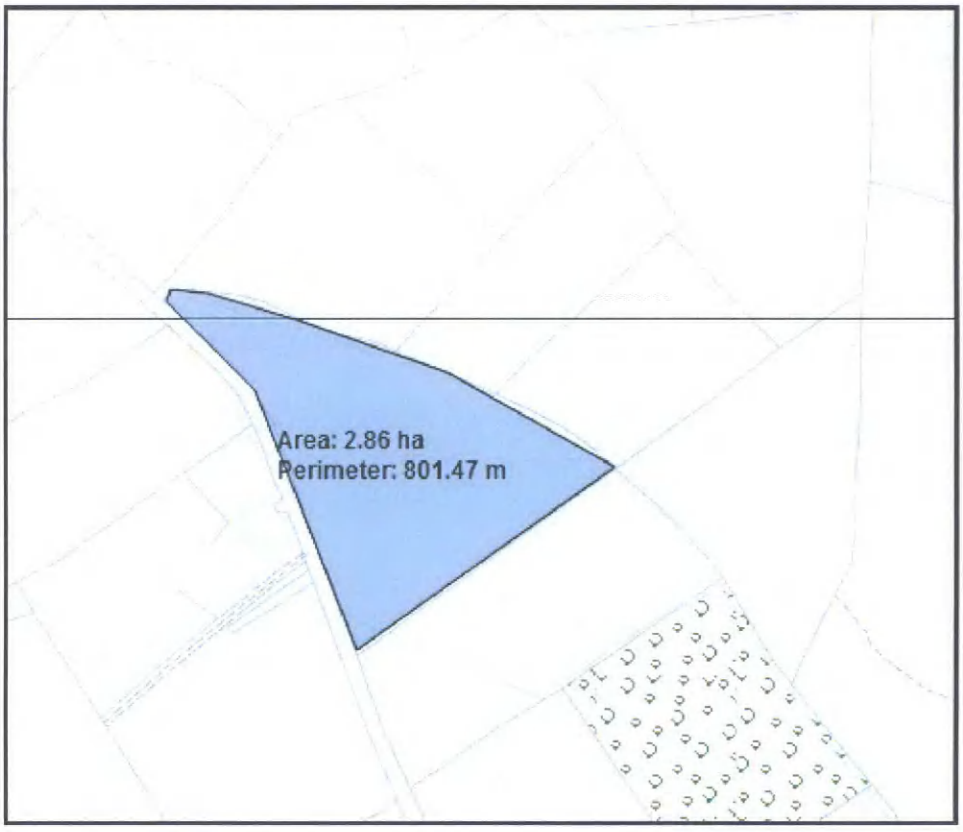
b: Location of deep bore well proposed shown on site layout plan, adjoining office.

c: RME Environmental has carried out a full and extensive search of the Geological Survey of Ireland Borehole dataset and have determined that there are no published details of boreholes adjacent to the site. It is however asserted that there is no mains water in the area thereby it must be concluded that there are unmapped wells located at the nearest sensitive residents houses.

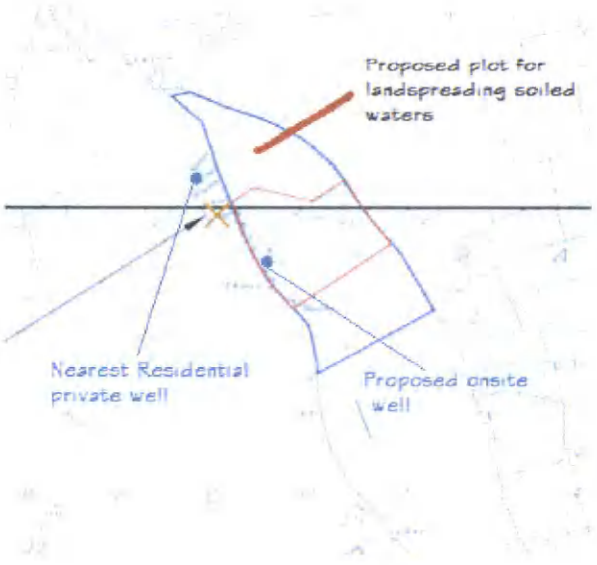
Land spreading of the soiled waters will take place on the applicant's field adjacent to the proposed development at ITM E547386, N549845. Please see below:



The proposed land is currently on tillage but will be converted to grassland in order to provide all year round access for the recovery of the soiled water from the facility. The site area is approximately 2.86 ha.



The assumptions made here is that there is a private household well located adjacent to the proposed plot for land spreading of the soiled waters. This would represent the most sensitive location in this respect. Adequate buffers will be maintained for same. The application rates for the spreading of soiled waters as per SI31 of 2014 are 50m^3 per hectare every 45 days. The plot has a capacity of 2.86 hectares therefore it can receive 143m^3 every 45 days. That allows for 8.11 applications annually and a total of 1159.73m^3 annually.



The actual distances between the well may be as little as 39.82 metres and therefore adequate provision will have to be taken to ensure wellhead protection and groundwater protection is maintained.

It must be noted that this plot of land is currently in barley production and has received fertiliser both chemical and organic in the past. This has not had any adverse effect on groundwater quality or indeed the quality of the water at the nearest sensitive residence. The residents at this dwelling farmed the plot and indeed sold it to the applicant.

12. Clarification of what is meant by settlement tanks as identified in the site layout drawing.

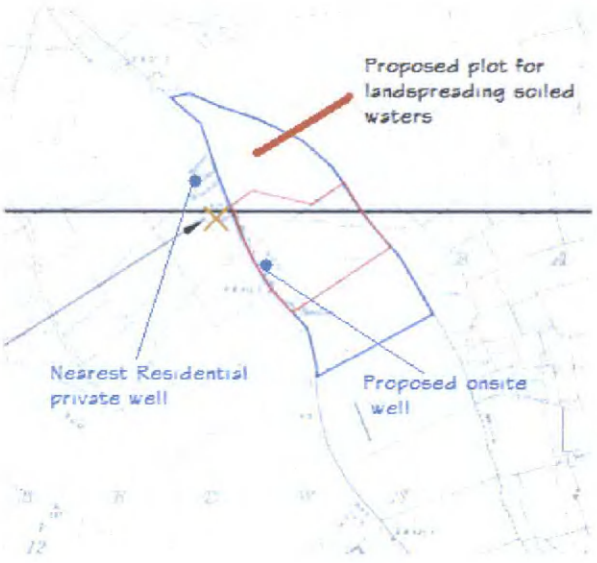
The term settlement tanks as used in the drawing is not reflective of the function of the tanks and indeed suggests some form of function other than storage. It would be more appropriate to term the tanks soiled water storage tanks as these are the storage tanks required for holding the soiled water (wash-water) from the houses post clean out of the litter and prior to the re-setting of the incoming stock.

13. Clarification of how soiled water from the washing of the poultry houses, & soiled water run-off from the hard surfaced areas used for loading of poultry manure will be collected & managed. Include details of expected volumes of soiled water generated on site.

A study across the Shannonvale group in response to the large volumes of planning applications being made by group members in recent times has demonstrated that the average volume of soiled water generated per 50,000 bird house is 13.3m^3 per cycle.

Therefore in any given cycle the proposed development at Knockbrown (4 x 50,000 bird houses) will generate 53.2m^3 per batch.

Given that soiled water can be land spread at a rate of 45m^3 per hectare that implies that a minimum of 1.18 hectares is required to recover the soiled water via land spreading. As per the submission in question 8 above the applicant proposes to utilise his own land adjacent to the development site for this purpose. The total land available is 2.86 hectares and provides 2.5 times the total required.



Collection, storage and management of the soiled water and washings:

As the houses are washed down all washing will be directed to the soiled water storage tanks of which 1 will be located per house. These tanks will be sized to take 120% of the proposed load. All of the external yard washings will be diverted to the same holding tanks. The drains in the hard stand area external to the houses where the material will be loaded will be fitted with a diverter valve which will allow in normal circumstances all clean runoff from the hard stand to go to the surface water drainage system and during times of house cleaning and washing this hardstand drainage will be diverted to the soiled water holding tanks.

The total required storage is a 10 days however house washing occurs immediately after destocking and for all houses at the same time therefore the total required storage must equal 100% of the total projected soiled water generated. Given that the batch times match the 45 day spreading interval this does not become an issue either.

Over the 4 proposed houses a total storage capacity of 53.3m^3 is required (13.325 m^3 per tank). In best practice terms RME Environmental advises at least a 10% freeboard and a 10% buffer in capacity so the total storage provided in the 4 tanks will be 63.84m^3 or 16 m^3 per storage tank.

14. A site specific odour assessment for the proposed development which will consider in detail the odour impact from the proposed development on all sensitive receptors within 1000m of the site.

In response to the requirements of the FI request RME Environmental commissioned Odour Monitoring Ireland to complete an odour impact assessment that would predict in detail the odour impacts from the proposed development on all sensitive receptors proximate to the development. (within 1000m) A survey was carried out by OMB Architects of the sensitive receptors locally and presented to Odour Monitoring Ireland for use in their assessment.

The report concluded the following:

1. Dispersion modelling of odour emissions from Kieran O Regan's proposed development was performed in accordance with best international practice with a minimum of five years of hourly sequential meteorological data used in the dispersion modelling assessment. Topographical data from Ordnance Survey Ireland was also inputted into the dispersion model in order to take account of any complex terrain in the vicinity of the site.

2. With regard to Scenario 1 - Odour, the plume spread from the facility is considered small with the plume generally remaining relatively inside the facility boundary for an odour concentration of less than or equal to 3.0 OuE/m3 for the 98th percentile of hourly averages. In addition, the predicted ground level concentration of odour at the closest worst case residential receptor is less than 1.81 OuE/m3 at the 98th percentile of hourly averages for 5 years of screened hourly sequential meteorological data (*see Table 4.1 – year 2003*). This is within the proposed limit guideline value published in the Irish EPA and UK EA guidance documents for proposed facilities (i.e. less than 3.0 OuE/m3 at the 98th percentile of hourly averages). The predominant odour impact in this near field is as a result of emissions of odour through side and end gable vents in a horizontal manner. In addition, library based data was utilised within the dispersion model and the level of emissions from Kieran O Regan's proposed facility operation could be significantly lower in comparison to this published data (i.e. as a result of good management, production system operation and feed type).

The report also made some recommendations which should be incorporated into the operational management plan for the facility when operational these were:

The operator of Kieran O' Regan should develop an odour management plan and ensure the implementation of good management practice in accordance with the guidance contained in the following publications to include:

- Guidance for Poultry Processing IPPC S6.11 | Issue 3,
- IPPC Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs,
- IPPC NI, Standard farming installation rules and guidance for poultry production Ver 3. (2009). NIEA.
- PPC (NI) Regulations 2003, Example – Odour Management Plan Template, Laying Hens.
- PPC Regulations (Northern Ireland) 2003 – Example – Odour management plan template, laying hens. NIEA.
- PPC (Northern Ireland) Regulations 2003 – Application for a permit, Example of supporting documentation –laying hens, NIEA.
- PPC (Northern Ireland), 2006 – Guidance for Operators on Odour Management at Intensive Livestock IPPC installations. Ver.2. NIEA.

A copy of the full odour assessment report is attached as Attachment 1 to this report in full.

15. A site specific noise assessment for the proposed development which will consider in detail the noise impact from the proposed development on all sensitive receptors within 1000m of the site.

Section 15 of the request for further information from Cork County Council requests that a noise assessment is carried out for the proposed development which will consider in detail the predicted noise impact from the proposed development on all sensitive receptors within 1000m of the site.

In response to this request RME Environmental commissioned noise specialists Fitzsimons-Walsh Environmental to carry out the required predictive assessment on the proposed development. This assessment was carried out by placing noise metres in-situ at the nearest noise sensitive location and spot metering for background noise at sensitive locations proximate to the site and at the site itself. Predictions were then made regarding the impacts of all proposed activities from fans to feed deliveries to general run-time operations at the site. The report concluded the following:

- The maximum noise levels predicted should occur during the construction phase of the development and should pertain for short periods only. Construction noise by nature is a temporary activity and should have no long-term negative effects.
- Noise impacts from the minimal increase in road traffic volumes should be negligible.
- During normal operation of the facility there should no significant noise sources consequently there should be a negligible noise impact at all nearby residents.
- Noise emissions should contain no clearly audible tones and should not be impulsive in nature.
- Predicted noise emissions should be well within recommended criteria levels

The report made some recommendations also as to mitigation measures that could be incorporated into the site development plan which would ensure proactive mitigation against any operational future impacts;

Though the predicted off-site noise emissions would be only marginally significant and well within recommended guidelines the following mitigation measures are nonetheless proposed for the proposed development

- An acoustic berm (minimum height of 4m) should be constructed at the boundary of the site (refer to figure 3 below.) The berm should be sited to act as a barrier between the nearest noise sensitive receptors. As such the berm should be located primarily on the north and south boundaries. This berm should be constructed with soil material sourced from the site development works. The berm should be planted with suitable native shrubs which should also provide visual screening. This acoustic barrier should provide additional noise attenuation of c 8 dBA.

- 'Noisy' activities including feed deliveries will be restricted to daytime hours

- All construction should be carried out in accordance with BS 5228: Noise Control on Construction and Open Sites Part 1: 2009. Accordingly all construction traffic to be used on site should have effective well-maintained silencers. Operators of all mobile equipment should be instructed to avoid unnecessary revving of machinery and limiting the hours of site activities that are likely to give high noise level emissions. Where possible the contractor should be instructed to use the least noisy equipment. With efficient use of well maintained mobile equipment considerably lower noise levels (3-6 dB(A)) than those predicted can be attained. The Project Engineer should closely supervise all construction activity.

Construction activity due to its nature is a temporary activity and thus any impacts should be short term. All construction works should be carried out during daytime periods.

A copy of the full Noise Impact Assessment is attached to this response document as attachment No. 2

16. If poultry manure is to be sent to composting facility, please submit written agreement from the composting facility stating that they will accept the volume of manure which will be generated on site.

In respect of the response to section 5 above reference was made to the methodology to be utilised to remove poultry manure from the facility. In essence the operational contract for the removal and recovery / disposal of the poultry litter is contracted to MJ Kehoe Transport Limited. The service offered here is a mix between composting and land spreading of the litter and control is managed by Mr Kehoe through receipts and dockets at point of collection and dockets at point of recovery / disposal. Full traceability is provided by Mr Kehoe in relation to the management of the material and on the recovery side each receiving farmer / composting facility declares annually to the Department of Agriculture what volumes it recovers. The organic waste register on-site which is a requirement of all IPPC licences and any associated Environmental Management system for such a facility records loads of waste which have left the site and these loads will tally with the receipts as received from the contracted haulier. This system has been in operation for some time now and has met at all stages with EPA approval. In accordance therefore with the requirements of this specific request please see attached as attachment no 3 to this submission a letter from MJ Kehoe Transport Ltd confirming that they are in a position to recover 1500 Tonnes of poultry litter from the proposed facility in Knockbrown, Bandon, Co. Cork.

MJ KEHOE TRANSPORT LIMITED,
Kilbride,
The Ballagh,
Enniscorthy,
Co. Wexford.
Tel/Fax: 053 9136164
Mobile: 087 2534168
Vat number: IE 3776965 B

Shannonvale Foods,
Clonakilty,
Cork.

14.10.14

To Whom It May Concern:

M.J. Kehoe Transport has been transporting poultry litter for Shannonvale foods for many years. We are in a position to take 1500 tonnes of chicken litter per annum from the new proposed broiler development in Bandon, West Cork. Our waste permit number is WCP-LK-08-582-01.

Any queries please do not hesitate to contact me.

Kind Regards

pp Fiona Murtagh

M.J. Kehoe
Director

17. Drawing SV02, (Boiler House Plans, Sections & Elevations) refers to 1,440m^3 of poultry manure being generated during each production cycle in the 4 poultry houses. The traffic section of the EIS refers to 6.5 production cycles per year, therefore this indicates that 9,360m^3 of poultry manure will be generated each year on site. However the Solid Waste Infrastructure section of the EIS refers to 1,385 tonnes of poultry manure being produced per annum, this does not appear to be consistent with the estimated 9,360m^3 manure production calculated elsewhere in the application, please clarify.

By way of clarification on this matter the total volume of poultry manure to be generated at the facility annually is correct as per the Solid Waste Infrastructure section i.e. 1385 tonnes per annum. All other sections should be read as same. An error was made in relation to the drawing SV02 whereby 1440m^3 was quoted instead of 1385 m^3 and then quoted on a per cycle as opposed to annualised basis. 1385 m^3 per annum is the total predicted amount of poultry manure to be generated at the facility.

18. Confirmation that the storage capacity proposed for poultry manure on site complies with the requirements of Article 11 of the European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014 (S.I. 31 of 2014).

Article 11 of SI 31 of 2014 states as below:

Capacity of storage facilities for poultry manure
11. (1) Without prejudice to the generality of Article 8, the capacity of facilities for the storage on a holding of livestock manure produced by poultry shall, subject to sub-article (2) and Article 14, equal or exceed the capacity required to store all such livestock manure produced on the holding during a period of 26 weeks.

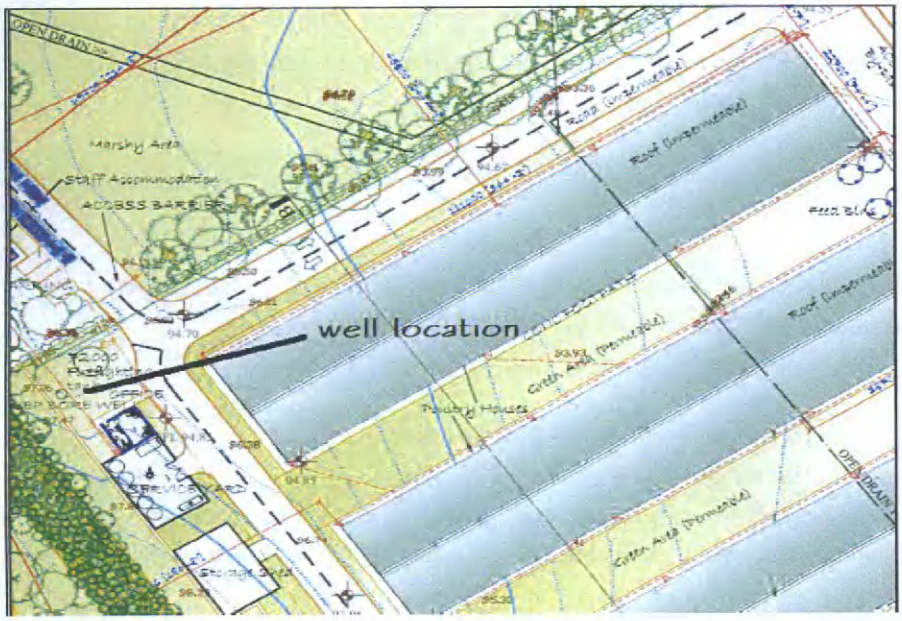
This would result in an overall onsite storage requirement of 1385m^3 / 2 = 692.5 m^3 of waste.

This is not applicable in this case given the ability to have an all year round collection option through MJ Kehoe Transport Ltd however a storage facility has been made available to the north of the site the dimensions of which are 53.7m x 20m x 5m. Given that the operator could stack poultry litter to a height of 1.5m – 2m this gives an available storage capacity of 1611m^3 stacked to 1.5m high.

This gives a potential storage capacity in the proposed development 2.3 times in excess of the requirements of Article 11(1) of SI31 of 2014.

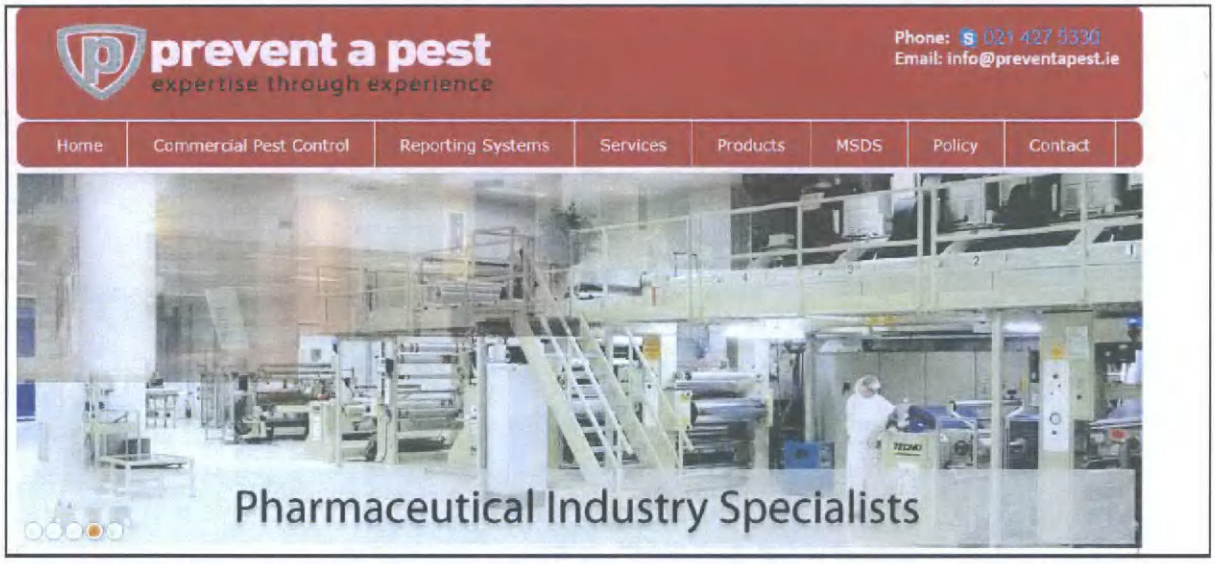
25. The application is proposing a private well. Clear details of the location are required.

Please refer to the attached drawing SV02 for a clear indication of the location of the proposed private well for the proposed development: In descriptive terms the proposed well is to be located at the west of the site adjacent to the proposed site office and firewater retention tank.



26. Details of pest control company in relation to consultation and comissioning phases of the development

In respect of the pest control professionals consulting with the group at present the Shannonvale group incorporating the applicant uses is "prevent a pest" whose full details and specialities can be viewed at www.preventapest.ie

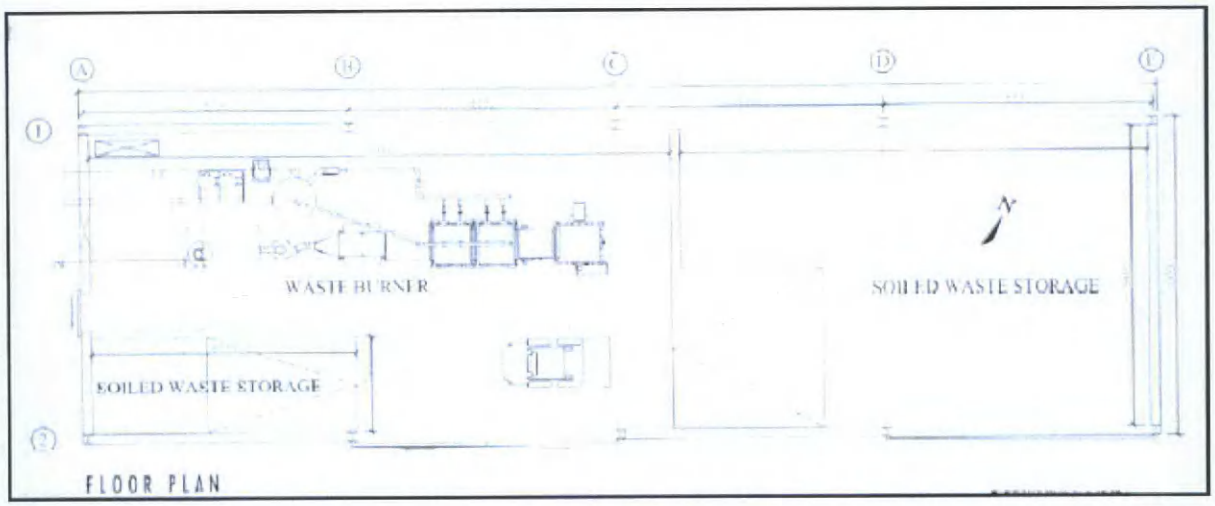


It will be the intention of the applicant to engage with these specialists in respect of the vermin and pest control and health requirements of the Bord Bia Quality Assurance Scheme and also in respect of the requirements of the IPPC/IED licence and the generic site environmental management system.

27. Additional details regarding the emissions from the proposed Biomass burner and when it is due to be comissioned

As stated previously in this document the intention of the applicant in this case is to establish fully the facility and operate it certainly for the first 2 – 3 years in a conventional manner i.e. using registered contractors to remove all waste products from the facility for recovery.

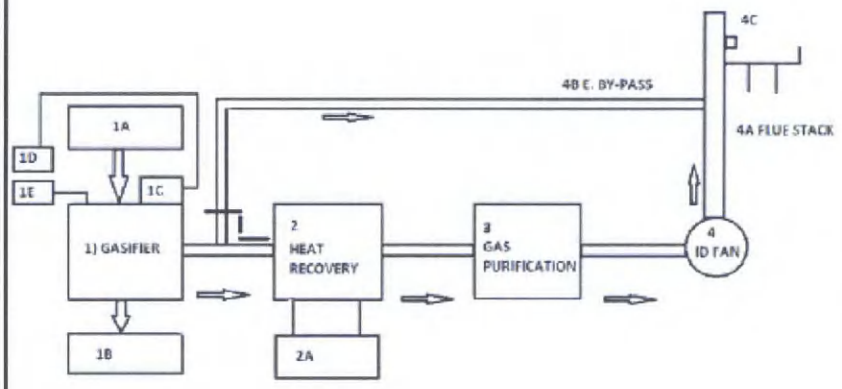
At present the favoured technology for the group is the Brookes Gasifier and successful trials have been demonstrated in respect of the technology with regard to its ability to efficiently and cleanly recover energy from the resource that is poultry litter. RME Environmental is carrying out research on behalf of the group regarding the efficacy of the energy recovery processes and their relevance as they stand to existing and upcoming energy efficiency legislation. Until this process may take up to a year to complete and then the group policy in respect of available technologies will be formed.



The figure above is a diagrammatic representation of the proposed layout for the Brookes Gasifier as is currently proposed for the site. The unit will assume a floor space requirement of approximately 166m^2 in a shed of 1074m^2 capacity. The remainder of the shed will be separated for storage purposes for waste litter.

The storage and process shed proposed for the biomass burner will be located to the East of the proposed site. There will be 7 batches of birds placed per annum and therefore there will be seven events where approximately 198 tonnes of poultry litter will be deposited in the waste storage area. The waste material will be brought via a bobcat or telescopic handler and loaded into the main feed system as per 1a below. From there the material will be fed into the main gasifier at a maximum feed rate of 130Kg per hour. This represents a sustainable level for this facility and would be thus ensuring availability of recovered heat for the poultry houses throughout the cycle. Once the material enters the gasifier and is combusted the generated heat is recovered in a heat recovery module and sent to heat the poultry houses and the residual ash is recovered in an ash recovery system. 6.2% of the throughput material is recovered in the form of ash and this material is collected by a dedicated customer who utilises the product in fertiliser manufacture. The exhaust gas from the gasifier passes through a bespoke particle filter and is vented to atmosphere. Provision will be made for the monitoring of the flue gas emissions on a yearly basis in accordance with EPA and DAFM regulations.
The recovered heat will be directed to custom made fan/heaters in the houses and this heat will be utilised to substitute the requirement for gas heating in the house. The effect of this will be a reduced gas bill for the site and a better lighter and drier quality of litter being generated in the houses.

Gasification System Overview:



1) Brookes 6 Auger Gasifier

   a) Feed system
   b) Ash disposal system
   c) Electric control panel and Instrumentation
   d) Emergency backup power generator
   e) Air compressor inc receiver

2) Heat Recovery System

   a) Customer Energy Receiver Unit (Buffer Tank)

3) Gas Purification System – Particle Bag Filter

4) Flue Gas Discharge System – ID Fan

   a) Flue stack
   b) Emergency by-pass
   c) Emission monitoring platform and ports

The facility will be licensed by the EPA in relation to all operations within the confines of the site itself including the operations of the biomass burner. In that respect and despite the fact that the material is a fuel and a by product it is subject to the requirements of the Waste Incineration Directive in respect of the potential emissions the unit. A review of the table below demonstrates that the process will emit pollutants in a range significantly below the WID requirements and given the small scale nature of the process and the remote nature of the facility atmospheric dispersal is not considered to be of any specific concern.

EXECUTIVE SUMMARY

Emissions Summary

Parameter	Units	Result	Calculated Uncertainty +/-	Half Hourly WID Limit
Total Particulate Matter	mg/m³	1.6	0.92	10
Particulate Emission Rate	g/hr	1.8	1.0	-
Dioxins & Furans - UPPER Limits				
Dioxins & Furans (NATO I-TEQ)	ng/m³	0.0147	0.0037	0.1
Dioxins & Furans (NATO I-TEQ) Emission Rate	µg/hr	0.0143	0.0036	-
Dioxins & Furans (WHO TEQ Humans / Mammals)	ng/m³	0.0151	0.0038	-
Dioxins & Furans (WHO TEQ H / M) Emission Rate	µg/hr	0.0147	0.0037	-
Dioxins & Furans (WHO TEQ Fish)	ng/m³	0.0186	0.0047	-
Dioxins & Furans (WHO TEQ Fish) Emission Rate	µg/hr	0.0181	0.0046	-
Dioxins & Furans (WHO TEQ Birds)	ng/m³	0.0138	0.0035	-
Dioxins & Furans (WHO TEQ Birds) Emission Rate	µg/hr	0.0135	0.0034	-
Dioxins & Furans - LOWER Limits				
Dioxins & Furans (NATO I-TEQ)	ng/m³	0.0000	0.0000	-
Dioxins & Furans (NATO I-TEQ) Emission Rate	µg/hr	0.0000	0.0000	-
Dioxins & Furans (WHO TEQ Humans / Mammals)	ng/m³	0.0000	0.0000	-
Dioxins & Furans (WHO TEQ H / M) Emission Rate	µg/hr	0.0000	0.0000	-
Dioxins & Furans (WHO TEQ Fish)	ng/m³	0.0000	0.0000	-
Dioxins & Furans (WHO TEQ Fish) Emission Rate	µg/hr	0.0000	0.0000	-
Dioxins & Furans (WHO TEQ Birds)	ng/m³	0.0000	0.0000	-
Dioxins & Furans (WHO TEQ Birds) Emission Rate	µg/hr	0.0000	0.0000	-
Cadmium & Thallium	mg/m³	0.01	0.002	0.05
Cadmium & Thallium Emission Rate	g/hr	0.01	0.002	-
Heavy Metals	mg/m³	0.21	0.04	0.5
Heavy Metals Emission Rate	g/hr	0.24	0.05	-
Mercury	mg/m³	0.0002	0.00004	0.05
Mercury Emission Rate	g/hr	0.0002	0.00005	-
Hydrogen Chloride	mg/m³	1.2	0.14	10
Hydrogen Chloride Emission Rate	g/hr	2.0	0.24	-
Volatile Organic Compounds	mg/m³	0.40	0.20	10
Volatile Organic Compounds Emission Rate	g/hr	0.67	0.3	-
Oxides of Nitrogen (as NO_2)	mg/m³	54	8.6	400
Oxides of Nitrogen (as NO_2) Emission Rate	g/hr	91	14.6	-
Sulphur Dioxide	mg/m³	85	13.5	200
Sulphur Dioxide Emission Rate	g/hr	143	23	-
Carbon Monoxide	mg/m³	4.0	2.57	100
Carbon Monoxide Emission Rate	g/hr	6.8	4.3	-
Oxygen	% v/v	18.6	0.6	-
Moisture	%	2.0	0.24	-
Stack Gas Temperature	°C	179.1	-	-
Stack Gas Velocity	m/s	4.8	-	-
Gas Volumetric Flow Rate (Actual)	m³/hr	2771	-	-
Gas Volumetric Flow Rate (STP, Wet)	m³/hr	1686	-	-
Gas Volumetric Flow Rate (STP, Dry)	m³/hr	1652	-	-
Gas Volumetric Flow Rate (@ref conditions)	m³/hr	1686	-	-

ND = None Detected.
Results at or below the limit of detection are highlighted by bold italic text.
The above volumetric flow rate is calculated using data from the preliminary survey. Mass emissions for non isokinetic tests are calculated using these values. For all isokinetic testing the mass emission is calculated using test specific values.
Reference conditions are 273K, 101.3kPa without correction for water vapour

6.2% of the input material will form an ash residue. This will equate to 55.8 tonnes of Ash per annum from the system. This material will be stored in an ash recovery container as specified in the accompanying process drawings and the ash will be removed by a local fertiliser manufacturer for re-use. A neighbouring poultry farmer with existing biomass burner currently avails of this recovery route and there is a very high demand for the product. Control of the recovery of the product will be overseen by the EPA in the facility licence.

The system requires registration with the department of agriculture and we reference a snippet of the registration document below.

APPLICATION FOR REGISTRATION IN ACCORDANCE WITH REGULATION (EC) NO. 1069/2009 AND COMMISSION REGULATION (EU) NO 142/2011 TO USE ANIMAL BY-PRODUCT OR DERIVED PRODUCTS FOR PURPOSES OUTSIDE THE FEED CHAIN (ARTICLE 23 OF REGULATION (EC) NO 1069/2009MATERIAL

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

Mr O Regan will not commence the operation without prior authorisation from both the EPA who will licence the operations of the facility and DAFM who have a specific interest in the management of animal by-products.

28. A dust control programme is required as part of the Environmental Management Plan and a more proactive approach is required in relation to control of dust programme

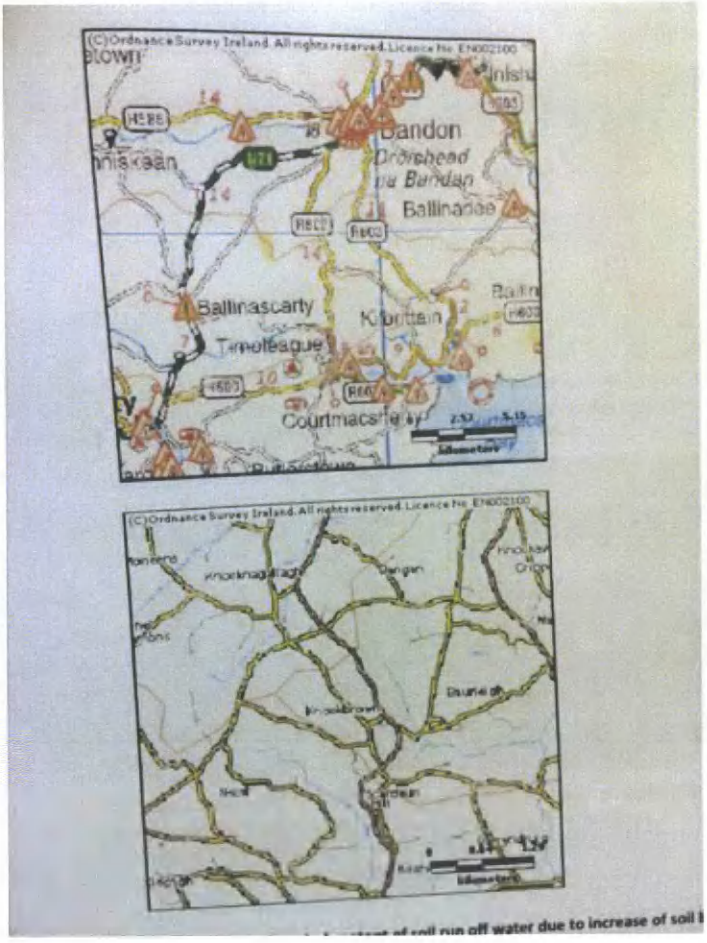
As stated in previous sections the applicant will be applying for an IPPC/ IED licence with the Environmental Protection Agency on successful receipt of the planning permission. All IPPC licensed facilities are licence bound to establish an environmental management system and within that where dust arisings are perceived to be a significant environmental risk or effect outside the site boundary or at the nearest sensitive receptor. Having carried out several audits / inspections of existing group facilities and environmental risk audits on many poultry facilities dust in normal operation is not considered significant. Construction dust will arise and a construction environmental management plan will ensure sufficient mitigation is put in place to ensure no adverse effects are experienced. Should the local authority or the EPA establish an opinion different to that expressed in the EIS the applicant will readily without question establish a dust monitoring programme to the satisfaction of both.

In general terms the dust monitoring programme would involve the following:

- Placement of 3 / 4 dust monitoring gauges (Berghoff Gauges) around the perimeter of the at specified locations to establish firstly the existing background ground level concentrations for dust. (Pre-development) (30 day deposition analysis assay)
- The deposition rate of dust will be measured in a normal scenario and this process will be carried out at 6 monthly intervals to establish the deposition rates in full operation versus the background deposition rates. This will very quickly establish where the greatest deposition or dust issues arise and whether the levels are significant.
- Mitigation measures would be initiated in respect of significant emissions namely by assessing fan speeds, feed dust content and external roadways and pathways which may have an impact on dust generation.
- As part of the daily / weekly record sheets which are normal practice in the operation of poultry facilities the visible levels of dust could be noted and a procedure for damping down of yards etc could certainly be put in place for summer or dry periods.

29. Surrounding lands susceptible to flooding and other potential drainage issues should be described.

An assessment was carried out on The office of Public Works (OPW) website www.Floodmaps.ie and also a local investigation was carried out with neighbours proximate to the proposed development. Neither source provided any evidence of flood risk in the proposed development area. Therefore if the runoff levels are maintained consistent with the Greenfield run-off rates through the suggested attenuation measures there will be no flood risk associated with the proposed development.



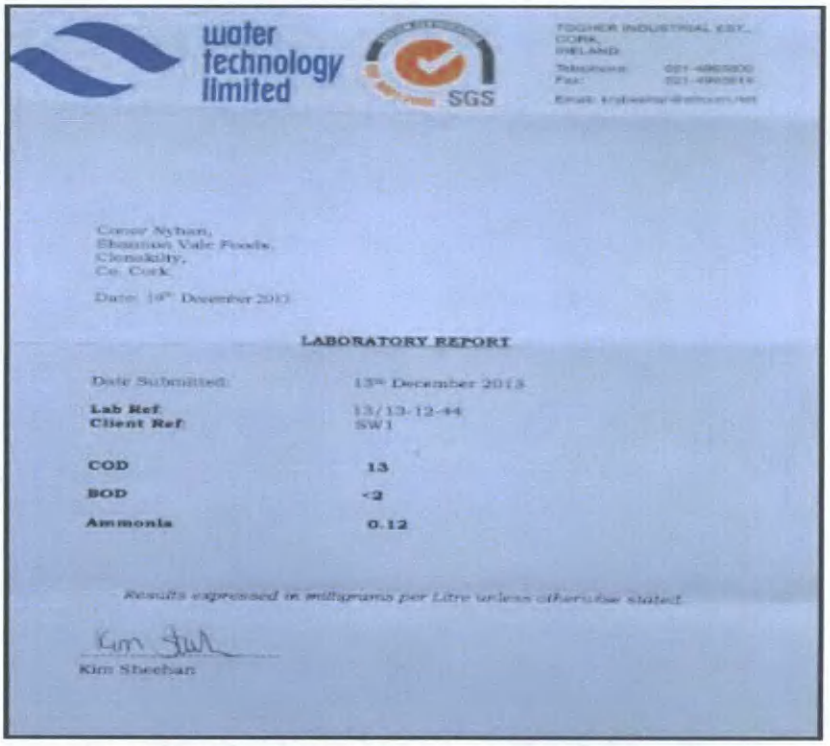
OPW Flood Map for the proposed development area

30. Information on chemical content of soil run off water due to increase of soil bedding should be provided

In addition to the increase in quantity and rate of runoff, development usually results in an adverse impact on the quality of the runoff water. A considerable number of contaminants can be taken up by the water. Accidental spills from container vehicles or tankers can result in infrequent but high volume and concentration contaminants.

It is not predicted that there will be any effect in the chemical content of soil runoff water due to an increase of soil bedding (soiled bedding in the poultry houses). The management of bedding will be contained to the dirty yard areas which will in effect be washed down effectively in to the soiled water holding tanks and removed for land spreading on adjoining lands in conjunction with the requirements of SI31 of 2014.

There will undoubtedly be an effect on surface water runoff from the site and this will be mitigated in quantity through the associated SUDS measures as suggested for the site and through essential good design in the separation of clean yard/ dirty yard and through good management on site. Below is a certificate for analysis of BOD, COD and Ammonia for surface water runoff at a group poultry farm operating under the Shannonvale Group. This analysis reflects a typical well managed poultry facility.



water technology limited

SGS

FOGHER INDUSTRIAL EST., CORK, IRELAND

Telephone: 021-4963000
Fax: 021-4963014
Email: info@watertech.com

Conor Nyhan,
Shannon Vale Foods,
Clonakilty,
Co. Cork.

Date: 16th December 2013

LABORATORY REPORT

Date Submitted:	13th December 2013
Lab Ref.	13/13-12-44
Client Ref.	SW1
COD	13
BOD	<2
Ammonia	0.12

Results expressed in milligrams per Litre unless otherwise stated

Kim Sheehan

The levels detected are quite low in respect of pollution status and we note from data on the EPA hydronet facility that the river basin districts are of a High Quality Status in the surrounding area. These results would in our experience be typical of results applicable to operational sites

31. Information on quality and sensitivity of receiveing water course Baurleigh River, and any consequent increase in nurtients from run off water

The Baurleigh River flows into the Kilbrittain River which is rated Q4-Q5 High status in the EPA's river water quality Envision index at Maulskinlahane. The river quality has not been assigned a Q value further downstream to the courtmacsherry estuary. In 2009 the Kilbrittain River was assessed as Q4 with Water Framework status Good, Pollution status – Unpolluted and General Condition being Satisfactory with good ecological quality.

Attached to this document as attachment 4 is a copy of the water framework Full Status Report for the Kilbrittain River – Coastal which in summary states that the macroinvertebrate status of the water body is good indicating no significant levels of eutrophication. The physic-chemical status of the river has not been assessed and the water body is essentially at risk from diffuse pollution sources along its profile.

There are no hydrometric gauges between the Baurleigh and Kilbrittain rivers and their entry to the Courtmacsherry estuary therefore accurate flow data is difficult to obtain.

Without any definitive flow data on the Baurleigh River it is not possible to carry out a definitive Waste Assimilative Capacity calculation on the river at this point therefore the opinions on consequent increases in run-off water from the proposed facility are borne out of professional experience and not engineering predictions:

Given that:

- the run-off from the site will be brought to 2 separate discharge locations and attenuated via swales in association with best practice SUDs deign
- that the facility design has clearly allowed for clear delineation between dirty yard and clean yard
- the operation of the site will be subject to inspection by Bord Bia and the EPA thereby ensuring very high standards of housekeeping are maintained
- The proposed operator of the site has over 30 years experience in same

it is apparent that the facility will not create any adverse effect on the Baurleigh River. In any event the surface water discharge from the facility will be subject to inspection by the EPA and the operator on a regular basis.

33. Information on design of sampling and inspection chambers at outlets of surface water drainage systems should be provided.

The inspection chambers will be designed to reflect the SUDs calculation for Greenfield run-off rate and given that there are 2 a split in the catchment calculations will be carried out in achieving the design specification. The Greenfield run-off rate has been calculated at an average default of 5.46 l/s and an 1 in 100 year event of 16.77 l/s. The design of the sampling chamber will be in accordance with 16.77l/s x 0.5 = 8.385 l/s.

A precast design with easy access to the sampling point is required. The chamber will have a sump which will broadly represent mean flows in active flow periods and will gather representative low flows in drier periods.

The sampling chambers will be located at the following locations:

Sampling and inspection Chamber No 1
ITM coordinates Easting 547386 Northing 549845

Sampling and inspection Chamber No 2
ITM coordinates Easting 547461 Northing 549731

34. The maximum capacity of the onsite sewerage tanks for organic waste should be quantified

The onsite proprietary sewerage treatment system has a maximum storage capacity of $3m^3$ and will only receive sewerage from the onsite dwelling.
There are also 4 onsite soiled water holding tanks located adjacent to each of the proposed poultry houses. These have an individual capacity of $16m^3$ and a total combined capacity of $64m^3$.

36. An amended screening assessment should be submitted, *if necessary*, depending on the response to the items listed above.

In respect of the submission RME Environmental does not consider that any aspect of the initial screening assessment document needs to be altered.

Attached to this document are the following additional reports:

Attachment 1 – Odour Impact Assessment as carried out by Odour Monitoring Ireland

Attachment 2 – Noise Impact Assessment as carried out by Fitzsimons Walsh Environmental

Attachment 3 – Letter of acceptance of waste from waste contractor MJ Kehoe Transport Ltd

Attachment 4 – Water Framework Directive status Report for Kilbrittain River

Signed as complete Rachael Mc Evoy

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ODOUR AIR QUALITY IMPACT ASSESSMENT OF PROPOSED KEVIN O REGAN POULTRY FARM TO BE LOCATED IN KNOCKBROWN, BANDON, CO. CORK.

PERFORMED BY ODOUR MONITORING IRELAND ON BEHALF OF RME LTD

PREPARED BY:	Dr. Brian Sheridan
ATTENTION:	Mr. Raphael McEvoy
DATE:	09th Nov 2014
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Executive Summary

Odour Monitoring Ireland was commissioned by RME Ltd to perform an odour air quality dispersion modelling assessment of a proposed poultry farm to be layout located in Kevin O Regan, Knockbrown, Bandon, Co. Cork. The operation of the poultry can lead to emissions of air pollutants such as Odour and by using atmospheric dispersion modelling, the potential impact of odour can be assessed and compared to relevant ambient odour air quality objectives and limits including the methodology contained within the Irish EPA publication "Odour impacts and odour emissions controls for Intensive Agricultural Facilities" and the Environment Agency Horizontal Guidance notes for Odour, Parts 1 and 2. These documents lay out general methodologies for assessing the risks of odours from such sites.

Emissions and guidance on Odour emissions were taken from reference data including:

1. Guidance for Poultry Processing IPPC S6.11 | Issue 3,
2. IPPC Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs,
3. IPPC Application form for a variation to a pig and poultry farm, NIEA Q57/20 Part C version 1.
4. EPR H1 (2008) – Environmental Risk Assessment Part 1 – Simple assessment of environmental risk for accidents, odour, noise and fugitive emissions.
5. EPR H1 (2008) - Environmental Risk Assessment Part 2 – Assessment of point source release and cost benefit analysis.
6. IPPC NI, Standard farming installation rules and guidance for poultry production Ver 3. (2009).
7. PPC (NI) Regulations 2003, Example – Odour Management Plan Template, Laying Hens.
8. Valli, L., Moscatelli, N., (2008). Odour emissions from livestock production facilities. Centro Ricerche Produzioni Animali – CRPA SpA Corso Garibaldi 42, 42100 Reggio Emilia, Italy.
9. Navaratnasamy, M. and Feddes, J.J.R. (2004). Odour emissions from poultry manure/litter and barns. PIC Project No. 155, Poultry Industry Council.
10. Van Geel, P.L.B.A. (2006) Annex 1 - Odour nuisance and farming act, Netherlands.
11. Bruce D. Northern Ireland Environment Agency. (2010). Per communication.

One odour emission data set was calculated to determine the potential impact of Kevin O Regan proposed facility during its proposed operation.

This scenario assessed included:

Ref Scenario 1: Predicted overall Odour emission rate from proposed Kevin O Regan facility operations (*see Table 3.3*).

Average modelling scenarios were performed to allow for comparison with relevant odour air quality impact criteria as described in *Section 2.6*. This included 1-hour mean and maximum number of exceedences expressed as percentiles. All processes and source characteristics as outlined within the emission tables were used in conjunction with library air emissions data to construct the basis of the dispersion model. Five years of hourly sequential meteorological data (Cork 2003 to 2007 inclusive) was screened within the dispersion model in order to provide statistical significant conservative ground level concentration estimates. Cork met station was chosen as the appropriate station.

Aermod Prime (12060) was used to determine the overall odour impact of the proposed Kevin O Regan facility operation to be located in Knockbrown, Bandon, Co. Cork. In terms of prediction of overall odour impact area, the following assessments were examined and presented. These included:

Ref Scenario 1 – Proposed operations.

1. Predicted odour emission contribution of overall proposed Kevin O Regan facility operation (*see Table 3.3*), to odour plume dispersal at the 98th percentile for an odour

concentration of less than or equal to 3.0 Ou_E/m^3 for meteorological years, 2003, 2004, 2005, 2006 and 2007 (*see Figure 7.2 for worst case year Cork 2007*).

The following conclusions were formed during the study. Greater detail can be found within the document and it is recommended that the document be read in full. These include:

1 Dispersion modeling of odour emissions from Kevin O Regan was performed in accordance with best international practice with a minimum of five years of hourly sequential meteorological data used in the dispersion modeling assessment. Topographical data from Ordnance Survey Ireland was also inputted into the dispersion model in order to take account of any complex terrain in the vicinity of the site.

2 With regard to Scenario 1 - Odour, the plume spread from the facility is considered small with the plume generally remaining relatively inside the facility boundary for an odour concentration of less than or equal to 3.0 Ou_E/m^3 for the 98th percentile of hourly averages. In addition, the predicted ground level concentration of odour at the closest worst case residential receptor is less than 1.81 Ou_E/m^3 at the 98th percentile of hourly averages for 5 years of screened hourly sequential meteorological data (*see Table 4.1 – year 2003*). This is within the proposed limit guideline value published in the Irish EPA and UK EA guidance documents for proposed facilities (i.e. less than 3.0 Ou_E/m^3 at the 98th percentile of hourly averages). The predominant odour impact in this near field is as a result of emissions of odour through side and end gable vents in a horizontal manner. In addition, library based data was utilised within the dispersion model and the level of emissions from Kevin O Regan operation could be significantly lower in comparison to this published data (i.e. as a result of good management, production system operation and feed type).

The following recommendations are made as a result of the desktop study. These include:

The operator of Kevin O Regan should develop an odour management plan and ensure the implementation of good management practice in accordance with the guidance contained in the following publications to include:

- Guidance for Poultry Processing IPPC S6.11 | Issue 3,
- IPPC Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs,
- IPPC NI, Standard farming installation rules and guidance for poultry production Ver 3. (2009). NIEA.
- PPC (NI) Regulations 2003, Example – Odour Management Plan Template, Laying Hens.
- PPC Regulations (Northern Ireland) 2003 – Example – Odour management plan template, laying hens. NIEA.
- PPC (Northern Ireland) Regulations 2003 – Application for a permit, Example of supporting documentation –laying hens, NIEA.
- PPC (Northern Ireland), 2006 – Guidance for Operators on Odour Management at Intensive Livestock IPPC installations. Ver.2. NIEA.

1. Introduction and scope

1.1 Introduction

Odour Monitoring Ireland was commissioned by RME Ltd to perform a predictive odour air quality impact assessment of the proposed poultry farm to be located in Knockbrown, Bandon, Co. Cork utilising library emission data and dispersion-modelling software Aermod Prime (12060). Like the majority of industries, the operation of the proposed poultry farm is faced with the issue of preventing odour air quality impact to the public at large.

Library based odour emission rates were gathered from reference publications. One odour emission scenario was developed to take account of the proposed design operations. These odour emission rates and specified source characteristics were inputted into Aermod Prime (12060) in order to determine any overall odour impact from the proposed operations.

This document presents the materials and methods of the dispersion modelling assessment and provides a list of recommendations that are required to be achieved in order to ensure the predicted ground level concentrations of odour in the vicinity of the facility are in compliance with best practice.

1.2 Scope of the study

The main objective of the odour air quality impact assessment is to ascertain the levels of odour concentrations in the vicinity of the proposed facility and to compare these with the proposed limits for odour.

The following assessment will take account of the likely and potential impacts associated with the proposed operation of the poultry laying farm.

The methodology adapted involved a number of distinct steps. These included:

- Calculation of odour emission rates from library based data;
- Prediction of ground level concentrations (GLC's) of odours dispersed from the emission point source from the proposed farm operation;
- Comparison between dispersed GLC's and relevant air quality objectives and limits for odours for the proposed poultry farm.

1.3 Model assumptions

The approach adopted in this assessment is considered a standard investigation in respect of odour emissions to the atmosphere from a facility.

These assumptions used within the dispersion modelling assessment include:

- Emissions to the atmosphere from the process operation were assumed to occur simultaneously 24 hrs each day over a standard year.
- Maximum GLC's were compared with relevant odour air quality objects and limits;
- Five years of meteorological input data from Cork 2003 to 2007 inclusive was screened in the study with the worst case year 2007 used for contour plot production. This provided statistical significant results in terms of the short and long term assessment. This is in keeping with current national and international recommendations (EPA Guidance AG4). In addition, AERMOD incorporates a meteorological pre-processor AERMET PRO. The AERMET PRO meteorological preprocessor requires the input of surface characteristics, including surface roughness (z0), Bowen Ratio and Albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. The values of Albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc) and vary with seasons and wind direction. The assessment of

appropriate land-use type was carried out to a distance of 10km from the meteorological station for Bowen Ratio and Albedo and to a distance of 1km for surface roughness in line with USEPA recommendations.

- 10 m spaced terrain data was inputted into the model which was taken from Ordnance Survey.
- All receptors were assumed to be at normal breathing height of 1.8 m above ground level.
- All building wake effects were taken into account in the dispersion modelling assessment.

2. Materials and methods

This section will describe the materials and methods used within the study.

2.1 Odour emission rate values

Odour emission rate values were gathered from the publication "Van Geel, P.L.B.A. (2006) Annex 1 - Odour nuisance and farming act, Netherlands". A value of 0.35 Ou_E/s/bird was used for broiler poultry production. This value are likely to overestimate the odour emission factors for the proposed site as emission factors are greatly influences via housing management and feed types.

2.2 Volumetric flow rate values

The volumetric airflow rate values were calculated from standard reference ventilation factors for broiler housing and as supplied by the ventilation design team. Once the numbers of bird units are known the overall required maximum ventilation rate from the housing can be calculated. Data as supplied from PS Services poultry production systems suggests that a required ventilation rate of approximately 5.4 m^3 [air] / bird / hr is required to ensure adequate comfort conditions within the housing.

The proposed total bird unit population for each house will be 50,000 bird units thereby providing for a total bird population of 200,000 units. This will equate to a total ventilation factor of 270,000 m^3/hr per house at maximum ventilation. This is likely to occur for about 60 days of the year with the remaining time of the year been at a much lower ventilation rate of approximately 2.0 m^3 [air] / bird / hr.

2.3 Atmospheric dispersion modelling of air quality: What is dispersion modelling?

Any material discharged into the atmosphere is carried along by the wind and diluted by wind turbulence, which is always present in the atmosphere. This process has the effect of producing a plume of air that is roughly cone shaped with the apex towards the source and can be mathematically described by the Gaussian equation. Atmospheric dispersion modelling has been applied to the assessment and control of emissions for many years, originally using Gaussian form ISCST 3 and more recently utilising advanced boundary-layer physics models such as ADMS and AERMOD (Keddie et al. 1992). Once the compound emission rate from the source is known, (g s^{-1}), the impact on the vicinity can be estimated. These models can effectively be used in three different ways: firstly, to assess the dispersion of compounds; secondly, in a "reverse" mode, to estimate the maximum compound emissions which can be permitted from a site in order to prevent air quality impact occurring; and thirdly, to determine which process is contributing greatest to the compound impact and estimate the amount of required abatement to reduce this impact within acceptable levels (McIntyre et al. 2000). In this latter mode, models have been employed for imposing emission limits on industrial processes, control systems and proposed facilities and processes (Sheridan et al., 2002).

2.4 Atmospheric dispersion modelling of air quality: dispersion model selection

The model chosen in this study was AERMOD Prime (EPA Version 12060). The AERMOD model was developed through a formal collaboration between the American Meteorological Society (AMS) and U.S. Environmental Protection Agency (U.S. EPA). AERMOD is a Gaussian plume model and replaced the ISC3 model in demonstrating compliance with the National Ambient Air Quality Standards (Porter et al., 2003) AERMIC (USEPA and AMS working group) is emphasizing development of a platform that includes air turbulence structure, scaling, and concepts; treatment of both surface and elevated sources; and simple and complex terrain. The modelling platform system has three main components: AERMOD, which is the air dispersion model; AERMET, a meteorological data pre-processor; and AERMAP, a terrain data pre-processor (Cora and Hung, 2003).

AERMOD is a Gaussian steady-state model which was developed with the main intention of superseding ISCST3 (NZME, 2002). The AERMOD modeling system is a significant departure from ISCST3 in that it is based on a theoretical understanding of the atmosphere rather than depend on empirical derived values. The dispersion environment is characterized by turbulence theory that defines convective (daytime) and stable (nocturnal) boundary layers instead of the stability categories in ISCST3. Dispersion coefficients derived from turbulence theories are not based on sampling data or a specific averaging period. AERMOD was especially designed to support the U.S. EPA's regulatory modeling programs (Porter at al., 2003)

Special features of AERMOD include its ability to treat the vertical in-homogeneity of the planetary boundary layer, special treatment of surface releases, irregularly-shaped area sources, a three plume model for the convective boundary layer, limitation of vertical mixing in the stable boundary layer, and fixing the reflecting surface at the stack base (Curran et al., 2006). A treatment of dispersion in the presence of intermediate and complex terrain is used that improves on that currently in use in ISCST3 and other models, yet without the complexity of the Complex Terrain Dispersion Model-Plus (CTDMPLUS) (Diosey et al., 2002). Additional utilities associated with the dispersion model allow computation of ground level concentrations of pollutants over defined statistical averaging periods, consideration of building wake/downwash effects in the vicinity of the assessed facility.

2.5 Odour Air quality impact assessment criteria

The predicted air quality impact from the operation of the poultry farm is compared to relevant odour air quality objectives and limits. Air quality standards and guidelines referenced in this report include:

- Irish EPA 2002 and Environment Agency 2002 Guideline limit of less than 6.0 and 3.0 Ou_E/m^3 at the 98th percentile of hourly averages for medium risk odours - Existing.
- EPR H1 (2008) – Environmental Risk Assessment Part 1 – Simple assessment of environmental risk for accidents, odour, noise and fugitive emissions.
- EPR H1 (2008) - Environmental Risk Assessment Part 2 – Assessment of point source release and cost benefit analysis.

The relevant odour air quality standard is presented in *Tables 2.1*.

2.6 Odour Air Quality Guidelines

Table 2.1 illustrates the guideline and limit values for odour air quality limits for poultry production.

Table 2.1. Limit and guideline values laded out in the EPR H1 Parts 1 and 2.

POLLUTANT	Objective				TO BE ACHIEVED BY[3]
	Concentration[1]	Maximum No. Of exceedences allowed[2]	Exceedence expressed as percentile[2]	Measured as	
Odours[4]	less than or equal to 3.0 Ou_E/m^3	175 times in a year	98th percentile	1 hour mean	Long term – New installation

Notes: [1] denotes conversions of ppb and ppm to µg m^{-3} and mg m^{-3} at 293.15 Kelvin and 101.3 KPa;
[2] denotes Number of exceedences are quoted in the directive, exceedences or percentiles are used in AMDS;
[3] denotes EPR H1 (2008) – Environmental Risk Assessment Part 1 – Simple assessment of environmental risk for accidents, odour, noise and fugitive emissions and EPR H1 (2008) - Environmental Risk Assessment Part 2 – Assessment of point source release and cost benefit analysis.
[4] denotes – Guidance for Operators on Odour Management at Intensive Livestock IPPC installations, Version 2, May 2006. pg 24.

2.7 Meteorological data

Five years of hourly sequential meteorological data was chosen for the modelling exercise (i.e. Cork 2003 to 2007 inclusive). Cork was chosen as the representative meteorological station due to its proximity to the site relative to other synoptic meteorological stations. All five years were run individually and the predicted ground level odour concentration for each year presented in the results section of this report. The worst case year 2007 was used for contour plot generation only.

A schematic windrose and tabular cumulative wind speed and directions of all five years are presented in *Section 8*.

2.8 Terrain data

In order to examine any terrain effects (based on the fact that low stack based emission points and horizontal based emission points are present within the modelling scenario) a terrain file was included in the dispersion modelling assessment. A 10 metre Cartesian grid spaced topographical data was obtained from Ordnance survey Ireland and used to create a 10 metre Cartesian grid *.DEM file for use in Aermap software within AERMOD Prime.

2.9 Building wake effects

Building wake effects are accounted for in modelling scenarios (i.e. all building features located within the poultry farm) as this can have a significant effect on the compound plume dispersion at short distances and can significantly increase GLC's in close proximity to the facility. This is particularly important due to the significant changes in elevation around the facility.

3. Results-Emission calculations.

The results of predictive estimation of volume flow and emissions of Odour from the proposed Kevin O Regan poultry farm are presented in *Tables 3.1 to 3.2.*

3.1 Predicted Volumetric flow rate results

Table 3.1 summarises the volume flow estimates from the four houses to be located in Kevin O Regan for the proposed operations. All houses are mechanically ventilated using roof, end gable or a combination of both. Reference data gathered from poultry ventilation system manufacturers suggest that a maximum ventilation rate of approximately 5.40 m^3/bird/hr is required to ensure comfort conditions within the housing.

Table 3.1. Predicted volumetric airflow rate calculations for Houses 1 to 4 for proposed Kevin O Regan operations – ref Scenario 1.

Proposed Ventilation rate – Ref Scenario 1			
House number	**Stocking density**	**Ventilation rate per bird (m^3/bird/hr)**	**Total ventilation rate (m^3/hr)**
House 1	50,000	5.4	270,000
House 2	50,000	5.4	270,000
House 3	50,000	5.4	270,000
House 4	50,000	5.4	270,000
Total volumetric airflow rate (m^3/hr)	**200,000**	-	**1,080,000**

3.2 Predicted Odour mass emission rate results

Table 3.2 present the predicted overall odour emission rates for the various housing types to be located in Kevin O Regan for proposed operations. Odour emission rate values were gathered from the publication "Van Geel, P.L.B.A. (2006) Annex 1 - Odour nuisance and farming act, Netherlands". A value of 0.35 Ou_E/s/bird was used for new type housing and broiler production. These values are likely to overestimate the odour emission factors for the proposed site as emission factors are greatly influences via housing management and feed types.

Table 3.2. Predicted mass emission value results for odour from Houses 1 to 4 for proposed Kevin O Regan operations – ref Scenario 1.

Proposed Odour – ref Scenario 1			
House number	**Stocking density**	**Odour emission rate (Ou_E/bird/s)**	**Total odour emission rate (Ou_E/s)**
House 1	50,000	0.35	17,500
House 2	50,000	0.35	17,500
House 3	50,000	0.35	17,500
House 4	50,000	0.35	17,500
Total odour emission rate (Ou_E/s)	**200,000**	-	**70,000**

3.4. Dispersion model input data – Source characteristics

Table 3.3 illustrates the source characteristics utilised within the dispersion model. Stack height (A.G.L), number of fans, ventilator orientation and temperature of the emission point are presented within this table for reference purposes only.

Table. 3.3. Stack source characteristics for Kevin O Regan emission point – Scenario 1.

Source identity –Kevin O Regan	Description of emission point in Model
House 1	9 ridge ventilation fans and 3 end gable fans. Each ridge fan is 0.83 m diameter and located 11 m above ground level. Each end gable fan is 1.27 m diameter and located on the end gable horizontally.
House 2	9 ridge ventilation fans and 3 end gable fans. Each ridge fan is 0.83 m diameter and located 11 m above ground level. Each end gable fan is 1.27 m diameter and located on the end gable horizontally.
House 3	9 ridge ventilation fans and 3 end gable fans. Each ridge fan is 0.83 m diameter and located 11 m above ground level. Each end gable fan is 1.27 m diameter and located on the end gable horizontally.
House 4	9 ridge ventilation fans and 3 end gable fans. Each ridge fan is 0.83 m diameter and located 11 m above ground level. Each end gable fan is 1.27 m diameter and located on the end gable horizontally.
Overall ventilation rate from each house	*See Table 3.1*
Average temperature	293K
Stack height (m)	Each ridge fan is 11 m above ground level with a 0.83 m diameter outlet. The end gable fans are located on the north eastern gable and located approx. 6 m off ground level.
Efflux velocity (m/s)	10.78 m/s
Stack tip diameter (m)	0.83 m for ridge fans and 1.27 m diameter for end gable fans

3.5 Emission rate calculations and mass emission rates

The contaminant concentration from a stack is best quantified by a mass emission rate. For a chimney or ventilation stack, this is equal to the compound concentration ($\mu g/m^3$ or mg/m^3) of the discharge air multiplied by its flow-rate ($m^3\ s^{-1}$). It is equal to the volume of air contaminated every second to the concentration limit ($g\ s^{-1}$). The mass emission rate ($g\ s^{-1}$) is used in conjunction with dispersion modelling in order to estimate the approximate radius of impact. All data used in the dispersion modelling exercise was obtained through library data. *Tables 3.1 to 3.3* illustrates the overall volume flow values, mass emission rate values and general source characteristics used as input data to the model for each *Scenario* to estimate the radius of impact for odour.

3.6 Dispersion modelling assessment

AERMOD Prime (12060) was used to determine the overall ground level impact of the poultry farm emission points. These computations give the relevant GLC's at each 20 and 150-meter X Y Cartesian grid receptor location that is predicted to be exceeded for the specific odour air quality impact criteria (fine and course grid assessment). A total Cartesian grid receptors of 1,706 points was established giving a total fine and course grid coverage area of 0.46 and 9 square kilometres around the emission points.

Five years of hourly sequential meteorological data from Cork (Cork 2003 to 2007 inclusive) was screened and source characteristics (including emission date contained in *Sections 3.1 to 3.3*) were inputted into the dispersion model for all parameters.

3.7 Dispersion model Scenarios

AERMOD Prime (USEPA ver. 12060 Parallel) was used to determine the overall odour air quality impact of the proposed poultry farm operations.

Impacts from the emission points were assessed in accordance with the impact criterion contained in *Section 2.6*.

One distinct scenario was assessed within the dispersion model. The output data was analysed to calculate the following:

Ref Scenario 1 – Proposed operations.

1. Predicted odour emission contribution of overall proposed Kevin O Regan facility operation (*see Table 3.3*), to odour plume dispersal at the 98th percentile for an odour concentration of less than or equal to 3.0 Ou_E/m^3 for worst case meteorological year 2007 (*see Figure 7.2*). Each individual year was also examined and predicted GLC's at each sensitive receptor are presented for each for the 5 years.

4. Discussion of Results from Dispersion modelling exercise

This section will present the discussion of results from the dispersion modelling assessment.

AERMOD GIS Pro Prime (Ver. 12060) was used to determine the overall odour air quality impact of Kevin O Regan operation.

Various averaging intervals were chosen to allow direct comparison of predicted GLC's with the relevant odour and air quality assessment criteria as outline in *Table 2.1.* In particular, 1-hour and annual average GLC's of the various pollutants were calculated at 20 and 150 metres distances from the site. These computations give the relevant GLC's at each 20 and 150-meter X Y Cartesian grid receptor location that is predicted to be exceeded for the specific odour air quality impact criteria (fine and course grid assessment). A total Cartesian grid receptors of 1,706 points was established giving a total fine and course grid coverage area of 0.46 and 9.0 square kilometres around the emission points. Relevant percentiles of these GLC's were also computed for comparison with the relevant Odour Air Quality Standards presented in *Table 2.1.*

4.1 Odour air quality impact – Scenario 1

Scenario 1 – Proposed operations

The plotted odour concentrations of ≤ 3.0 Ou_E m^{-3} for the 98th percentile for the poultry farm is illustrated in *Figure 7.2.* As can be observed, the plume spread from the facility is small with the radial plume spread remaining within the facility boundary. In addition, the predicted ground level concentration of odour at the closest worst case residential receptor is 1.81 Ou_E/m^3 at the 98th percentile of hourly averages for 5 years of screened hourly sequential meteorological data (*see Table 4.1 – year 2003*). This is within the limit guideline value published in the Irish EPA and UK EA guidance documents for proposed facilities (i.e. less than 3.0 Ou_E/m^3 at the 98th percentile of hourly averages). The predominant odour impact in this near field is as a result of emissions of odour through side and end gable vents in a horizontal manner. The predicted 98th percentile ground level concentration of odour at each sensitive receptor is presented in *Table 4.1* for each modelled year.

cted 98th percentile ground level concentrations of odour at each identified receptor locations in the vicinity of the facility for each screened meteorological year (*see Figure 7.1 for locatio*

entity	X coordinate (m)	Y coordinate (m)	Predicted 98%ile odour conc. Yr. 2003 (Ou_E/m^3)	Predicted 98%ile odour conc. Yr. 2004 (Ou_E/m^3)	Predicted 98%ile odour conc. Yr. 2005 (Ou_E/m^3)	Predicted 98%ile odour conc. Yr. 2006 (Ou_E/m^3)	Predicted 98%ile odc conc. Yr. 2007 (Ou_E/r
	147163.48	49846.891	1.81	1.45	1.73	1.74	1.45
	146828.411	49681.853	0.46	0.27	0.33	0.30	0.33
	146818.408	49754.869	0.72	0.33	0.47	0.48	0.37
	146909.429	49476.809	0.24	0.17	0.24	0.24	0.28
	147304.514	49000.705	0.15	0.15	0.20	0.16	0.17
	147511.558	49031.713	0.34	0.42	0.49	0.34	0.50
	147434.54	49353.783	0.85	1.05	1.10	0.87	1.05
	147421.537	49397.793	0.97	1.13	1.18	0.98	1.12
	148046.67	48938.694	0.38	0.40	0.41	0.27	0.37
	148091.679	49067.722	0.27	0.35	0.35	0.25	0.28
	148123.683	49476.812	0.49	0.62	0.58	0.52	0.59
	148166.691	49684.858	0.32	0.48	0.37	0.30	0.46
	148199.698	49761.875	0.34	0.53	0.42	0.34	0.49
	148206.699	49798.883	0.36	0.57	0.49	0.43	0.54
	148222.702	49862.898	0.46	0.59	0.51	0.49	0.59
	147853.624	49964.919	1.03	1.12	0.99	1.07	1.09
	148232.702	50179.967	0.58	0.61	0.51	0.61	0.60
	147945.642	50277.988	0.48	0.51	0.54	0.54	0.55
	147914.634	50524.042	0.44	0.42	0.44	0.48	0.45
	147871.625	50533.044	0.46	0.43	0.45	0.47	0.43
	147545.556	50591.056	0.34	0.32	0.33	0.36	0.26

nued. Predicted 98th percentile ground level concentrations of odour at each identified receptor locations in the vicinity of the facility for each screened meteorological year (*see Figure 7.*

entity	X coordinate (m)	Y coordinate (m)	Predicted 98%ile odour conc. Yr. 2003 (Ou_E/m^3)	Predicted 98%ile odour conc. Yr. 2004 (Ou_E/m^3)	Predicted 98%ile odour conc. Yr. 2005 (Ou_E/m^3)	Predicted 98%ile odour conc. Yr. 2006 (Ou_E/m^3)	Predicted 98%ile odc conc. Yr. 2007 (Ou_E/r
	147446.535	50593.056	0.26	0.25	0.24	0.28	0.21
	147366.518	50588.054	0.27	0.25	0.25	0.28	0.22
	147162.476	50477.029	0.36	0.33	0.31	0.50	0.31
	147059.454	50522.039	0.32	0.21	0.23	0.39	0.22
	146997.442	50484.03	0.31	0.20	0.22	0.34	0.20
	146938.43	50386.009	0.34	0.21	0.21	0.28	0.17
	146820.405	50455.023	0.29	0.16	0.17	0.21	0.14
	146768.394	50393.01	0.21	0.15	0.15	0.17	0.12
	148807.826	49543.829	0.13	0.25	0.15	0.13	0.21
	148421.749	48941.696	0.15	0.22	0.19	0.15	0.19
	146483.337	49974.917	0.42	0.16	0.27	0.26	0.18
	146926.433	49358.783	0.16	0.08	0.15	0.20	0.20
	147062.462	49293.769	0.12	0.15	0.19	0.21	0.19
	147103.471	49270.764	0.14	0.19	0.23	0.23	0.21
value	-	-	**1.81**	**1.45**	**1.73**	**1.74**	**1.45**
u_E/m^3)	-	-	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**

5. Conclusions

The following conclusions were drawn from the dispersion modelling assessment: Greater detail can be found within the document and it is recommended that the document be read in full. The main conclusions include:

1. Dispersion modeling of odour emissions from Kevin O Regan was performed in accordance with best international practice with a minimum of five years of hourly sequential meteorological data used in the dispersion modeling assessment. Topographical data from Ordnance Survey Ireland was also inputted into the dispersion model in order to take account of any complex terrain in the vicinity of the site.

2. With regard to Scenario 1 - Odour, the plume spread from the facility is considered small with the plume generally remaining relatively inside the facility boundary for an odour concentration of less than or equal to 3.0 Ou_E/m^3 for the 98th percentile of hourly averages. In addition, the predicted ground level concentration of odour at the closest worst case residential receptor is less than 1.81 Ou_E/m^3 at the 98th percentile of hourly averages for 5 years of screened hourly sequential meteorological data (*see Table 4.1 – year 2003*). This is within the proposed limit guideline value published in the Irish EPA and UK EA guidance documents for proposed facilities (i.e. less than 3.0 Ou_E/m^3 at the 98th percentile of hourly averages). The predominant odour impact in this near field is as a result of emissions of odour through side and end gable vents in a horizontal manner. In addition, library based data was utilised within the dispersion model and the level of emissions from Kevin O Regan operation could be significantly lower in comparison to this published data (i.e. as a result of good management, production system operation and feed type).

6. Recommendations

The following recommendations are made as a result of the desktop study. These include:

The operator of Kevin O Regan should develop an odour management plan and ensure the implementation of good management practice in accordance with the guidance contained in the following publications to include:

- Guidance for Poultry Processing IPPC S6.11 | Issue 3,
- IPPC Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs,
- IPPC NI, Standard farming installation rules and guidance for poultry production Ver 3. (2009). NIEA.
- PPC (NI) Regulations 2003, Example – Odour Management Plan Template, Laying Hens.
- PPC Regulations (Northern Ireland) 2003 – Example – Odour management plan template, laying hens. NIEA.
- PPC (Northern Ireland) Regulations 2003 – Application for a permit, Example of supporting documentation –laying hens, NIEA.
- PPC (Northern Ireland), 2006 – Guidance for Operators on Odour Management at Intensive Livestock IPPC installations. Ver.2. NIEA.