

**SUSTAINABILITY STATEMENT
FOR THE NOCTON DAIRIES
PROPOSAL**

November 2010

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1. Introduction

About this document

Sustainable development is 'development which meets the needs of the present without compromising the ability of future generations to meet their own needs', as defined by the World Commission on Environment and Development (the Brundtland Commission) in 1987.

Professor John Beddington, Chief Scientific Adviser to the Government, summarised modern-day sustainability challenges when he said: "How can we feed 9 billion people equitably, healthily and sustainably? Provide enough water and energy for a growing population coming out of poverty? And all this whilst mitigating and adapting to climate change?"

This challenge was reiterated by The Royal Society in 2009 in its report 'Reaping the benefits: science and the sustainable intensification of global agriculture', which looked at the need for a 'sustainable intensification' of global agriculture in which yields are increased without adverse environmental impact and without the cultivation of more land.

In this document, we have summarised the ways in which we believe the Nocton Dairies proposal addresses sustainability challenges, covering all three areas of environment, economics and society. Further details can be found in the following chapters of the planning submission:

- 3: Proposed Development
- 5: Acoustics
- 6: Air Quality and Amenity
- 8: Flora and Fauna
- 10: Surface Water
- 11: Ground Water
- 12: Water Resources
- 13: Landscape Visual Amenity
- 15: Lighting
- 16: Socio-economic
- 17: Sustainability
- 18: Traffic and Transport

About sustainability

Sustainability is not a new concept. Traditional mixed farming encompassed many highly sustainable practices such as farms using livestock manure to grow the crops that would then feed the livestock. This kept the soil fertile and in good condition while feed for livestock was close to hand. Old fashioned estates with mixed enterprises provided robust employment opportunities in the local area and sustained many families which, in turn, built thriving communities.

Charles Townshend, a British statesman from the late 17th/early 18th century, had a strong interest in farming and played an important part in the British agricultural revolution by pioneering the four-field crop rotation in Britain. The system (wheat, barley, a root crop and clover), introduced a fodder crop and livestock to the rotation, improving soil fertility and utilising what would have otherwise been a fallow, unproductive year. Today, The Royal Society report states that a modern sustainable production system exhibits most of the following attributes:

- Utilises crop varieties and livestock breeds with high productivity per externally derived input
- Avoids the unnecessary use of external inputs
- Harnesses agro-ecological processes such as nutrient cycling, biological nitrogen fixation, allelopathy (natural production of biochemical), predation and parasitism
- Minimises the use of technologies or practices that have adverse impacts on the environment and human health
- Makes productive use of human capital in the form of knowledge and capacity to adapt and innovate and social capital to resolve common landscape-scale problems
- Quantifies and minimizes the impacts of system management on externalities such as greenhouse emissions, clean water availability, carbon sequestration, conservation of biodiversity, and dispersal of pests, pathogens and weeds.

This is particularly pertinent when looking at arable and livestock production and the challenges they face from Nitrate Vulnerable Zones and the Water Framework Directive. While nitrates are currently controlled, phosphate levels in the soil will come under increasing scrutiny and control measures are likely to be introduced in the future to avoid water eutrophication, particularly affecting the west of the country with its high levels of animal manure application.

However, potatoes and sugar beet are high users of phosphate so using cow manure in arable rotation with root crops will provide better utilisation of phosphate. Phosphate and potash are mined resources so using nutrients from animal manure will reduce use of finite resources that are increasingly coming under the control of large multinational corporations.

Sustainability and the Nocton Dairies proposal

The proposal is for facilities for 3,770 dairy cows to be mainly housed, but with outdoor loafing and access to grazing when not milking – both weather permitting. Before the plan was developed, the two farmers behind the project carried out extensive research into how a very large farm could be used to provide economies of scale, lower carbon footprints and high welfare.

They spent two years visiting dairy farms all over the world to establish the model for the perfect farm design for cow welfare, environmental benefit and economic sustainability.

They have taken some of the country's – and sometimes the world's – most respected vets, environmental consultants, nutritionists and farm advisory consultants with them. Many tens of thousands of pounds have been invested in this process at a time when dairy farm margins continue to be crippling low, to show that as well as the small family farm and efficient mid-size dairy unit, there is also room for very large farms that push the boundaries of sustainable food production.

The proposal for Nocton Dairies offers opportunities to meet many of the above goals – simply by reintroducing livestock to an arable area. Soil fertility would be improved in increasingly shallow and depleted soils; profitable break crops would be grown that would help improve soil structure; the organic matter supplied to the ground would reduce leaching of nitrates into watercourses, a growing problem in Lincolnshire's (NVZs); phosphate and potash would be supplied to crops that need them most, for example sugar beet and potatoes; arable by- or co-products that might otherwise go to waste are fed to animals; miles taken to transport feed to livestock would be reduced and carbon emissions with it; and there is the potential to produce renewable energy from cow waste.

To be sustainable any enterprise must be economically viable as well. Many years of low milk prices have continued to decimate the dairy farming population of the UK, with the number of dairy farmers halving over the past 10 years. A further 10% are predicted to exit the industry for a variety of reasons over the next two years. The UK currently imports some 1.5bn litres worth of dairy products each year so there is clearly opportunity to displace some of this by creating a viable new dairy with a low cost base without impinging on the existing dairy farming community. This would displace imports, increase production of British milk, and ensure that milk was being produced in a manner that was regulated and transparent.

High levels of mechanisation in arable areas have dramatically reduced the population connected with farming and rural employment opportunities. Introducing a livestock enterprise with inherently greater labour requirements offers the opportunity to bring new employment to the area, new families and, with this, increased spend on local services.

Finally, the aim for North Kesteven is 'to be a District of 100 flourishing communities', with the following three objectives:

- A good quality of life for all residents
- A thriving and prosperous economy and
- A clean, green and safe environment

With this in mind, the Nocton Dairies proposal must not only provide these genuine economic opportunities, but it must also address local concerns about the environment and not impinge on – and even look to enhance – local quality of life.

The progress made in addressing sustainability issues and meeting targets will be monitored through membership with the UK's leading farm sustainability auditing organisation.

About the Nocton Dairies proposers

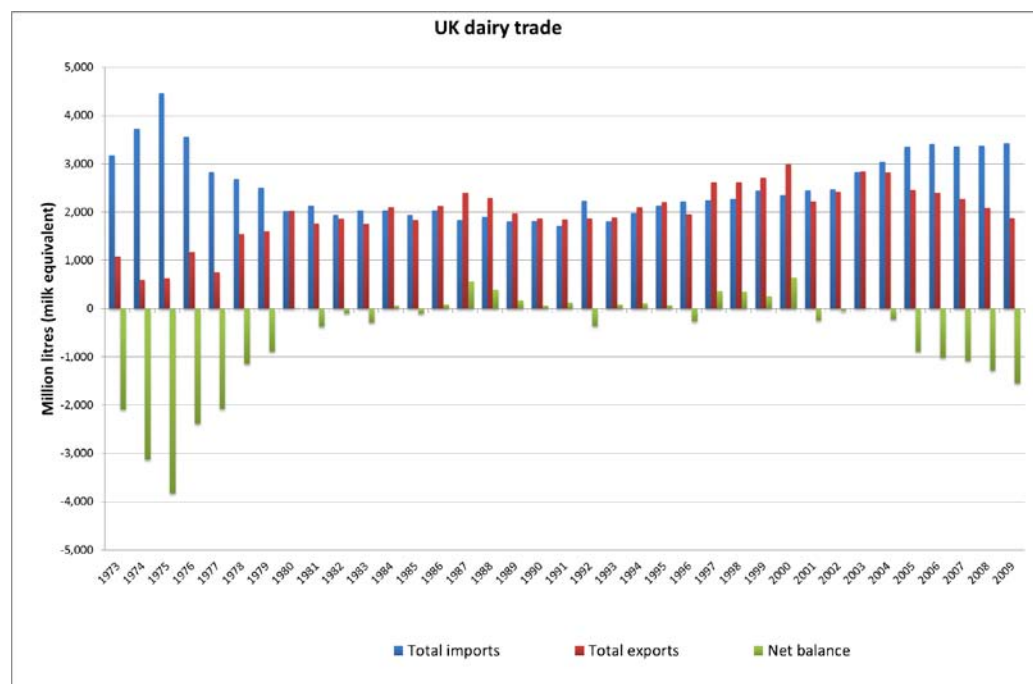
David Barnes and Peter Willes are two of the UK's most experienced dairy farmers at running high yielding, high welfare dairy farms. David manages almost 2,000 cows in Lancashire, and Peter 2,000 cows in three different units, plus a successful Westcountry farmhouse cheddar business, in Devon. The system developed for Nocton Dairies is based on their experience from a combined 60 years in dairy farming, plus the latest worldwide information – and the benefit of starting with a clean sheet on a green field site.

2. Economic sustainability

Impact on the UK dairy industry

In the early 1980s, the UK began to be self-sufficient in milk production. But since 2003, it has again become a net importer of milk and dairy products, and this trend is increasing¹.

We have lost half our milk producers in the last 10 years (30,200 in 1999 to 16,400 in 2009², which has contributed to milk production falling by almost a billion litres. The average herd size has increased by 50% at the same time, continuing a long-running trend for fewer farmers running larger herds.



Another report shows that half our dairy farmers work over 80 hours a week and over three quarters will pay themselves less than £20,000 this year (average British salary 2009 = £26,629³). Maybe then it's not surprising that 10% of farmers intend to leave milk production within the next two years⁴.

The industry needs investment and Nocton Dairies is a chance to significantly increase British milk production without impinging on the vast diversity and number of existing dairy farms and markets within the UK.

¹ Defra

² DairyCo

³ Office of National Statistics

⁴ DairyCo

Employment

The development of the proposed unit includes a total investment of approximately £34 million (£17.5m on land, £6m in cows and £10.5m construction). The construction phase would require two teams of 25 plus local electricians, plumbers and fabricators. Although these workers would probably be drawn from a wider area than the North Kesteven district, most would probably come from a geographically small area and would increase the employment in the construction sector (assuming a constant level of employment in the absence of the development) in Lincolnshire. The construction of the development would also provide additional temporary employment as a result of local suppliers, plant equipment, catering and other services.

The operation of the new unit would create a number of different roles of varying skills and experience. These workers would come from a number of sources, with some of the more senior positions already filled. As the region currently has a relatively small dairy industry, it would be necessary to source many of the dairy workers/cattle handlers from outside the area initially but there would be a regular intake of trainees each year and the structure of the business would allow training and career development. The increase in the size of the dairy sector in Lincolnshire has the potential to create significant employment benefits through the establishment of secondary and tertiary dairy food facilities.

Role	No of positions
Farm manager	1
Arable & Environmental Manager	1
Dairy shift managers	3
Vets	2
Veterinary & Maternity Assistants	6
Foot trimmers	2
Stockmen	6
Dairy foreman	3
Dairy workers	13
Dairy assistants	3
Mechanics	2
Anaerobic digester technicians	3
Vacuum Scraper Driver	3
Feed handlers	3
Estate workers	2
Tanker drivers	5
Administration	2
Total	60

Contribution to local economy

The unit's annual turnover would be in the region of £11m, with a payroll of £1.237m and a feed bill of £4.4m. It would have a significant effect on other local businesses, especially agricultural suppliers and services which would receive a considerable increase in trade. Both during the construction phase and in operation, the unit would employ the services of a variety of local businesses including, builders, plumbers, electricians, haulage contractors, veterinary care, feed supply, and agricultural sundries suppliers and contractors, with an anticipated annual local spend of more than £1 million including sundries (£640k) and repairs (£230k).

Dairy farming is only a minor proportion of agriculture in the area, with almost no dairy farming taking place in North Kesteven, and comparatively little in Lincolnshire. Although the new unit could potentially compete with existing dairy businesses, in reality they would be selling to different markets and with the current deficit in milk production (see Economic Sustainability chapter) in the UK, there would be no adverse impact on local dairy farms.

The new unit would also benefit existing agricultural holdings with surrounding farms receiving treated animal waste from the unit to be spread on arable farmland, reducing the need for artificial fertilisers.

Another significant positive impact on the local agricultural economy which would arise from the proposed unit are the calves which would be sold off site and raised for beef, and the cull cows from the farm. The existing beef sector in Lincolnshire has been a significant part of the agricultural economy in the county, and the estimated benefit to the local area from cows and calves going for further rearing or slaughter would be over £500,000 in total.

3. Environmental sustainability

Carbon emissions

While the net carbon emissions of the site would increase from its former use, it would be displacing milk production for imported dairy products that would be estimated to have a significantly higher carbon footprint. The estimated carbon footprint of a litre of Nocton Dairies milk will be approximately half that of the current industry average.

The dairy's carbon footprint for production has been calculated as the equivalent of 720g of CO₂ per litre, using Carbon Trust-approved methodology. This does not include any production of renewable energy from the anaerobic digester, but if the reduction in methane emissions from putting manure through the digester is included it would reduce emissions by a further 10%, to around 650g.

A 2010 FAO report⁵ calculates that on average, 80% of a dairy carbon footprint can be attributed to farming/milk production and 20% to transport, processing, packaging and distribution. Relating this to the average footprint for Western European milk, this suggests that 300g of the 1.5kg footprint is from processing, packaging and transport. Using the same 300g figure this would take the carbon footprint of a litre of 4% fat Nocton Dairies' milk to 950g CO₂ once on the supermarket shelf.

On a projected yield of 10,000 litres per cow, this has the potential to save more than 20,000 tonnes of CO₂ emissions each year.

The Nocton Dairies carbon footprint for milk is low due to efficiencies including:

- Recycling of resources such as sand and reduction of use of raw materials
- Ability to store the nutrients in the digestate that have come from cow manure, then being able to apply them at the right time for better efficiency
- Use of own nutrients and leguminous crops that need little extra nitrogen (ie reduction in use of artificial fertiliser)
- Lower rainfall area so easier to grow more nutritious forages and feeds
- Access to good local by-products that can be used for feed
- High yielding system which spreads the carbon load

But there is also an effect of displacing artificial fertiliser use on neighbouring farms. Ammonium nitrate fertiliser is estimated to have a carbon footprint of around 3.6kg CO₂ equivalent per kg of nitrogen⁶.

⁵ Greenhouse Gas Emissions from the Dairy Sector: A Life Cycle Assessment, 2010

⁶ [ref. 4] IPCC Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic

Chemicals - Ammonia, Acids and Fertilizers, EU Commission, August 2007.

[ref. 5] Energy Efficiency and CO₂ Benchmarking of European Ammonia Plants - Operating Period 2007-08, Plant

Surveys International Inc, December 2009.

[ref. 6] Methodology for calculating the carbon footprint of AN-based fertilizers (2010), www.yara.com

So with the farm 'exporting' 418 tonnes of nitrogen a year, this displacement of artificial fertiliser would amount to further CO₂ savings of 1,500 tonnes a year.

Lastly, the slurry and manure arising from the unit would feed an on-site anaerobic digester and the biogas would in turn supply a Combined Heat and Power plant generating 0.75MW of power and 0.8MW of heat. The dairy would use all the heat for its own purposes, including heating the digester to the required 55°C needed to kill pathogens. The power would be exported to the Grid. The approximate needs of the dairy will be 0.4MW, making the dairy a net exporter of around 0.35MW of renewable power. No gas would be flared on site, except in the event of an emergency.

Management of cow manure, slurry and dirty water

The volume of cow manure or slurry produced by the farm will be in the region of 230m³ per day or over 83,000m³ per year.

Cow manure would be 'vacuumed' up using a scraper mounted beneath a conventional vacuum tanker towed by a tractor. It would be removed from the housing areas three times a day during milking, as part of the daily management routine. Tanker contents would be delivered to the on-site sand separation facility and then to the anaerobic digester.

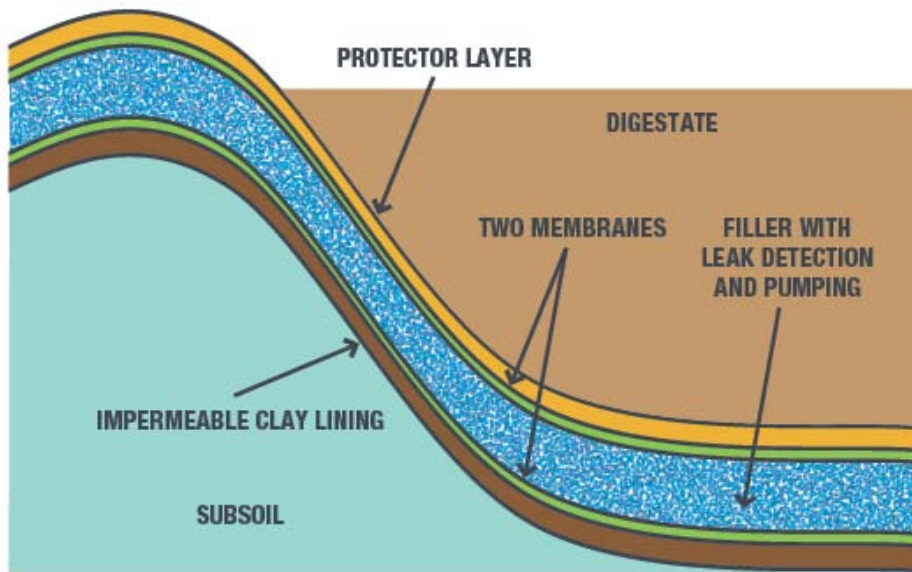
Liquid manure in the anaerobic digester would have its temperature raised to between 15°C and 40°C for a retention period of up to 16 days in two stages to first maximise gas output and then to stabilise effluent and minimise emission of any pollutant gases such as ammonia and hydrogen sulphide, which is broken down into elemental sulphur. Following biogas extraction, the effluent would be passed through a thermophilic stage where temperature would be raised (using the heat output from the power generation process) to in excess of 55°C, where it would be retained for at least six hours to maximise pathogen kill.

Output from the plant would comprise biogas and digestate containing about 5% solids. The digestate would be further separated into 30% dry matter solids that could either be returned to the digester for further treatment or stored before application to land, and a 3% dry matter liquid, which would be pumped to adjacent storage lagoons before being applied to growing crops as a fertiliser replacement.

The storage for the digestate has a number of safety features built in to prevent any risk of leakage. This comprises:

- a protectant layer next to the digestate effluent
- a double layer of high-gauge plastic liner
- a permeable fill between with leak detection and pumping in the unlikely event a leak occurs
- an impermeable clay layer underneath.

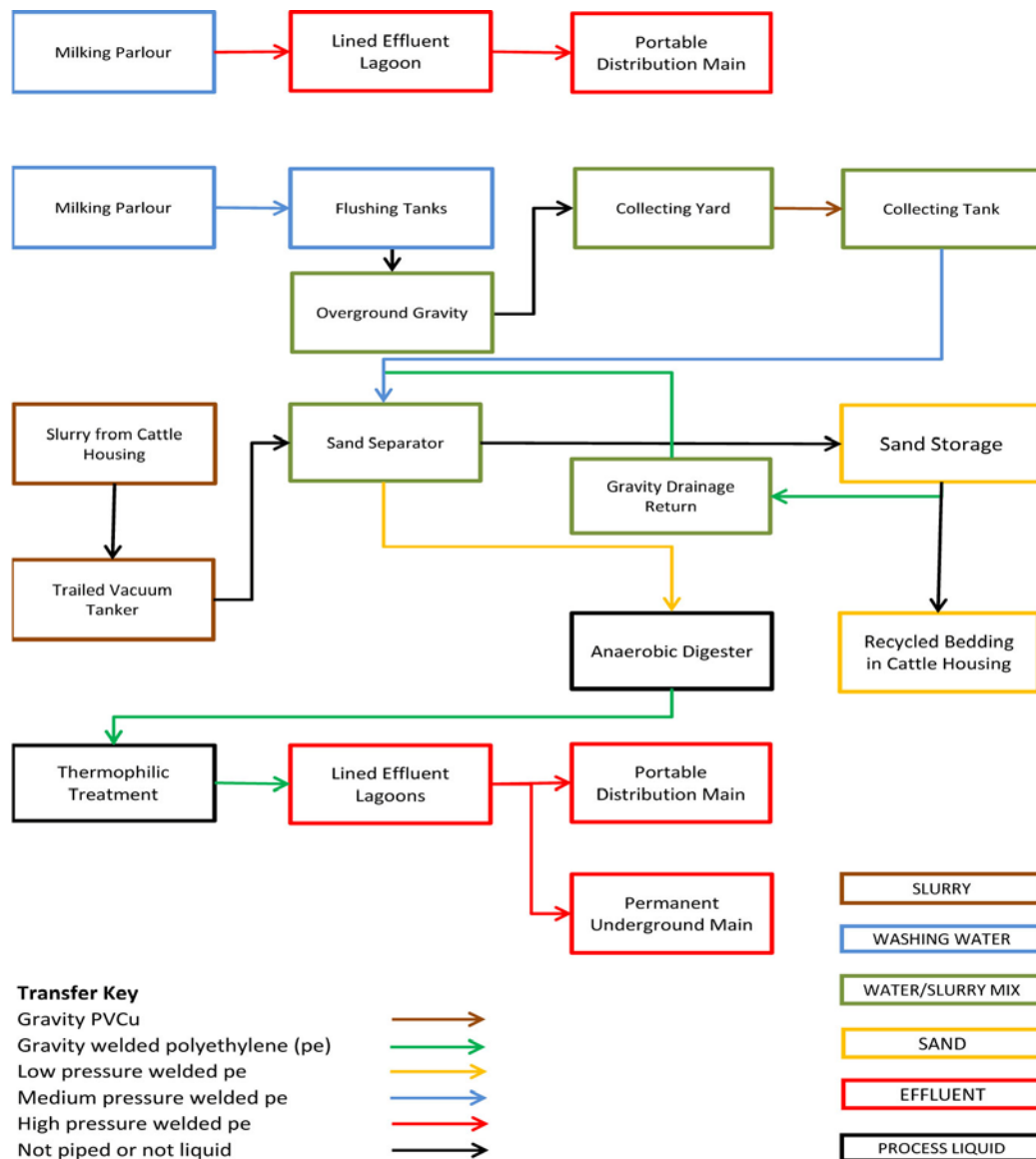
A cross section of the digestate storage facility



Any spreading of the digestate is governed by Nitrate Vulnerable Zone regulations, which apply to the local area and mean no digestate can be spread over the high rainfall autumn and early winter period, and a maximum application rate for nitrogen of 170kg per hectare applies. The solid fraction from the digester is stackable and would be safely stored on field headlands before application to land. The liquid fraction, after storage, would be transported via underground pipes to sites where it can be easily loaded for spreading via a dribble bar technique.

It is estimated that with the risks properly managed, the effect on water quality in the area could be positive with a net reduction in nitrates from their current levels.

Slurry and waste water management



Water requirements

A dairy unit of this scale would require significant quantities of water due to the large numbers of animals at the farm. Water would also be required for on-site operations such as washing down and domestic uses.

Due to the new unit's need for a reliable supply of fresh clean water, a dependable water supply system has been central to the design and location of the new development. It is proposed to abstract water from the River Witham east of Nocton Fen and pump it via new and existing underground mains to existing and newly constructed clean water reservoirs; the new reservoir is the subject of a separate planning application and is planned to be located to the south of Nocton village.

Cows have a significant water requirement – almost 100 litres per day – plus there are requirements for youngstock and washing down the parlour and facilities to help maintain hygiene. The total estimated requirement is just under 130,000m³ per year. Current abstraction licences exist for 151,000m³ from the River Witham, and just under 100,000m³ from ground abstraction. While these abstraction licences were previously used for irrigating crops and bulbs grown on the farm, they can now be used for the dairy and supply almost double the amount of water needed for this number of cows – although some variation may be needed in the licences in terms of abstraction timing.

Water used for washing down the milking parlour and dairy plant would be recovered and used to flush the collecting yard and return areas associated with the milking parlours. This practice, which allows slurry to be removed from heavily-trafficked areas without interrupting cow flow, is commonly used in many large-scale dairy units in the UK and USA.

Despite original intentions to harvest rainwater from roofs, it has been agreed that it is preferable to allow clean water to run back into the ground to replenish the aquifer beneath the farm. However, this means it is imperative that routes back to the ground are clean and all dirty water and run off from dirty areas is captured and treated separately.

A thorough water footprinting exercise cannot be carried out until the farm is operational, but monitoring water use and improving efficiency would form part of the on-going environmental audit.

Reduce, reuse and recycling of resources

The main resources used in connection with milk production at Nocton Heath Farm would be:

- manufactured fertiliser for crop production
- feed for cattle
- sand for bedding in cubicle accommodation
- fuel used for journeys to work

In addition, an incentivised recycling programme would be put in place at the farm, involving on-site source separation of waste streams into paper and card, plastics, glass and metals to ensure that the bulk of waste arisings at the farm are suitable for use as recycle in the waste chain.

Soil nutrients

The nutrients in the digestate, after the slurry has gone through the anaerobic digester, would replace:

- 419 tonnes of nitrogen, the equivalent of 1,060 tonnes of compound nitrogen fertiliser
- 169 tonnes of phosphate
- 574 tonnes of potash
- lost soil organic matter

In addition, it would also reduce:

- delivery vehicle movements
- natural gas use in fertiliser manufacture
- bulk transport of resources imported to the UK
- use of finite natural phosphate and potash resources.

Outputs from the unit would mean that more than 6,000 hectares of local farmed land need no longer be reliant on imported phosphate and potash supplies, and would have potential to provide more than 0.35MW of renewable energy to the Grid.

Feed and forage

Diets at Nocton Heath Farm would be based around locally-produced forage, including grass, maize, whole-crop cereals and lucerne, which also fixes atmospheric nitrogen in agricultural soils, supplemented with palatable co-products such as rapeseed and grain pulp from bio-fuel production, brewers' grains, sugar beet pulp from sugar refining, citrus pulp from juice processing, and molasses, balanced with grains where needed.

By making optimum use of co-products from other sectors of the food industry, the dairy would ensure that maximum use is made of materials that might otherwise go to landfill or directly to anaerobic digestion for biogas and energy production. By-products would be sourced from a range of industries and locations, including:

- food production from Boston, Peterborough, Kings Lynn and Newark
- drinks manufacture in Boston, Nottingham and Leeds
- biofuel manufacture in Teesside and Hull

Finally, no soya would be used on the dairy and only sustainable sources of protein would be fed to the cows. Both farmers involved in Nocton Dairies have avoided using soya for three years by instead utilising other plant-based protein grown in the UK or imported for Europe.

Bedding

Cows would not be bedded on straw or mats in cubicles, but on deep sand. Sand contained in slurry would be separated from the organic and liquid components by a combination of screening and settlement. Sand is washed as part of the recovery system, and after a three-week drainage period can be reused in the cubicle accommodation.

Selected, graded sand which is available locally would be used, with a particle size distribution suited to sand bedding and recycling; such sands have very low silt and clay contents, and a relatively large average particle size to assist settlement during separation.

Initially, 500kg of sand would be placed in each cubicle. It is anticipated that cubicles would need to be replenished at a rate of about 7kg sand per cubicle per day, of which 92% would be recovered on site, requiring in the region of 600g of fresh sand per used cubicle to be brought on to site daily. Recycled sand has an organic matter content of about 2% on a dry matter basis.

Fuel

It is proposed that a number of key staff would be housed near the site of the proposed dairy and in existing dwellings on the farm. It is anticipated that other workers would live locally, or in Lincoln City. In order to reduce the number of traffic movements associated with the site, a private bus service will operate in line with shifts at the dairy. Travel to work by foot and bicycle will be encouraged, and the existing avenue access to Nocton village will be closed to vehicular traffic and reserved for pedestrians and cyclists.

Pollution and pathogen control

The measures taken to ensure digestate storage is secure and spreading is carried out with sensitivity to the local environment and aquifer mean water pollution will be prevented and, in fact, due to the change in land use, potentially reduced in terms of nitrate content.

Gas pollution will be prevented by the stabilisation phase of the anaerobic digester. The main gases to be considered are hydrogen sulphide, methane and ammonia.

Hydrogen Sulphide (H₂S) has a distinct odour of rotten eggs and is normally only produced in trace quantities, whilst methane is odourless. Both gases are associated with manure being stored in anaerobic conditions. Prompt removal of manure in housing, at least three times a day, will prevent the conditions developing. During anaerobic digestion, there will be two stages of processing. The first would capture methane for use in the site's Combined Heat and Power (CHP) generating system, and the second would stabilise the effluent to stop it producing methane and hydrogen sulphide. This process reduces hydrogen sulphide levels by between 80% and 90%. Methane is also belched by cows as part of their digestive process, which 'ferments' forage in their stomachs. However, methane rises quickly through the atmosphere and causes no local air quality issues on farms.

Ammonia emissions for the proposed dairy have been modelled by the Met Office's Rural Environment Team and compared with UK exposure thresholds, with the outcome that they aren't sufficient to cause any ill health. Levels of ammonia decrease rapidly in air and emissions would be kept as low as possible by frequent vacuum scraping in cow accommodation and walkways, the use of anaerobic digestion (which traps the gases) and avoiding stirring or disturbing the digestate store. The use of low impact dribble bars to place rather than spray the digestate on land will also reduce emissions as well as smell.

The main pathogenic microorganisms that could be associated with dairy farming are E coli 0157, Giardia, Cryptosporidium and Aspergillus moulds. All these pathogens are effectively controlled by the anaerobic digestion process where temperatures are heated to 55°C, and avoiding the application of any raw slurry on ground.

Work carried out on behalf of the Scottish Executive found that anaerobic digestion had a significant beneficial impact on the quality of water draining from livestock areas, supporting work carried out for the Farm Energy Centre on the use of various treatment systems to minimise pollution from livestock farming.

Several studies in the US look at the potential hazards of dusts from pig and poultry sites which incorporate antibiotics in the feedstuffs, but in dairy farming this practice would mean withdrawal of milk from sale and therefore loss of income, so it simply doesn't happen. Routine use of hormones, which happens in the US, is also completely forbidden in the EU. Any small airborne particles will be cut by bedding cattle on sand, rather than straw or sawdust and lime.

Other measures include: no composting of green waste on the farm which can cause the emission of small fragments of airborne particles or fungal spores; feedstuffs will be mainly moist and loaded from low heights; and roads will be surfaced to cut dust.

4. Biodiversity and conservation

A detailed study of flora and fauna shows that there will be no significant negative impact on species from the loss of habitat due to the construction and operation of the dairy.

Conversely, the planting of a bank of native trees and shrubs around the edges of the accommodation buildings would provide foraging and commuting habitat for bats; the rough grassland ground-flora would similarly provide extra habitat for small mammals. This in turn would provide increased foraging opportunities for barn owls and other predators. Incorporation of flower- and berry-bearing shrubs would provide nectar and pollen for invertebrates such as butterflies, and food for woodmice and winter thrushes. These strips would also improve landscape connectivity and provide valuable shelter for a wide range of species.

There is a large tract of semi-ancient woodland on the farm totalling 140ha, which contains a very rich diversity of trees, plants and wildlife. It currently contains a number of non-native species such as rhododendron, which would be cleared to ensure natural native species could develop. Once this work is carried out, public access would be considered as part of the plan to increase local amenity as a result of this development.

The whole area provides potential nesting habitat for birds, including UK and Lincolnshire BAP species such as skylark. The farm is in an environmental Entry Level Stewardship scheme, run by Natural England, and is also valid for a Higher Level Stewardship scheme⁷. This would involve a number of goals but two in particular – reversing the decline of farmland birds and securing the recovery of nationally important species – are pertinent to the site. The bird species involved in these include grey partridge, corn bunting, lapwing, turtle dove, tree sparrow and yellow wagtail; insects are rare bumblebees such as large garden bumblebee and red-shanked carder bee; and nationally scarce plants include night-flowering catchfly, small-flowered catchfly, shepherds needle, corn buttercup and red hemp nettle.

Creation of the new reservoir would provide further new wetland habitat for plants, invertebrates and amphibians. Fish will not be deliberately introduced, although it is accepted that water birds can move fish eggs attached to their legs. Rough grassland on the banks of the new reservoir and bounding its eastern and southern edges would again provide habitat for invertebrates, amphibians, small mammals and nesting birds, and also allow reptiles to spread from Nocton village, should there be any locally. Shrubs and woodland on the banks would increase the availability of nesting habitat for woodland birds and foraging for bats, and in time would provide mature trees suitable for roosting bats. Taken together, these measures would provide a positive, long-term impact of minor significance.

Protocols for promoting biodiversity in crops have not been covered here but will be considered as part of the ongoing auditing system once the farm is up and running.

⁷ Natural England www.naturalengland.org.uk East Midlands: Higher Level Stewardship Theme Statement

5. Community relations

Community impact

There is clear concern in the local area about the impact this farm might have on quality of life. For this reason, considerable work has been undertaken to look at how great any impacts might be and, where they exist, how they can be mitigated. All these aspects are covered in detail in the relevant chapters of the Environmental Statement, but the findings have been summarised below. It is also recognised that the findings need to be communicated better and concerns listened to, and details of efforts to do so are later in this chapter.

Smell

With such a big farm and large spreading area for the digestate – over 2,600 hectares in total – it's important that the potential for smell to become a nuisance, through either frequency or intensity, is studied. Specialists from the Met Office have modelled odour from the farm and from spreading digestate; this has shown that any smell would not be strong enough or frequent enough to have any impact on normal local activities.

Wind direction and speed can have a big impact on odour, but so can the distance from odour source, the strength of the smell and the height at which the odour is being released. Modelling shows that with the reduced size of the farm, odour from the buildings doesn't reach any local dwellings at all.

When looking at the potential smell from spreading digestate in the area, the application technology – a dribble bar – will help minimise smell as will the fact digestate is being spread rather than raw slurry. A spreading management plan will be used to ensure dwellings are upwind of spreading where possible and that watercourses are avoided.

Flies

Flies are not just a nuisance – they are also potential carriers of pathogens and as such, their control is a stipulation in all milk contracts and also part of Assured Dairy Farms and dairy hygiene regulations, mainly through effective removal of manure and maintaining hygienic conditions on the farm. Fly control measures are closely linked with odour control and will have a positive impact on cow health, the farm workers' health and working conditions, and the living conditions for the cows.

Slurry removal three times a day and storage of only digestate rather than raw slurry will eliminate almost all breeding sites, but there will also be an integrated pest control plan in place as a precautionary measure. Visitors to the directors' farms in Devon or Lancashire have commented on the lack of flies – this is due to the implementation of the same management systems that will be in place on this dairy in Nocton.

Traffic and transport

Detailed traffic assessments have been carried out and have shown that the dairy will only cause a 1.28% increase in traffic movements, which is classed as 'negligible'. Each single journey taken in a car or lorry is called a 'vehicle movement'. There will be vehicle movements from a variety of sources during the construction phase, and thereafter from staff, delivery vehicles and visitors. Most concerns have been raised about daily HGV movements. The number of movements (both in and out) would be 106 per day in total – cars, tractors and lorries.

The proposed route for HGVs avoids villages and only uses improved junctions on main routes. Milk tankers will travel via the B1188, B1178 and the A15 to Sleaford and on via Newark to Nottingham and Derby. Their movements will be monitored electronically to ensure they keep to the agreed routes. Other vehicles will arrive at the farm from the A15 via local B roads along routes which avoid local villages. The observance of these routes will form an implicit part of the supply agreements.

Noise

Noise impact from the site has been assessed as 'negligible' to 'none', even though many of the noises associated with a dairy of this size will be new and quite different to the area. The main sources of noise on the farm will be the milking parlour, lorry movements on site, loading and operating of feeder wagons, slurry vacuum tankers, and the combined heat and power plant next to the anaerobic digester.

The three nearest groups of properties have been examined for potential noise impact – on Dunston Heath Lane, on the Sleaford Road at the junction with Lincoln Road, and at Grange Farm Cottages. Ambient noise readings have been taken from outside these houses and the noise impact modelled in decibels (dB). Their current ambient noise readings are between 49 and 52dB (the noise of a whisper in a quiet library is 30dB or the noise of a normal conversation 60dB). Only the sites at Dunston Heath Lane and Grange Farm show any potential increase in noise – of the order of only 2dB in each case. An increase of 1dB has been rated as 'imperceptible' and 3dB as 'barely perceptible' by the Centre for Human Performance & Health, Ontario, Canada.

An average of seven HGVs will enter and leave each day, delivering animal feed or fuel, or taking away milk, which based on traffic audits, is not a statistically significant increase.

Lighting

In order to minimise the impact of the development on the night-time landscape, all outside lights will be on timers and angled directly downwards to ensure they don't shine off the site or produce skyglow. Other lighting, outside and in, will be low level and angled downwards or inwards. The smaller size of the farm means there is less opportunity to screen lights using other buildings, but the landscaping vegetation will be designed to provide screening as it develops. Although this development will create an additional light source in a relatively dark area, it has been assessed in the context of other significant light sources, eg at RAF Waddington, the grass drying unit at Scopwick Heath and Branston Potato packhouse.

Community consultation

It is recognised that community consultation and communication was far from perfect when the application was originally submitted. Now the plans are confirmed and the application has gone back in, the intention is to ensure all facts are communicated clearly and a number of opportunities are provided to pose questions direct.

A factsheet is being delivered to 5,000 local residents in the area to make them aware of the resubmitted plans and their content, and parish councils from the six nearest villages are being approached to ask what form of open meetings and exhibitions their residents would like over the initial four week period after the application had been submitted. It is the aim of the directors that time allowing, requests for meetings will be accommodated where possible and reasonable.

Because it isn't possible to anticipate when the Council will validate and post the application (10/0831/FUL) on its website www.n-kesteven.gov.uk, the planning application documents are now live on the Nocton Dairies website www.noctondairies.co.uk.

Community liaison

It is intended that once planning permission is granted, a formal liaison group will be set up to ensure the construction and operation of the farm:

- complies with the application as it is laid out
- adheres to welfare and environmental standards
- addresses any concerns from local residents
- allows any actions that would provide community benefit to be fed through and considered

The farm also intends to work within the parameters of the UK's leading farm sustainability scheme and also to leading welfare standards, which will be monitored and reported transparently by independent assessors. Representatives from these auditing organisations will be invited to attend these meetings so that they can continually challenge the farm's standards and respond to questions from the community.

Farm visits and open days

It is hoped that grant funding will allow a visitor's centre to be built to improve education about food production among local children, students and adults. However, even if grant funding is not available, the farm will aim to set up open days and access to all interested parties where possible.

6. Animal welfare

Although welfare is not currently considered as part of planning decisions in the UK, detailed information on the proposed management of the livestock has been submitted as a separate document entitled 'Welfare and Management Statement'. It can be accessed via the Nocton Dairies website www.noctondairies.co.uk.