AgriPlan Cymru
Head Office:
Neuadd Mansion,
Llanarth, SA47 ORL
office@agriplancymru.co.uk
www.agriplancymru.co.uk
Tel/Fax: 01545 581 130

FARMING connect
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Group Infrastructure Report

Name:	D&E Owen & Sons
Full business address of client:	Llwydiarth Farm Pontfadog Llangollen Wrexham LL20 7AG
BAS number:	04018
Name of adviser:	Dewi Davies
Company name:	AgriPlan Cymru
Category:	Technical Grassland & Crop Management
Date:	

Report Prepared by **Dewi Davies**
Benmoore, Llangoed, Beumaris, Anglesey, LL58 8ST
Mob: 07553 655743 dewi.davies@hotmail.co.uk

Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig: Ewrop yn Buddsoddi mewn Ardaloedd Gwledig
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Llywodraeth Cymru Welsh Government

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Introduction, Objectives and Disclaimer

1.1 Objectives of this Report

The purpose of this report is to:

1.1.1 Investigate the current storage facilities for manure and slurry and assess these against the estimated level of production of manures.

1.1.2 Highlight where improvements can be made, which in turn should improve resources and business efficiency, and reduce carbon equivalent Green House Gas (GHG) emissions.

1.2 Disclaimer

This report is prepared from physical and financial information supplied by the farming client. The report is prepared in good faith and every effort has been made to ensure accuracy, however AgriPlan Cymru cannot accept liability for errors and omissions. Responsibility for actions taken lies with the client. Professional advice and statutory advice should be taken as appropriate.

1.3 Farming Connect

AgriPlan Cymru has been approved to deliver the Advisory Service on behalf of Farming Connect. This Technical Report should be part-funded through Farming Connect.

2. Introduction

The impacts of on-farm pollution affecting water quality and wildlife have increased recently, often due to poor slurry storage, dirty water handling facilities and air pollutants. This report will focus on capital investments in infrastructure, equipment and machinery that will address the impacts of on-farm pollution, offering clear and quantifiable benefits to your farm enterprise and the wider environment. These investments will increased nutrient management of the farm, along with safeguarding and improving water, soil and air quality by reducing pollution

3. Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021

The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021 have been introduced to reduce losses of pollutants from agriculture to the environment by setting rules for certain farming practices.

The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021 also set standards for silage making, storage of silage effluent and for slurry storage systems. They replace the Water Resources (Control of Pollution) (Silage and Slurry) (Wales) Regulations 2010 and establish good practice requirements for nutrient management into one set of regulations to reduce complexity.

Summary of measures and dates from when they will apply

What has been announced?

On 27 January 2021 the Minister for Environment, Energy and Rural Affairs announced the introduction of regulatory measures to address agricultural pollution in Wales, the Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021.

The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021 will apply from 1 April 2021 for an initial set of measurements. The remainder will be phased in over a period of 3 years.

The Regulations focus on those farms where the environmental risk from poor manure management is greatest. They are based on current good practice recommendations, so some farmers will see minimal impact, particularly those already following good practice and those not producing slurry, such as sheep farmers, whilst others will need time and support to become compliant.

In summary, the regulations include the following requirements:

- Nutrient management planning;
- Sustainable fertiliser applications linked to the requirement of the crop;
- Protection of water from pollution related to when, where and how fertilisers are spread; and
- Manure and silage storage standards.

The Regulations establish baseline standards for production in Wales comparable to those in the rest of the UK and Europe.

When will the regulations apply?

- The measures will be phased in over the next 3 years, with the initial measures applying to farms from 1 April 2021 with the remainder being phased in from January 2023 and August 2024 (an overview table is provided below).

- The phased approach will provide farmers with time to gain an understanding of the requirements, to seek advice before the rules apply and to make any necessary changes to their farm management practice.

- The initial measures are associated with best practice, with greater time provided for the introduction of those measures which for some may require more significant change.

- The requirements of the new regulations will be included within Cross Compliance but only from the date from which the individual measures first apply.

Guidance and support

- Detailed guidance documents will be published on the Welsh Government website providing a step-by-step approach to the implementation of the regulations. The latest information can be found on the following pages: https://gov.wales/land-management

- There will be a range of advice and training available during the implementation period looking at different aspects of the regulations in detail.

- Welsh Government has made support available to farmers through the Rural Development Small Yard Coverings (SYC) and Nutrient Management Plan (NMIS) schemes to improve nutrient management and to reduce farm pollution.

- Further information can be found at: https://gov.wales/rural-grants-payments

Farms within existing Nitrate Vulnerable Zones

- The new regulations will replace the existing NVZ regulations but there will be minimal changes to requirements and practices. The transitional periods will not generally apply to farms within NVZs. Further information will be provided in the guidance documents.

The table below provides an overview of the regulations and the dates when individual measures will apply. Full guidance will be available shortly and should be used when considering individual farm requirements.

From 1 April 2021
Storage of manure and silage • 14 days' notice must be given to NRW before construction begins on a new or improved slurry or silage store (applies from 28 April). • Other than the requirement to notify NRW before construction of a store begins, the silage storage requirements will remain the same (as SSAFO).
Exempt Structures • Installations that were in use or built before March 1991 or where a contract for construction was entered into before March and completed before September 1991 are "exempt structures". • An old store may be used, but the storage capacity requirements of these Regulations must still be met by 1 August 2024.

Controlling the spreading of nitrogen fertiliser (includes manufactured nitrogen fertiliser, slurry and other organic manures):

- If you intend to spread nitrogen fertiliser you must first inspect the field to consider the risk of nitrogen getting into surface water.
- You must not spread nitrogen fertiliser on land if there is a significant risk of nitrogen getting into surface water, taking into account factors such as weather and slope. Mandatory buffer zones will be established (as per existing cross compliance requirements).

Closed periods for spreading manufactured nitrogen fertiliser

- on grassland, from 15 September to 15 January*
- on tillage land, from 1 September to 15 January*

*Exemptions apply which are explained in the full guidance.

Incorporation of manure

Organic manure applied to bare soil must be incorporated within 24 hours in most circumstances.*
*Exemptions may apply eg. if precision spreading equipment is used.

From 1 January 2023

Risk Maps

- If you intend to spread manure on the holding you must produce and maintain a risk map which highlights the areas on which spreading may cause pollution, including buffer zones and surface waters.
- Sites suitable for field heaps should be marked if manure is to be stored in field heaps.

Storage of Organic Manure

- *Other than slurry, any organic manure must be stored:*

  - in a vessel;
  - in a covered building;
  - on an impermeable surface; or
  - in a free standing temporary field heap

Temporary Field Heaps

- *Rules on the placement of manure field heaps will apply to minimise the risk of any leaching and run off reaching waterbodies.*

Nutrient Management Planning

- *A Nutrient Management Plan must be established for any nitrogen fertiliser application, which includes the soil nitrogen supply and the requirement of the crop.*

Import/Export of Manure

- *Any import/export of manure onto/off the holding must be recorded.*

Nutrient applications

- *Fertiliser applications must not exceed specified crop limits.*
- *Fertiliser must be applied as accurately as possible and spreading trajectory must be below 4 meters from the ground.*

Records

- *Records associated with Nutrient Management Plans and fertiliser applications must be kept.*
- *Exemptions from certain requirements will apply to extensive farms.*

From 1 August 2024

Holding limit

- *A limit of 250kg of Nitrogen per individual hectare is applied to the spreading of organic manure for any 12 month rolling period.*
- *No more than 170kg of nitrogen from manure can be applied each year, averaged across the holding, either directly deposited by the animal or by spreading.*

Closed periods

- The spreading of slurry (and other manures but not farmyard manure) will be prohibited during the following periods (certain exemptions will apply*):

Soil Type	*Grassland*	*Tillage land*
Sandy or shallow soils	1 Sept to 31 Dec	1 Aug to 31 Dec
All other Soils	15 Oct to 15 Jan	1 Oct to 31 Jan

- Spreading after the closed period until the end of February will be limited to 30 cubic metres per hectare (8 tonnes per hectare of poultry manure) at any one time, and there must be at least three weeks between each spreading.

*Details of exemptions are provided in the full guidance

Slurry Storage capacity

- 5 months of slurry storage will be required for any slurry produced by any livestock, other than pigs or poultry.
- For slurry produced by pigs and poultry, 6 months of slurry storage will be required.

  Note: the rainfall figures and calculations used to determine the storage you will need to meet the requirements of the new regulations differs from those of the existing SSAFO regulations. Because of this, the difference between 4 months SSAFO and 5 months required by the new regulations is not necessarily equivalent to an additional month of storage. In some cases, such as in low rainfall areas, the new requirement may be lower than the existing SSAFO requirement. Where the requirement in the new regulations is greater, you should assess the most effective way to meet the new storage requirement, such as improved clean and dirty water separation.

Irrespective of the minimum storage requirement, you must ensure you have sufficient storage available to enable you to comply with the other requirements of the regulations.

The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021 Guidance for Farmers and Land Managers (gov.wales)

4. Additional regulatory requirements

National Resources Wales (formerly Environment Agency)

- Natural Resources Wales (NRW) must be notified before the construction or modification of any new silo or slurry storage system. A minimum of 14 days' notice must be issued to Natural Resources Wales (NRW) in writing before construction of a new, substantially enlarged or reconstructed store containing slurry or silage begins. This applies to any silo or slurry storage system whose construction is to begin on or after 28 April 2021("a new or improved store").
- It is strongly recommended that you minimise the risk of constructing an installation which is not compliant and of receiving a notice, by involving NRW early in the planning stage. Note if you require planning permission NRW is a statutory consultee in the planning process.
- Contact: **0300 065 3000** (Mon-Fri, 9am-5pm)
  enquiries@naturalresourceswales.gov.uk

Water Resources Act 1991

- It is an offence under Section 85 of the Water Act to cause or knowingly permit any poisonous, noxious or polluting matter or any solid waste matter to enter any controlled waters (this means ground-water, and all coastal or inland waters, including lakes, ponds, streams, canals and ditches) without written consent from the National Resources Wales.

The Groundwater Regulations 1998

- A person shall be treated as contravening these Regulations if he causes or knowingly permits the disposal or tipping for the purposes of disposal of waste pesticides, including sheep dip, and pesticide tank washings to land, disposal of unused diluted pesticide and tank washings and washing water from equipment cleaning, or any other substance in list I or II of the Schedule in circumstances which might lead to an indirect discharge of that substance into groundwater, unless it is carried on under and in accordance with authorisation granted by the National Resources Wales.

Health and Safety

- Any risk to health and safety associated with the workplace must be assessed in accordance with the **Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1992**

- Substances that are known to be hazardous need to be assessed to the **Control of Substances Hazardous to Health (COSHH) 1994 Regulations.**

- **Construction (Design and Management) Regulations 1994** will apply to:

    - Any construction design work, irrespective of how long the construction phase lasts or how many workers are involved on site.
    - All demolition work proposed and any construction work that lasts for more than 30 days, or involves more than 500 person days of work must be notified to the local Health and Safety Executive, before commencement, using form F10.
    - Non-notifiable construction work which involves five people or more carrying out construction work on any one time

Planning

- Any new building, structure, tank or excavation for the storage of manure, slurry and dirty water which is to be built within 400 metres of the curtilage of a 'protected' building requires planning permission.

- A 'protected' building is one that is occupied by people on a regular basis and is such as a private dwelling or school. The definition excludes a dwelling or other buildings that are used for or in connection with agriculture.

- The 400-metre rule is in addition to other restrictions on permitted development for agriculture such as that of 'within 25 metres of the metalled portion of a road'.

- From 2 January 1992, even if full planning permission is not required, the local planning authority will require to be informed of the siting, construction and size of any planned agricultural buildings and any engineering operations on any size of agriculture unit.

- Smaller agricultural units of 0.5-5.0 hectares have more restricted development rights.

- Further information is contained in the booklet 'A Farmer's Guide to the Planning System' that is available free from Welsh Assembly Government offices.

Extract from the Code of Good Agricultural Practice (COGAP) re Manure stores:

Solid manure stores

- Permanent stores for solid manures should have impermeable bases. The base should slope so that liquids run-off into collection channels, normally outside the store, which drain to an appropriate sized or designed tank.
- Using narrow densely packed A shaped heaps for manure will shed rainwater more easily and prevent manure from becoming very wet, and also reduce odour and ammonia emissions.
- Providing a roof or cover to keep rainfall off the manure will reduce dirty water run-off. You can reduce odour and ammonia emissions from poultry manure by keeping it as dry as possible. For pig buildings with scraped dunging passages, where it is intended to produce stackable solid manure there should be sufficient concrete yard area to retain the solid fraction for at least 1 month to allow drainage of liquids into a suitable slurry store.

Field heaps

- Only put solid manures into temporary field heaps if there is a minimal risk of run-off polluting groundwater or surface water. Sites should not be in a field liable to flooding or becoming waterlogged.
- You should not put heaps within 10 metres of a surface water or within 50 metres of a spring, well or borehole or in positions that would cause odour problems for nearby residents.
- Temporary field heaps should not be located in any single position for more than 12 successive months.
- There should be a 2-year gap before returning to the same field site.
- Field heaps should not be placed within 10 metres of field drains. If it is unavoidable that manure is stored over field drains, ensure it is for a maximum of a few days only and that it does not cause pollution.
- Field heaps should be located well away from any ruts or tracks that could provide a pathway for effluent to reach surface water or habitats.

Composting

- Composting solid manures reduces the quantity to be spread to land, and the odour that is released during and after spreading. Composting itself can give rise to site odours, and increase the loss of ammonia. The best results are obtained by using ingredients that are chopped and well mixed – usually manure and straw in the right proportions and by controlling temperature and moisture content, and by regular turning.

Earth lined slurry lagoons

Please reference the Environment Agency guidance document ‘Soil Suitability and Testing for Earth Lined Slurry Lagoons (2013).’ The document summarises the necessary soil characteristics and tests for constructing an unlined earth bank slurry lagoon.

Earth bank slurry lagoons

New Earth banks lagoons (Lined or unlined) will need to demonstrate that they comply with the new Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021. A Construction Quality Assurance (CQA) Plan will need to be commissioned and prepared by an independent CQA engineer (CQAE) familiar with geotechnical slope stability design and flexible membrane liners. On completion of the works a CQA Verification Report should be provided to the client demonstrating successful completion of the works as set out in the approved CQA Plan.

5. Additional information

As a condition of the Farming Connect Grant aid scheme you must demonstrate that you are keeping your land in Good Agricultural and Environmental Condition (GAEC) and that you are complying with a number of specified legal requirements, known as Statutory Management Requirements (SMRs). SMRs relate to the environment, public, animal and plant health and animal welfare.

The table below shows in more detail the Cross Compliance requirements under SMR and GAEC, and which are particularly relevant to this report.

	SMR TITLE	
SMR 1	Water Protection	**X**
SMR 2	Wild Birds	
SMR 3	Conservation of Fauna and Flora (Biodiversity)	
SMR 4	Food and Feed Law	
SMR 5	Restrictions on the Use of Substances having Hormonal or Thyrostatic Action and Beta-Agonists in Farm Animals	
SMR 6	Pig Identification and Registration	
SMR 7	Cattle Identification and Registration	
SMR 8	Sheep and Goat identification	
SMR 9	Prevention, Control and Eradication of Transmissible Spongiform Encephalopathies (TSE)	
SMR 10	Restrictions on the Use of Plant Protection Products	
SMR 11	Welfare Standards for the Protection of Calves	
SMR12	Welfare Standards for the Protection of Pigs	
SMR 13	Welfare Standards for the Protection of Animals Kept for Farming Purposes	

	GAEC TITLE	
GAEC 1:	Water – Establishment of Buffer Strips	**X**
GAEC 2:	Water – Use of Water for Irrigation	
GAEC 3:	Water – Groundwater	
GAEC 4:	Soil and Carbon Stock – minimum soil cover	
GAEC 5:	Soil and Carbon Stock – minimum land management site specific conditions to limit erosion	
GAEC 6:	Soil and Organic Matter – maintenance	
GAEC 7:	Maintenance of landscape features	

In addition to the need to comply with Cross Compliance requirements, there may be additional requirements if you are currently within a live Glastir Entry or Advanced Contract Glastir that must be followed for the full contract period (including contract extensions) that under the Whole Farm Code (WFC). These include:

a. **Comply with Cross Compliance** (as above)
b. **Comply with all legal requirements and obtain necessary consent where appropriate** (see Annexe 2 of Booklet 2: Technical Guidance)
c. **Retention and Management of Existing Habitat Land**. This includes causing damage by over or under grazing, or poaching caused by stock feeding and rutting by vehicles. You must not improve habitat land or plough or cultivate it. You must not roll or chain harrow between 15th March and 15th July, install new drainage or modify existing drainage, nor clear ditches between 1st March and 31st August. You must not apply slurry, manure or sludge etc, nor any lime, slag, inorganic or organic fertilisers etc. You must not spray herbicides (except spot treatment of some weeds). You must not store manure, silage or other farm wastes on habitat land, landscapes, or archaeological features or within 10metres of any watercourse. (see relevant pages of the Habitat Scheme Guidance)
d. **Rules applicable to all land in Habitat Scheme** These rules include a general ban on extracting rock, scree, sand, shingle, gravel, clay or peat, and also on burning vegetation on rocky areas or archaeological sites. In addition there is a requirement to keep field records of all applications of Farmyard manures, slurry, fertilisers, limes etc, pesticides and herbicides. You must not cultivate any land within 2 metres of a watercourse or a wetland habitat, nor apply livestock manures or dirty water when the ground is waterlogged or frozen hard. Manure, silage or other farm wastes must not be stored on an EA flood risk area (1 in 100 years risk) or on a high risk slope of over 7º. There are special requirements for practices to follow if growing maize. You must not introduce any non-native animal or plant species to land within your contract. You must retain and protect all in-field and veteran trees, and retain all traditional buildings and remnant structures. You must not damage any Scheduled or Unscheduled Ancient Monuments identified on your AWE map, must comply with your legal duties relating to existing Public Rights of Way (PRoW) and public access to open access.. And the land under your contract must be kept free of rubbish. (see relevant pages of Habitat Scheme Guidance)

6 Appendix

6.1 Farm resources

They operate a dairy and sheep farm in the Ceiriog Valley. The farm extends to 178acers and is owner-occupied acres with a further 80 rented in.

The farm carries the following
- 90 dairy cows (6,000 to 9,000ltr)
- 15 dairy replacement
- calves are reared and sold as heavy stores at 18 to 24 months
- 55 ewes

Dairy cows and replacements are house within cubicle sheds. All remaining livestock are loosed housed.

All the silage is big baled and stored within regulation.

6.2 Production & Storage of Organic Manures (slurry/manure)

Approximately 90 dairy cows and dairy replacement (13 months to first calving) are housed on a slurry system throughout the winter. Slurry generated from the sheds is directed into an existing pre 1991 mass concrete slurry store which has a total estimated capacity of 203.8 cubic m after allowing the 300mm freeboard and ramped access.

The existing slurry store, collecting yard and surrounding roadways and trafficked yards all collect rainwater and enters the slurry system. These areas total 1,125m sq which collects 661.5cu m (588mm Data Map Wales Lat: 52.932 - Long: -3.159) of rainwater throughout the winter period. This volume enters the existing slurry stores and becomes contaminated. In addition, 410.4cu m of parlour washings enters the slurry system an becomes contaminated.

Slurry storage capacity totals 203.8 cu m. This is against a storage requirement of is 1,931.10 cu m (89.4% shortfall of capacity). Please see appendix 1 for calculations of current slurry production and capacity

All remaining youngstock are loosed housed within several livestock sheds. FYM generated from the loose housing is mucked out regularly and is either applied to land immediately if conditions are favourable or stored within the open covered FYM store until applied to land or field heaped within regulation.

Please note the dimensions of the slurry store are based on information provided during the visit. As the store was nearly full during the visit, so I was unable to assess the internal condition or dimensions of the slurry store.

6.3 Opportunities and proposals

The proposed NMIS investments will significantly enhance the farm's nutrient and water management, leading to increase on-farm resource efficiencies. These investments will also contribute to the reduction of greenhouse gas (GHG) and ammonia emissions, while safeguarding the soil, water, and air quality of the catchment and wider environment. These approaches are innovative solutions that contribute to a more sustainable farming system.

The NMIS investment will support the farm in achieving compliance with The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021. Additionally, the NMIS improvements will support the farm's economic viability and environmental sustainability.

New Slurry Storage Solutions

Under the grant a new above ground uncovered circular slurry store will be constructed and will have and estimated capacity of 2,257 cubic meters after allowing for the 300mm freeboard,

Additional Storage Capacity

The total proposed slurry storage capacity will total 2460.8 cubic meters, which is 10.1% more than the future storage requirement of 2,235.40cubic meters. Please see the appendix 2 Future slurry storage capacity calculations

The NMIS grant will allow efficient and compliant facilities to be built to capture and store all slurry and dirty water over the 152days storage period. Please see the appendix 2 Future slurry storage capacity calculations

Rainwater Goods and First Flush Diverter

Under the grant clean rainwater from the slatted shed will be diverted through a first flush diverter and stored within a dedicated rainwater harvesting tank therefore increasing on farm water efficiency

These investments will modernise the business and deliver a step change in best practice by allowing the business to move towards a more sustainable management system while reducing business costs through increasing on farm resource efficiencies and supporting environmental sustainability through enhancing water, air and soil quality

6.4 Justification

The NMIS scheme objectives are:

- To enhance on-farm nutrient management
- To protect and enhance water, soil and air quality
- To increase on-farm water efficiency
- Increase on-farm resource efficiencies.

Benefits of the Investment

- **Improving Nitrogen Efficiency:** By reducing the need to apply slurry when soil conditions are not favourable, we can minimise soil compaction and saturation. This leads to greater infiltration of nutrients into the soil profile and reduces ammonia loss to the air.

- **Effective and Targeted Use of On-Farm Manures:** Accurate application of on-farm manures can reduce the need for inorganic fertilisers. This decrease in fertiliser application rates will lower NO2 emissions and the CO2 emissions associated with their production and transportation. Additionally, reducing fertilizer use will also cut their greenhouse gas emissions (NO2 and CO2) from overapplication, production, and transportation.

- **Operational Efficiency:** The investment in the new systems will streamline slurry management, reducing labour and operational costs and will enhance operational efficiency which will promote sustainable farming practices, leading to long-term soil health and productivity.

- **Air Quality**: Properly managed slurry can reduce the emission of harmful gases such as ammonia and methane, contributing to improved air quality and lowering the farm's greenhouse gas emissions. Additionally, managing slurry more effectively helps in containing odours, enhancing the air quality around the farm.

- **Environmental Protection** by preventing nutrient runoff and reducing the risk of effluent contamination, these improvements will enhance water quality and protect the surrounding environment.

- **Increased Farm Resilience:** By improving infrastructure and nutrient management practices, the farm will be better equipped to handle environmental stresses such as extreme weather conditions, contributing to long-term resilience.

- **Support for Biodiversity**: Improved soil health and reduced pollution contribute to greater biodiversity on the farm, supporting a healthier ecosystem.

Rainwater Goods and First Flush Diverter

- **Water Efficiency:** Installing a rainwater harvesting tank and a first flush diverter system will divert rainwater from an existing shed into a dedicated harvesting tank. This increases on-farm water efficiency and reduces reliance on external water sources.

  Sustainable Water Management: The system will improve water management practices on the farm, contributing to sustainability by utilising rainwater effectively

6.5 Action Plan and Recommendation

- The wider environment and the business would benefit from installation of
  - Above ground circular slurry store
  - a rainwater harvesting tank and first flush diverter to collect rainwater from an existing shed

- To this end, obtain three appropriate quotations the above infrastructure.

- **The building work for the supporting quote will need to confirm that the structure will be designed and built to BS5502 Class 2 for buildings and structures.**

- Specifications and construction standards must be in accordance with the Water resources (Control of Agricultural Pollution (Wales) Regulations 2021

- Apply for planning approval for the proposed work.

Appendix 1 Current slurry production in Storage Period

Slurry Production in Storage Period (152 days max)

		A	B	C	D
		Number of stock	No of days collected	Daily volume	Volume in storage period
Cattle					
Calf	0-3months		152	7.0	0.0
Dairy replacement	>3 & <13 m		152	20.0	0.0
	>13m	15	152	40.0	91200.0
Dairy Cow after 1st calf	> 9000 Litres		152	64.0	0.0
	6000- 9000 L	90	152	53.0	725040.0
	< 6000 Litres		152	42.0	0.0
Beef Heifers or steers to 25 months	>3 & <13 m		152	20.0	0.0
	>13m & <2 5m		152	26.0	0.0
Beef Cows or steers over 25 months	For slaughter		152	32.0	0.0
	Cows < 500kg		152	32.0	0.0
	Cows > 500kg		152	45.0	0.0
Bulls over 3 months	For slaughter		152	26.0	0.0
	Breeding 3-25m		152	26.0	0.0
	Breeding >25m		152	26.0	0.0
Sheep					
From 6m up to 9m				1.8	0.0
>9m to lambing, tupping or slaughter				1.8	0.0
After lambing or tupping	< 60 kg			3.3	0.0
	> 60 kg			5.0	0.0
Goats, deer, horses					
Goats				3.5	0.0
Deer	Breeding			5.0	0.0
	Other			3.5	0.0
Horses				24.0	0.0
Pigs					
7 kg and less than 13kg				1.3	0.0
13 kg and less than 31kg				2.0	0.0
31kg and less than 66kg	Dry Fed			3.7	0.0
	Liquid Fed			7.1	0.0
66kg	Intended for Slaughter - dry fed			5.1	0.0
	Intended for Slaughter - liquid fed			10.0	0.0
	Sows intended for breeding that have not yet had their first litter			5.6	0.0
	Sows (including litters up to 7kg)			10.9	0.0

	Breeding Boars from 66kg up to 150kg			5.1	0.0
	Breeding Boars from 150kg			8.7	0.0
Total Volume slurry in storage period		**Box E**		Litres	**816240.0**
		Box F		Cubic metres	**816.2**

Average volume of rainfall entering slurry store in Storage Period

	Description	Length	Width	Area m²
Yard 1	Yard area	1000	1	1000.0
Yard 2				0.0
Yard 3				0.0
Yard 4				0.0
Silo 1				0.0
Silo 2				0.0
Silo 3				0.0
Earth banked slurry store				0.0
Slurry store 1	Existing Pre 1991 slurry store	25	5	125.0
Slurry store 2				0.0
Round slurry store		Radius:-		0.0
Less: clean roof 1				0.0
Less: clean roof 2				0.0
Less: clean roof 3				0.0
Less: clean roof 4				0.0
Total area of water entering slurry store				1125.0
Average rainfall in storage period (Oct to Feb inclusive) (mm)				588
Rainfall data source:	Data Map Wales Lat: 52.932 - Long: -3.159			
Total Volume of Rainfall entering slurry store (m³)			**Box G**	**661.5**

Dairy Wash water entering slurry store during storage period

	No Cows	Litres	No Days	Total litres	Volume m³
High volume hose	90	30	152	410400	
Low volume hose		20	152	0	
Or daily measured volume			152	0	
Total volume of wash water entering slurry store (M³)				**Box K**	**410.4**

Other foul run-off entering slurry store during storage period

Details:			
Estimate volume 1			
Details:			
Estimate volume 2			
Total estimated volume (m³)		**Box L**	**0.0**

Total Volume of Cattle & Sheep Slurry, Rainfall & Foul run-off produced in Storage Period (m^3)	**Box M**	**1888.1**

Total volume bought forward from previous page (Box M)		**1888.1**
Volume of Pig slurry produced 1st October to 1st April	**Box N**	
Export of slurry during storage period		
Mechanical separator for cattle slurry (less 15-20%)		
Spread of slurry to land with low run-off risk after closed period		
If so, add one weeks slurry production		

Total volume requiring storage (m^3)	**1888.14**

Volume of available slurry storage

	Freeboard	Length (m)	Width (m)	Depth (m)	Capacity (M^3)
Earth Banked store	750 mm	0	0	0	0.0
Concrete store 1	300mm	0	0	0	0.0
Concrete store 2	300mm	25	5	2.13	203.8
		∏ (Pi)	Radius (m)	Depth (m)	
Steel tank (round)	300mm	3.142	0		0.0
Total available slurry storage (m^3)				**Box O**	**203.8**

Does the farm have sufficient slurry storage to satisfy the Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021? **No**

Shortfall or Excess capacity (m3)	-1684.4
	-89.2%

Appendix 2 Future slurry production in Storage Period

Slurry Production in Storage Period (1st Oct to 1st March - 152 days max)

		A	B	C	D
		Number of stock	No of days collected	Daily volume	Volume in storage period
Cattle					
Calf	0-3months		152	7.0	0.0
Dairy replacement	>3 & <13 m		152	20.0	0.0
	>13m	15	152	40.0	91200.0
Dairy Cow after 1st calf	> 9000 Litres		152	64.0	0.0
	6000- 9000 L	90	152	53.0	725040.0
	< 6000 Litres		152	42.0	0.0
Beef Heifers or steers to 25 months	>3 & <13 m		152	20.0	0.0
	>13m & <2 5m		152	26.0	0.0
Beef Cows or steers over 25 months	For slaughter		152	32.0	0.0
	Cows < 500kg		152	32.0	0.0
	Cows > 500kg		152	45.0	0.0
Bulls over 3 months	For slaughter		152	26.0	0.0
	Breeding 3-25m		152	26.0	0.0
	Breeding >25m		152	26.0	0.0
Sheep					
From 6m up to 9m				1.8	0.0
>9m to lambing, tupping or slaughter				1.8	0.0
After lambing or tupping	< 60 kg			3.3	0.0
	> 60 kg			5.0	0.0
Goats, deer, horses					
Goats				3.5	0.0
Deer	Breeding			5.0	0.0
	Other			3.5	0.0
Horses				24.0	0.0
Total Volume slurry in storage period		**Box E**		Litres	**816240.0**
		Box F		Cubic metres	**816.2**

Average volume of rainfall entering slurry store in Storage Period

	Description	Length	Width	Area m²
Yard 1	Yard area	1000	1	1000.0
Yard 2				0.0
Yard 3				0.0
Yard 4				0.0
Silo 1				0.0
Silo 2				0.0
Silo 3				0.0
Earth banked slurry store				0.0
Slurry store 1	Existing Pre 1991 slurry store	25	5	125.0
Slurry store 2				0.0
Round slurry store	NMIS 2 Circular	Radius:-	13.71	590.6

Less: clean roof 1				0.0
Less: clean roof 2				0.0
Less: clean roof 3				0.0
Less: clean roof 4				0.0
Total area of water entering slurry store				1715.6
Average rainfall in storage period (Oct to Feb inclusive) (mm)				588
Rainfall data source:	Data Map Wales Lat: 52.932 - Long: -3.159			
Total Volume of Rainfall entering slurry store (m^3)			**Box G**	**1008.8**

Dairy Wash water entering slurry store during storage period

	No Cows	Litres	No Days	Total litres	Volume m^3
High volume hose	90	30	152	410400	
Low volume hose		20	152	0	
Or daily measured volume			152	0	
Total volume of wash water entering slurry store (M^3)				**Box K**	**410.4**

Other foul run-off entering slurry store during storage period

Details:			
Estimate volume 1			
Details:			
Estimate volume 2			
Total estimated volume (m^3)		**Box L**	**0.0**

Total Volume of Cattle & Sheep Slurry, Rainfall & Foul run-off produced in Storage Period (m^3)	**Box M**	**2235.4**

Total volume bought forward from previous page (Box M)		**2235.4**
Volume of Pig slurry produced 1st October to 1st April	**Box N**	
Export of slurry during storage period		
Mechanical separator for cattle slurry (less 15-20%)		
Spread of slurry to land with low run-off risk after closed period		
If so, add one weeks slurry production		

Total volume requiring storage (m^3)	**2235.40**

Volume of available slurry storage

	Freeboard	Length (m)	Width (m)	Depth (m)	Capacity (M^3)
Earth Banked store	750 mm	0	0	0	0.0
Concrete store 1	300mm	0	0	0	0.0
Concrete store 2	300mm	25	5	2.13	203.8
		∏ (Pi)	Radius (m)	Depth (m)	
Steel tank (round)	300mm	3.142	13.71	4.23	2257
Total available slurry storage (m^3)				**Box O**	**2460.8**

Does the farm have sufficient slurry storage to satisfy the Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021? **Yes**

Shortfall or Excess capacity (m3)	225.3
	10.1%