

Construction Quality Assurance Report (CQA) - Digestate Lagoon

The following is the CQA report for the digestate lagoon at Much Fawley Farm.

The report refers to the Digestate Storage lagoon at Much Fawley which is used to store digestate from the anaerobic digester and is the subject of a permit variation request.

Site Plan Drawing

For location in context or rest of site please see drawing 01180-00-00-F Permit. For construction and layout detail please refer to Drawing Ref 01180-01-A-Digestate Lagoon. Note this drawing does not include the latest above ground round tank which is awaiting planning consent and is currently not used.

Design Drawing Confirming the materials used

In addition panels were installed as per Milbury "Vertical Slurry Store" DRG No 11-SLU.

Prefabricated products Manufacturers specifications and guarantee

Found on terms and conditions of supply, attached see document Milbury Vertical Panel guarantee. TPA 009 and TPA 039.

Capacity Calculations

The lagoon was constructed to comply with appropriate winter storage capacities and as part of the wider slurry and dirty water containment requirements at Much Fawley Farm. 2020 NVZ Storage Requirements sheet attached as justification of how it fits into the storage requirements on the site.

Calculating 2020 Anaerobic Digestate Production and Storage Requirement

Calculate the Anaerobic Digester Diet/ Daily Inputs.

| | | |
|----------------------------------|---|---|
| Open yard area (m ²) | 0 | * Liquid Waste Plant Washings dewatering sludge |
| Average Monthly Rainfall (mm) | 0 | |

| Input material | Daily input amount (tms/m ³) | Days fed per annum |
|-------------------------|--|--------------------|
| Rainfall from yard area | 0.00 | 365 |
| Broiler litter | 3.94 | 365 |
| Distillery Mash* | 4.00 | 365 |
| Ryegrass silage | 3.28 | 365 |
| Fruit | 4.00 | 365 |
| Winter Rye | 2.19 | 365 |
| Forage Maize | 3.28 | 365 |
| Total | 20.69 | |

Calculate the Anaerobic Digester Daily output.

| | |
|----------------------------|----|
| AD efficiency (%) | 90 |
| Separated solid Ratio (%) | 15 |
| Separated Liquid Ratio (%) | 85 |

| Total Removed Daily | Daily Production | Annual Production |
|-----------------------|--|--|
| 18.621 m ³ | Separated solid 2.79515 tms Separated Liquid 15.83 m ³ | 1803 Separated solid (tms) approx* 10220 Separated Liquid (m ³) approx* |

All liquid production includes the average rainfall that would enter open storage areas, along with an extra 25% rainfall to consider extreme weather conditions.

Calculate the Anaerobic Digester Storage Requirement.

| | |
|----------------------------|---|
| Months of storage Required | 6 |
|----------------------------|---|

| | |
|--|------|
| Amount of storage Required (m ³) | 2859 |
|--|------|

| Ref | Earth banked store (Yes/No) | Circular store (Yes/No) | Length (m) | Width / Diameter (m) | Working height or depth (m) | side Run (m) (length) | End Run (m) (Width) | Freeboard required (m) | Capacity (m ³) |
|----------------------------------|-----------------------------|-------------------------|------------|----------------------|-----------------------------|-----------------------|---------------------|------------------------|----------------------------|
| New Pit | No | No | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 1571 |
| Dirty Water Tank | No | No | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 60 |
| Collection Pit | No | No | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 60 |
| Digester Tank 1 | No | Yes | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 1567 |
| Digester Tank 2 | No | Yes | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 1567 |
| New Above Ground Store | No | No | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 1000 |
| Total Existing Capacity = | | | | | | | | | 5825 |

Total capacity includes an extra 25% rainfall collection, all deductions from the run and rise and also freeboard.

This holding has Sufficient Capacity

Monitoring

As per Management System document 'Tanks and Clamps' Maintenance Schedule.

In summary

Daily checks and records kept (Maintenance Checklist) - structure and pipework. Pre store slurry level.

Weekly Checks and records kept (Maintenance Checklist) – Leak Detection (Ammonia Test), Storage reception pit.

5 yearly Check and records kept (As part of Tank written Scheme of Examination) – Wash down and formal inspection.

Installation and Testing

Panels were purchased from FP Mccann and installed according to their Milbury Systems Drawing Lift-05-1,2 and 3 for adopted installation system.

Initial Testing- 50% full for 3 days and monitor level including rainfall impact. Then it was increased to 90% capacity for further 3 days as above.

Construction Documentation

Concrete Specification

Panels – C45 to ISO 9001 and ISO 14001

Base – C45 as Milbury Specification. 45 N/28 day strength.

Backfill – C45 as Milbury Specification.

Joints

Polysulphide Sealant as per installation instructions Milbury "Vertical Slurry Store" DRG No 11-SLU.

Life expectancy

20 years as accepted by Milbury Installation specifications being followed.

Backwall Drainage

Perforated land drain located behind wall and membrane as per Milbury Systems Design Instructions. Drawing 01180-01-A-Construction Details "Digestate Lagoon" shows as installed with vertical inspection pipe sampling location.

Leak Detection Systems

Leak detection has been installed as mitigation for the structure holding waste as per the attached plan. Installation as per Milbury Systems panels with perforated pipe behind membrane as stipulated. Leak detection is employed by groundwater testing from hydrostatic pressure outlet. Sample point located on southwest side of lagoon as indicated on drawing 01180-01-A-Construction Drawing "Digestate Lagoon" and capped to prevent contamination of the containment system. Design as per CIRIA 736. Location of leak detection sampling as in picture below – Marked as A.



Sampling as per maintenance section of Management System and as monitoring section above.

In summary

Visual Check – Daily and checklist entry.

Sampling – Weekly Ammonia Test and records.

Washdown and integrity check including leak testing – 5 yearly or sooner if damage observed.

Operation of tank

Picture below shows the reception pit for dirty water collection Marked B, Reception pit is automatically pumped over the top of the digestate store wall by the pump located in the central picture chest – marked as C. Pipe lengthened to reduce odours.

Digestate is removed from the store by the isolated extraction point right hand side of the chest – marked as D. Spills from the digestate extraction collected in reception pit and pumped back into store.



Construction Quality Assurance Report – Digestate Store

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Signature 

Date 7/2/2018