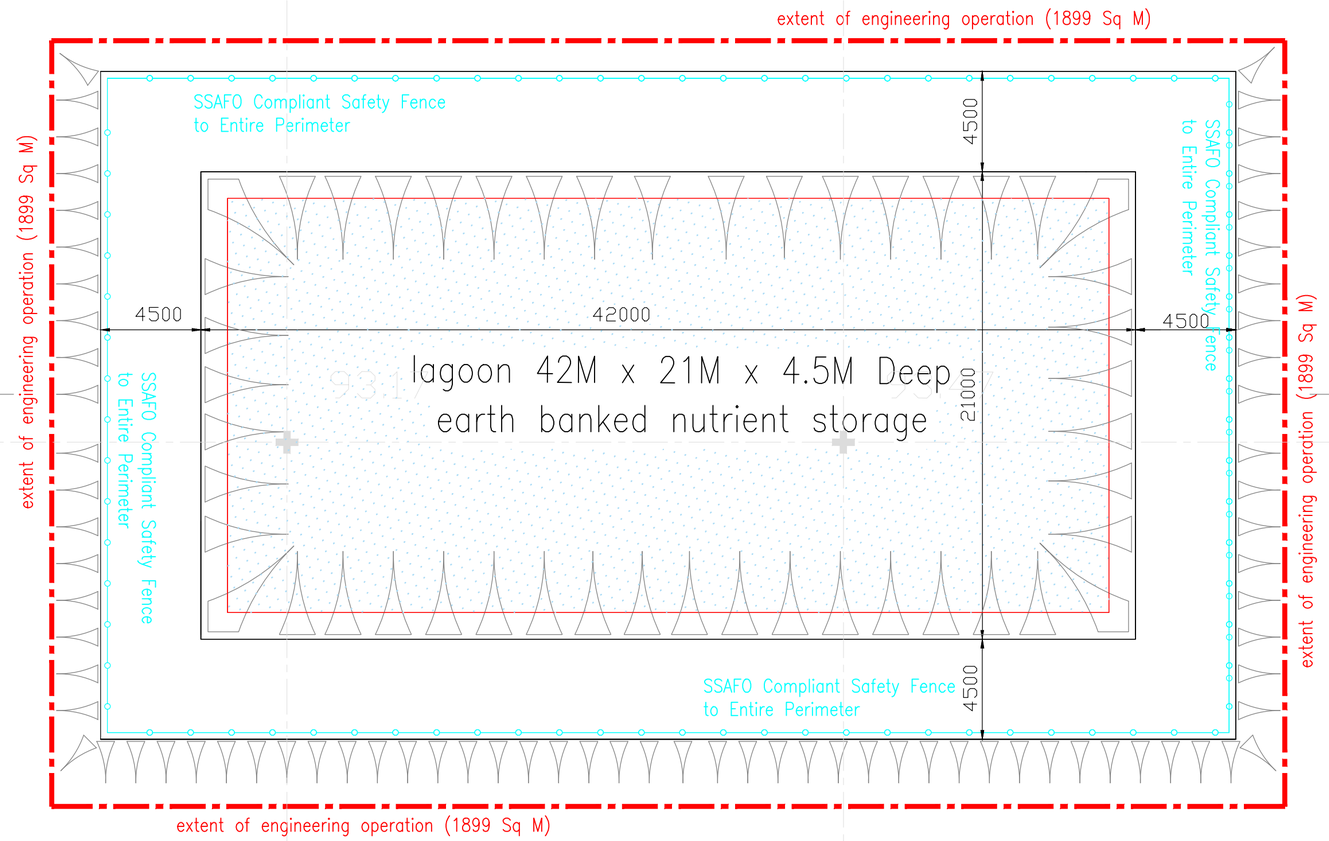
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partner LABC CYMRU

KeBeK Greener by Design



PLAN OF EARTH BANKED LAGOON

NODIADAU/NOTES

MAE'R LLUNIAD HWN WEDI EI WNEUD AR GYFRIFIADUR, NI DDYLID GYWIRIO GYDA LLAW. (AutoCAD LT / Revit 2021).

THIS IS A CAD PRODUCED DRAWING, AND SHOULD NOT BE AMENDED BY HAND. (AutoCAD LT / Revit 2021).
During reproduction Drawing may Shrink or Expand

- The valves must be locked shut when not in use. They must only be used under close supervision and never left unattended while open or partly open
- All parts of the system must comply with the regulations whenever it is used. Proper maintenance is therefore essential, i.e. do not allow tree growth on the embankment and repair rodent damage frequently.

SIZE OF THE STORE OR TANK

The Drawings are to be read in conjunction with the Design and Access Statement produced by KeBeK, this document identifies the maximum quantity of slurry likely to be produced and directed to this system in any continuous four month period. The store may form part of a slurry/dirty water irrigation system.

Earth bank stores have been designed to include a freeboard of 750mm They must never be filled above this level

SILAGE CLAMPS

The clamp base, effluent tank and drains must all be impermeable and resistant to attack from silage effluent. The base of the clamp must be designed and constructed in accordance with BS8007 or BS5502 Part 21.

Where walls are used, the base must extend beyound walls. All silage clamps must include a perimeter drainage channel connecting to an effluent tank.

All effluent must be collected and contained. The silage effluent tank must be 20 litres/cubic metre of silo capacity - up to 1500 cubic metres, plus an additional 6.7 litres/cubic metre of silo capacity thereafter.

No part of this installation should be within 10 meters of a watercourse or land drains.

Clamps and drains must be capable of lasting for 20 years (with routine maintenance.

Below-ground effluent tanks must be capable of lasting 20 years without Maintenance, A certificate to confirm suitable design and construction of tank and clamp must be sent to NRW 14 days before use.

If the clamp has walls, they must be designed to BS5502 Part 22 and be resistant to attack from silage effluent.

SLURRY STORAGE FACILITIES REQUIREMENTS

Slurry stores, tanks, pipes, and hannels must be impermeable. Where walls of the slurry store are not impermeable (eg weeping wall stores), the base must extend beyond the walls and have perimeter drains that connect to a slurry tank.

The base and walls of the slurry storage tank, any effluent tank, channels and reception pit, and the walls of any pipes, must be protected against corrosion, as described in BS 5502, Part 50 (1993).

Slurry storage tank and reception pit must be designed to BS 5502, Part 50 (1993).

The reception pit and associated channels must normally hold at least two days slurry production, including likely rainwater.

A slurry storage tank must normally hold at least four months production, including allowance for likely rain water. In designated Nitrate Vulnerable Zones (NVZ), it will need to hold five or six months production dependant on the type of slurry produced.

The slurry storage tank has been designed to have a minimum freeboard of 300mm but earth banked stores will have a minimum 750mm freeboard to be maintained at all times.

All parts of the slurry storage system has been designed to last for 20 years with routine maintenance.

Any fixed drainage pipe from the slurry store must have 2 valves in series These must be locked shut when not in use and for stores built since 2010 there must be at least 1 metre spacing between valves.

SILAGE AND SLURRY STORAGE REQUIREMENTS

The Water Resources (Control of Pollution) Silage, Slurry and Agricultural Fuel Oil (Wales) Regulations 2010 (SSAFO)

These above regulations set out the requirements for the design (capacity) construction and maintenance of storage facilities for silage, and slurry.

They apply to all installations completed since September 1991.

They require you to nofity NRW, in writing at least 14 days before using a system that is new, substantially enlarged or substantially re-constructed. NRW have forms available to enable you to provide the necessary information.

EARTH BANK SLURRY STORES AND TANKS

Any alteration works to an existing earth bank slurry store, or a replacement earth bank slurry store will be expected to meet the requirements of The Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (England) Regulations 2010 (as amended 2013). Commonly referred to as SSAFO and apply in England

The works contractor must be fully conversant with the regulations, and will provide written confirmation that the design, construction, and installation, will meet the legal requirements.

Any works within a Nitrate Vulnerable Zone (NVZ) then there are rules to follow concerning slurry storage capacity. See Defra guidance.

Ground Water Protection - no system to be located within a groundwater Source Protection Zone 1 or within 50 meters of a borehole, well, or spring used to supply drinking water.

SUITABILITY OF EARTH BANK STORES

Soils- where the soils are suitable (impermeable and stable), they are appropriate for storing slurry or semi-solid manure, or as a series of tanks or lagoons to settle and store dirty water.

To be suitable they must have a permeability of 0.000001 mm per second or less, following compaction if necessary. Impermeable soil must be present to a depth of at least one meter below the bottom of the store.

Soils with a clay content of between 20 - 30 per cent are generally ideal and produce stable embankments. Lower clay content may not meet the required permeability, whilst a higher one should be suitable for the base, but may be difficult to form into a stable embankment and could tend to shrink and crack on drying. The suitability of the material should be confirmed by analysis in a soil laboratory, and preferably verified by a civil engineer. Materials that is intended for use in-situ without any re-compaction need only be tested for permeability and depth.

SOIL TESTING

Initial soil tests to be taken from at least 5 locations to identify any variability in clay content and depth of impermeable soil. Where there is little variability in clay content, soils from only one sample location needs to be sent for detailed testing, otherwise send a range of samples. They need to be tested in an approved soils' laboratory to show whether the required level of impermeability can be achieved. This involves the direct measurement of soil permeability as well as other soil characteristics. Testing should meet BS 1377 (methods of tests for soils for civil engineering purposes)

Where the in-situ soils are not fully suitable, then import appropriate material, or use an impermeable synthetic liner.

SITE SELECTION

Sites in a flood plain or with a high water table to be avoided, including ground that has been previously made up or disturbed.

- Trees, scrub, roots, etc need to be removed
- Relocate any land drains at least 10 meters away from the outside of the embankment, and carefully back-fill the trench with impermeable material.

CONTROL OF AGRICULTURAL POLLUTION) (WALES) REGULATIONS 2021

The key aspects of the regulations are:

Notify NRW about any new, substantially enlarged or substantially reconstructed system at least 14 days before construction begins.

- The notification must include the type of structure and where it is to be used. Request details of the proposed design and construction, and once an agreed proposal has been constructed forward a completed notification form before using the new facility.
- The structure(s) must be impermeable. Soil permeability to be confirmed by a qualified civil engineer or soil scientist.
- No part of the system can be within 10 meters of inland freshwaters or costal waters that slurry could enter.

 Note that 'inland water' includes any stream, ditch or land drain, even if it flows for only part of the year.

 - Where the store has a gravity-fed outlet or connection to another store, it must be fitted with two lockable valves in series, unless the receiving store is larger or at the same height as the outlet store.
 - Each valve must be capable of completely shutting off the total flow of slurry from the store. The design and positioning of the valves should take into account the possibility of a single piece of debris obstructing both valves. The space between the valves must be at lest one meter.

Contd

Chartered Institute of Architectural Technologists

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