CQA INTERNATIONAL LIMITED

BV Dairy AD Plant

Containment System Assessment

Report prepared for

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1. Introduction

1.1 Terms of Reference

CQA International Ltd (CQAI) was appointed by BV Dairy Limited (BV) to assess the containment systems at BV's AD Plant at Shaftesbury, Dorset (the site). A site inspection was undertaken by CQAI with tank surveys undertaken by WSG Eagle Eye Ltd. (WSG). The report presents the results of the study and forms the inspection and works programme for the site's primary and secondary containment systems.

1.2 Scope of Report

This report presents details of an inspection and assessment of all primary and secondary containment systems present on site. It also includes a works programme to ensure that the containment systems present are fit for purpose in line with the Environment Agencies (EA) Environmental Permitting (England and Wales) Regulations 2016 Regulation 61(1) requirements. The assessment was requested by the Environment Agency (EA) as part of the operators plans to vary the site permit to an Installation. The requirements form part of the biowaste sector permit review process discussed in Section 1.3.

> *A detailed assessment of site infrastructure should be provided (e.g. secondary containment, tank specification, surfacing, storage lagoon etc.). The site infrastructure should be compared with the relevant industry /construction standards (e.g. CIRIA guidance C736 for secondary containment and C535 for above-ground tanks etc.).*
>
> *The assessment should include:*
>
> - *The physical condition of primary containment systems (storage and treatment vessels), secondary containment (bunds), loading and unloading areas, transfer pipework/pumps, temporary storage areas and liners underlying the site.*
> - *The suitability for providing containment when subjected to the dynamic and static loads caused by catastrophic tank failure;*
> - *Any work required to ensure compliance with the industry standards or equivalent; and*
> - *A preventative maintenance and inspection regime for site infrastructure.*

This report addresses the above requirements and includes additional information, such as a description of the containment systems and the environmental context. Definitions of containment systems are also included.

Any suggestions for measures to be taken are conceptual, and not design statements. The recommendations could be used as a framework for further discussion and agreement with the EA, prior to undertaking any necessary investigation, design and construction.

1.3 Biowaste Sector Permit Review

The EA has been carrying out a Biowaste Treatment Sector permit review as required by primary legislation, to ensure that permit conditions deliver compliance with relevant legislative requirements and appropriate standards to protect the environment and human health. The process covers all permit holders within the sector.

The scope of the sector wide permit review covered the following areas:

- the requirement for bioaerosols monitoring and compliance with M9 bioaerosols monitoring requirements;
- the design and construction of primary and secondary containment;
- review of process monitoring requirements;
- review of waste types;
- review of tonnages to ensure compliance with the Industrial Emissions Directive;
- review of permit conditions where required.

The review process commenced with the issuance of a Regulation 61 notice and request for information, with the recommendations following assessments included within varied permits as improvement conditions. However, some permits were automatically varied with the requirements listed as improvement conditions, as was the case with all Standard Rules Permits. Any operator wishing to vary their permit was also required to comply with the requirements.

The improvement programme requirements and pre-operational measures specific to this report require a technically competent person to undertake an inspection and produce a works programme to ensure that all primary and secondary containment is fit for purpose (generally referred to as meeting Best Available Techniques (BAT)). This often includes providing a written 'primary and secondary containment plan' detailing the level of compliance with CIRIA C736, however specific requests may vary.

Non-Hazardous and Inert Waste Appropriate Measures Guidance states that there is overlap between best available techniques (BAT) for waste installation facilities and necessary measures for waste operation facilities. The Environment Agency uses the term 'appropriate measures' to cover both sets of requirements.

The guidance sets out what must be considered when the appropriate measures for the facility are assessed, however it is not definitive and does not replace obligations to assess appropriate measures fully for the site. Appropriate measures will depend on the:

- activities being carried out
- size and nature of the activities
- location of the facility

Where a measure is not suitable or relevant, an operator can propose alternative measures that achieve the same level of environmental protection. Or they can provide an explanation of why the specific measure is not relevant. In certain situations, a higher standard of environmental protection may be needed, for example:

- where there are local sensitive receptors
- if the facility is affecting the local environment or human health despite using appropriate measures
- if there is a risk that you may breach an Environmental Quality Standard

'BAT conclusions' are contained in a reference document that defines the best available techniques for a process or sector, including emission levels, consumption levels, monitoring and where appropriate, remediation measures. The Non-Hazardous and Inert Waste Appropriate Measures Guidance refers to EU Directive 2010/75 on industrial emissions.

1.4 Professional Competency

CQAI is an engineering consultancy which specialises in containment engineering, typically for waste management, environmental and mining projects. The company developed from Containment Quality Associates Ltd, which was established in 1993 to provide design and supervision services for the containment of solid and liquid wastes, and wastewater.

CQAI's experienced team have designed and supervised the construction, closure and energy optimisation of numerous containment systems in the UK and overseas, for a range of purposes, including waste management, mining, petrochemical, agriculture, water supply and anaerobic digestion.

CQAI have been approved by the EA to undertake containment system assessments for the biowaste sector based upon submission and review of the company's experience and competency within the required fields.

WSG Eagle Eye Integrity Specialists offer 'Best in Class' customer focused asset integrity assessments and fitness for service plant inspections, with a team certified to API and EEMUA standards that utilise conventional and advanced NDT inspection methods.

This report has been prepared with reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the Client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

2. Overview of Industry Best Practice

2.1 Basis of Assessment

This assessment has been carried out in compliance with industry best practice as defined by CIRIA Report C736 - Containment systems for the prevention of pollution, secondary, tertiary and other measures for industrial and commercial premises, 2014 (hereafter, C736) which is widely accepted by the EA and planning authorities as the appropriate guidance document to assist owners and operators of industrial and commercial facilities to identify and manage the risks associated with storing substances (inventory) that may be flammable, combustible or hazardous to the environment.

2.2 CIRIA Report C736

C736 is applicable to industrial and commercial facilities for the containment of a wide range of inventories, which have the potential to pollute land and water, and to sites ranging from small commercial premises, which may contain a single tank, through to large industrial concerns, including chemical or petrochemical sites.

The report advocates a risk-based approach to managing the storage of inventory. However, it is important to ensure that the risk assessment methodology used is appropriate to the regulatory regime within which the facility is operating, including statutory requirements, regulations and the planning framework.

C736 deals principally with managing the potential consequences of failure of primary containment systems, such as storage or process tanks. Combustion of inventory is also covered, but has less relevance to wet systems, such as AD. Secondary containment is provided to mitigate these consequences and reduce the risk of the following substances reaching the wider environment:

- inventory
- firefighting agents
- contaminated surface water (such as incident rainfall)

Where flammable inventory is stored, it is often impractical to provide sufficient secondary containment near the primary containment, for the firefighting and cooling water that might be applied during an incident. Tertiary containment can provide a further level of protection should the secondary containment be overwhelmed by firefighting and cooling water.

The application of the report's guidance to existing facilities should be based on risk. Designs may be subject to "as low as reasonably practicable" (ALARP) and/or "best available techniques" (BAT) tests and supporting cost-benefit analyses (CBA) depending on the relevant regulations (COMAH, EPR etc.).

2.3 Definition of Containment Systems

The generally accepted definitions of containment systems are set out below:

Primary Containment	The operational storage, processing and transfer of inventory, such as tanks, intermediate bulk containers (IBCs), drums, pipework, valves, pumps and associated control systems. May also include equipment that prevents the breach of primary containment under abnormal conditions, such as high-level alarms linked to shut-down systems.
Secondary Containment	Minimises the consequences of a failure of the primary storage by preventing the uncontrolled spread of the inventory. Secondary containment is achieved by equipment that is external to and structurally independent of the primary storage. Typically, secondary containment systems are located close to the primary containment, such as bunds around storage tanks. However, perimeter systems may act as combined secondary containment on complex sites. Secondary containment may also provide temporary storage capacity for rainfall, and firefighting water.
Tertiary Containment	Provides back-up for secondary containment, possibly with additional allowance for rain and firefighting water. On complex sites, the definition and roles of secondary and tertiary containment may overlap or be combined, and this will need to be understood and explained in the management plan.
Combined Containment	Has both local and remote elements and are designed to contain some of the escaped inventory close to the source, as in local containment, and to transfer by gravity, or by pumping, to a further secondary containment facility at a remote location.

In addition, the guidance requires containment systems to be classified into one of three classes (Class 1 = low risk, Class 3 = high risk) on the basis of a risk assessment. The risk assessment shall be based on the source, pathway, receptor paradigm, together with an assessment of the likelihood of loss of containment. The resulting site risk rating is used to determine the class. The risk assessment and resulting classification for this site is addressed in Section 5.

3. Site Context

3.1 Site Location & Layout

The site is located on Wincombe Lane in the town of Shaftesbury, Dorset, England. The approximate grid reference is ST 87544 23657 and the postcode is SP7 8QD. The surrounding area is predominantly arable land to the east and urbanised to the west. The closest occupied buildings are located approximately 220m west of the facility, adjacent to the site entrance on Wincombe Lane.

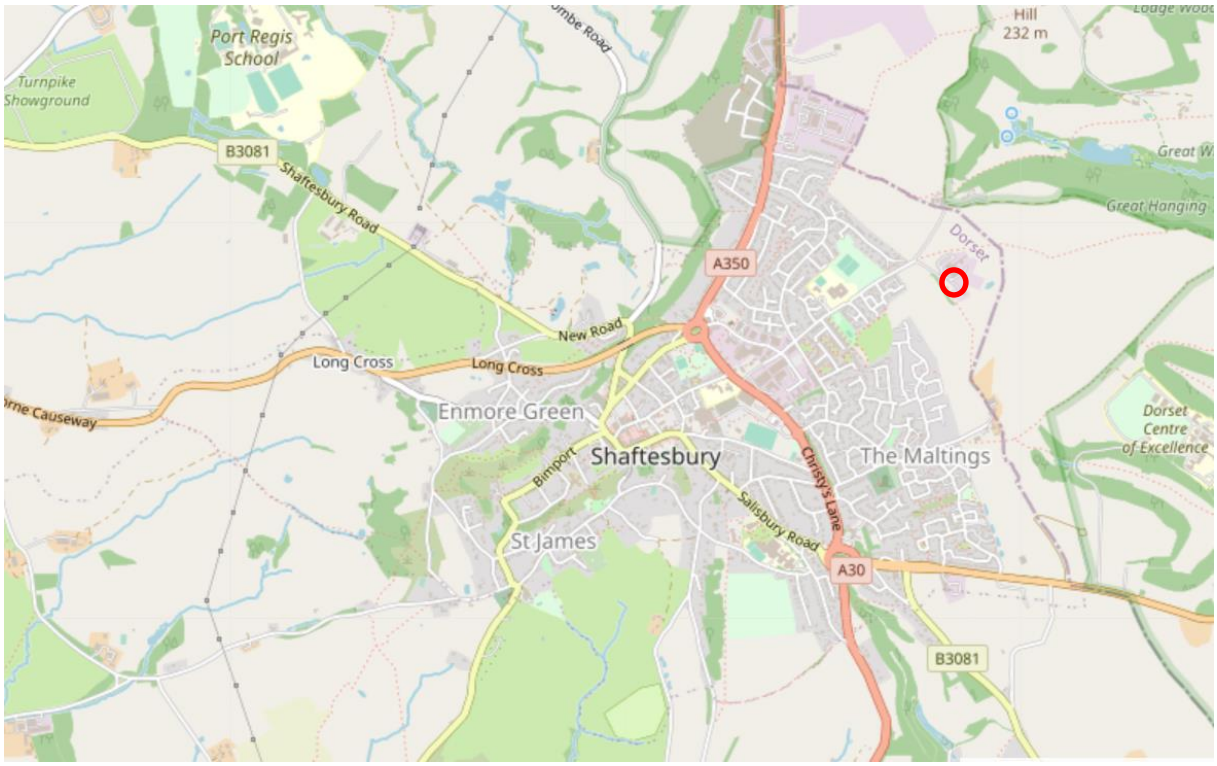


Figure 1 Site Location (Image reproduced from Openstreetmap)

BV Dairy produces a range of dairy products from the facility. The production facility is separate to the AD Plant and forms the northern buildings. The AD plant is located to the south of the production facility buildings, as shown on Figure 2. The location of the AD plant is shown by the red circle.

The site is permitted under Environmental Permitting Regulations, permit reference EPR/HP3492EZ9.

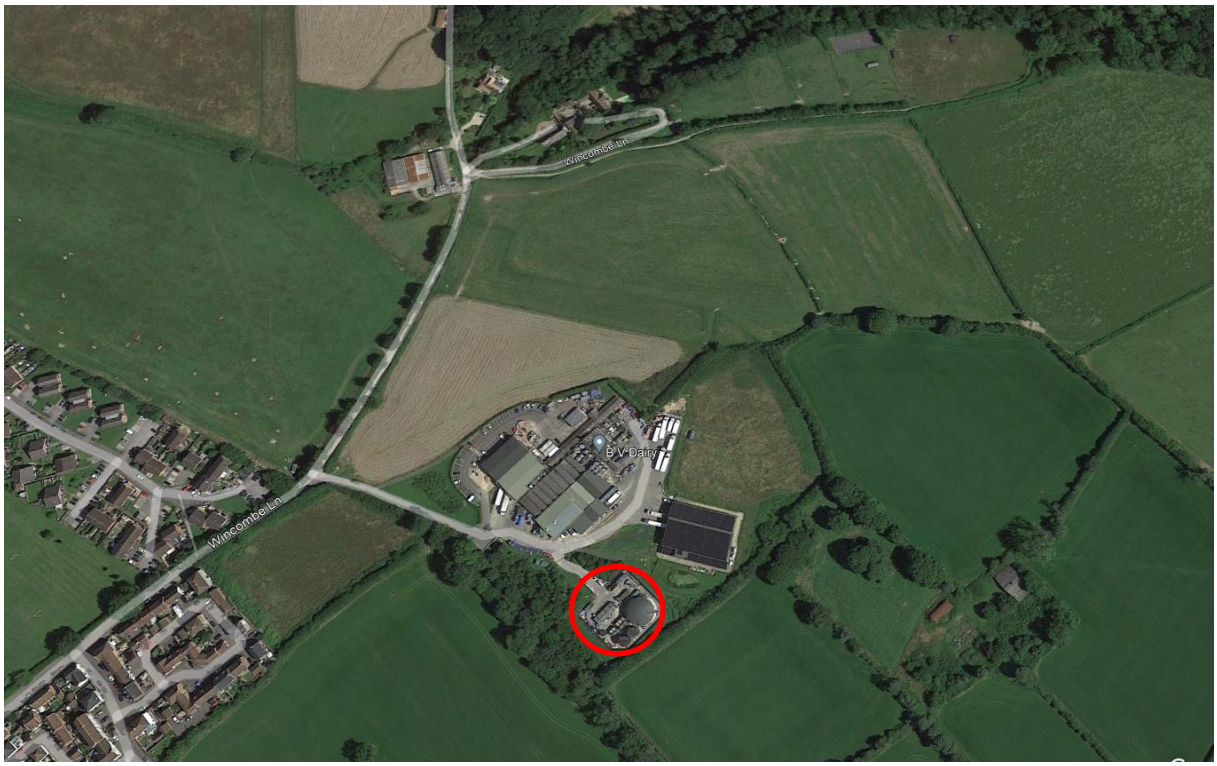


Figure 2 Aerial Image of the Site (Image reproduced from Google Earth)

A site plan (topographic survey undertaken 26 November 2010) is presented in Annex A as Drawing Ref: BVD 8111-M012 and photographs of the site are included in Annex B.

The infrastructure of the AD plant comprises:

Waste input	Trade and permeate (below ground) feed pipelines from factory feeding permeate & effluent reception tanks with pumps and pipelines to the mixer.
	Permeate tank comprises glass fused to steel construction (approx. capacity 160m^3) fixed onto a concrete base with GRP cladding and a sandwich of glass fibre insulation wadding for permeate storage until dosed into digester.
	Effluent (trade waste) tank comprises glass fused to steel construction (approx. capacity 160m^3) fixed onto a concrete base with GRP cladding and a sandwich of glass fibre insulation wadding for effluent storage until dosed into digester.
Digester	Steel reinforced cast in-situ poured concrete tank (approximate capacity 1200m^3) set into a concrete base.
	Domed gas tight roof for gas collection.
	External feed to digester via thickener feed pump
	External chopper pump for agitation and mixing
	Gas offtake pipeline to combined heat and power (CHP) unit.

Residue	Sludge tank comprising sectional bolted glass fused to steel construction (approx. capacity 25m^3) fixed onto a concrete base for storing liquid residue until processed through the sludge press (unused) and removed from site including high level input and low level outlet. Temporary additional sludge storage tank comprising single skinned reinforced steel tank (approx. capacity 25m^3) sited within secondary containment area including high level input and low level outlet/connection hose point for vacuum tankers.
CHP unit	Internal combustion engine with electrical generator. Emergency flare.

Inspections of the tanks were undertaken by an appropriately qualified specialist company as part of this study. The reports are included in Annex C.

3.2 Site Setting (Compliance with Permit Conditions)

The site inspection confirmed that the layout of the site matched the description. The geographical and environmental setting was also observed. The process infrastructure was inspected to assess compliance with the regulatory requirements (generally referred improvement conditions). The assessment of infrastructure is summarised in Section 4.1.

The site is compliant with general permit conditions concerning location, as summarised in Table 1.

Table 1 Compliance with Generic Permit Conditions

General permit condition	**Compliance status**
200 metres of the nearest receptor as measured from any combustion stack or stacks, unless the stacks are at least 7 metres high and the effective stack height of each stack is greater than 3 metres.	Compliant. No residential properties within 200m of the CHP stack. Only farm buildings are present within this radius.
250 metres of the nearest sensitive receptor where any processing or storage of digestate fibre is in the open.	Compliant. No sensitive receptors within this radius.
500 metres of a European site (within the meaning of Regulation 8 of the Conservation of Habitats and Species Regulations 2017) or a Site of Special Scientific Interest, including candidate or proposed sites or a marine conservation zone.	Compliant. Nearest SSSI is 2km distant.
a groundwater source protection zone 1 or 2, or if a source protection zone has not been defined then within 50 metres of any well, spring or borehole used	Compliant. Nearest GPZ is 2+km distant

Table 1 Compliance with Generic Permit Conditions	
General permit condition	**Compliance status**
for the supply of water for human consumption (including private water supplies)	
250 metres of the presence of great crested newts, where it is linked to the breeding ponds of the newts by good habitat.	Ponds are located around the site within 100m, however great crested newts are not understood to be confirmed at these locations.
10 metres of any watercourse.	Compliant. Nearest watercourse is 750m distant.
50 metres of a Local Nature Reserve, Local Wildlife Site, Ancient Woodland or Scheduled Monument.	Compliant. Nearest LNR 12+km No LWS identified nearby Nearest AW (semi-natural) 1.2km Nearest SM 2km
50 metres of a site that has species or habitats of principle importance (as listed in Section 41 of the Natural Environment and Rural Communities Act 2006) that the Environment Agency considers at risk to this activity.	Compliant. No listed habitats near the site.
a specified Air Quality Management Area.	Compliant. Not within such an area.

3.3 Operations

The AD plant was constructed by Clearfleau Ltd, commissioned in 2010 and produces 305 kWh of electricity and approximately 175 kWh of surplus heat. At the time the Plant was recognised for its innovation and was a showcase site to demonstrate innovative anaerobic digestion in the dairy sector and the wider food manufacturing industry. The energy and heat produced replaced a significant proportion of the energy required within the business.

The AD plant currently processes approximately 200 tonnes of feedstock per day, predominantly comprising onsite waste from the dairy facility (permeate), however they also accept suitable feed stock from off-site sources.

Inputs are pumped into a sealed digester tank. The material is heated, and the resulting bacterial activity produces biogas – about 60 per cent of which is methane. The biogas is used as the energy source for the CHP unit which includes a generator, rated at 499kW electrical output. The engine cooling system produces hot water, which is used to heat the digester. Electricity produced by the plant is used in the dairy processing facility, with surplus being sold to the grid. Digestate produced by the AD process is separated into liquid and solid fractions, which are tankered away from site as required.

3.4 Geology

According to the British Geological Survey online map, Figure 3, bedrock in the vicinity of the site is Boyne Hollow Chert Formation. This is described as: "Glauconitic sand and sandstone with regularly developed nodular and tabular beds of Chert. Interbedded Chert beds and nodules, up to 0.4m thick." The thickness of the Formation varies throughout Dorset and is believed to be between 0 and 15m. The underlying strata is the Shaftesbury Sandstone Member.

No superficial geology is recorded at the site.

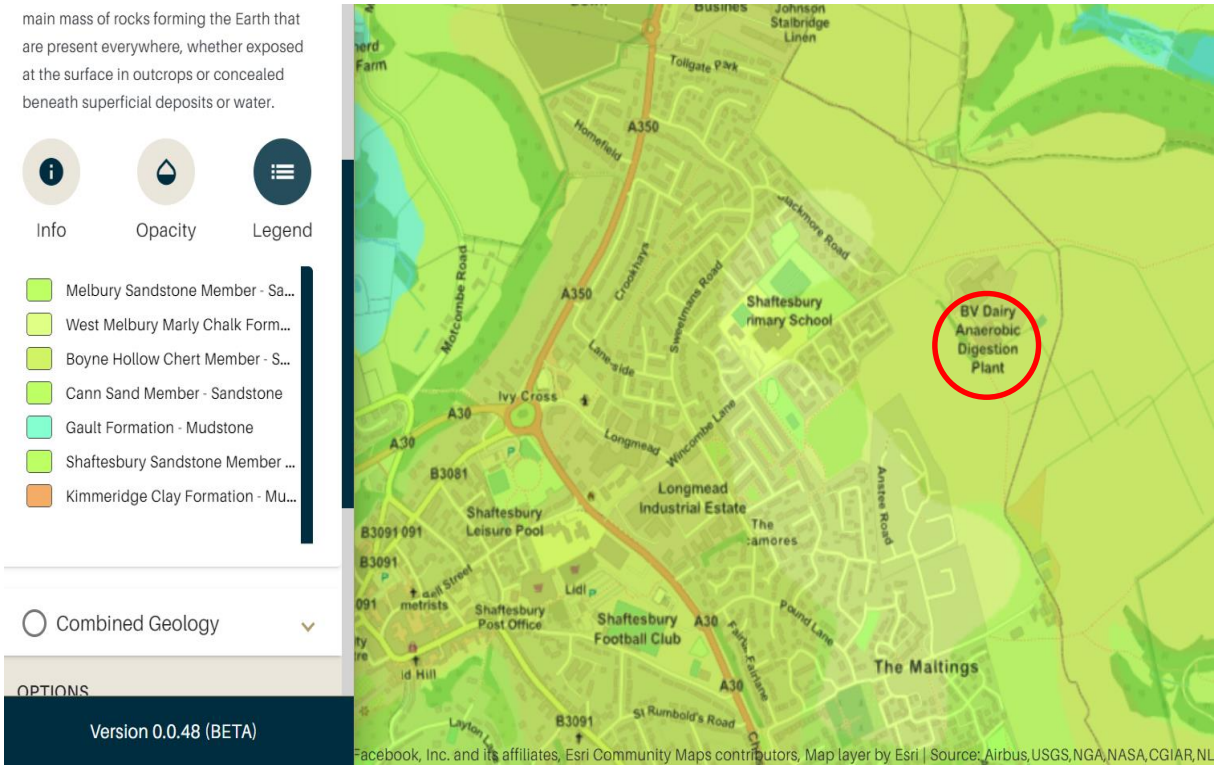


Figure 3 BGS Geological Map – Solid Geology

3.5 Hydrogeology

The bedrock beneath the site forms a moderately productive, Class 1B, aquifer. The aquifer is unconfined and the site is in a nitrate sensitive zone. The closest abstraction point is approximately 1.1km SSW of site.

The site is located within a Zone III Total Catchment Source Protection Zone.

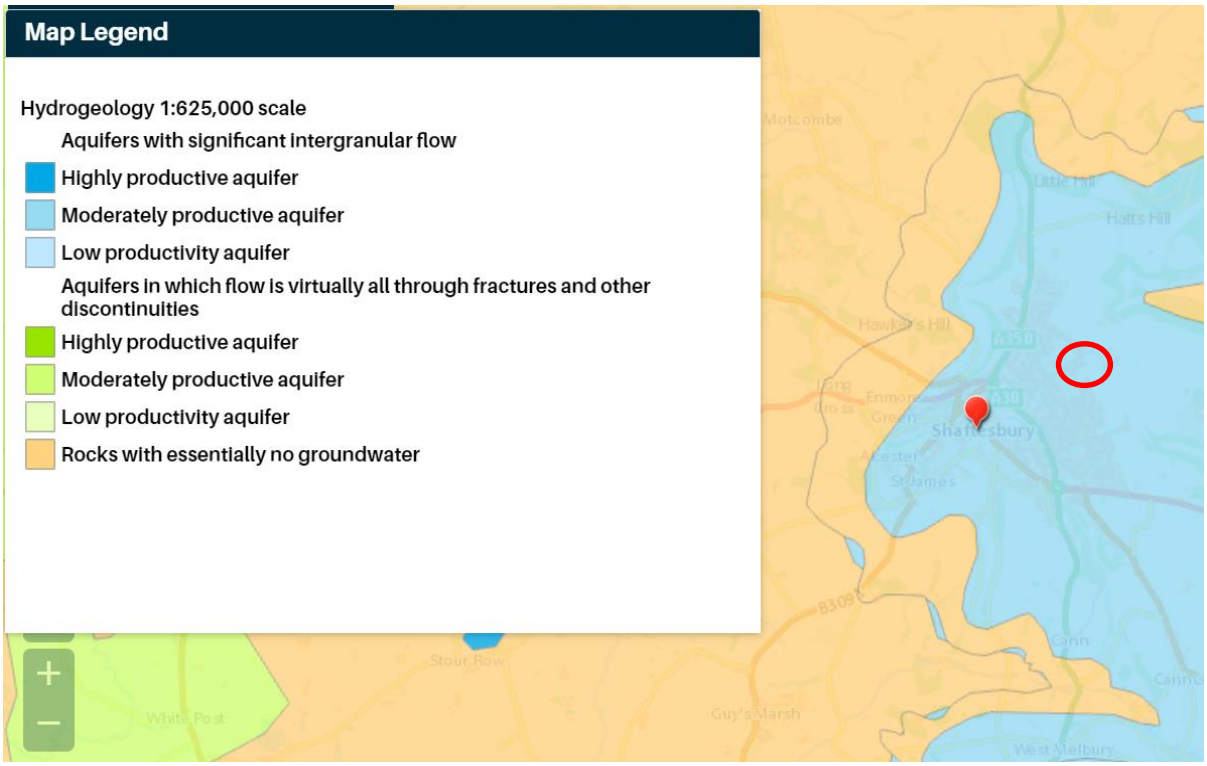


Figure 4 BGS Hydrogeology Map

3.6 Surface Water Features

The site is located within a localised depression approximately 3-4m below the immediate surrounding land. An unnamed pond is located within Wincombe Park, 700m North East of the site. This is believed to feed to the River Nadder.

3.7 Protected Environmental Receptors

There are no Sites of Special Scientific Interest (SSSI) within 2.5km of the site.

4. Site Inspection and Assessment

4.1 Assessment of Infrastructure

CQA's & WSG's assessments of the condition of the AD plant infrastructure, at the time of inspection in January 2023, is summarised in Table 2 and Table 3 respectively. The tank inspection reports are presented in full in Annex C.

4.2 Primary Containment

The primary containment systems on site comprise the tanks and pipes, all of which are assessed to be fit for purpose. The site layout and drainage plans are presented in Annex A, with design drawings for the tanks are presented for reference in the O&M manuals in Annex D. All tanks are above ground and there are no lagoons associated with the operation. The general tank configuration is presented in Figure 5 for ease in navigating the following sections and photographs detailing the infrastructure are presented in Annex B.

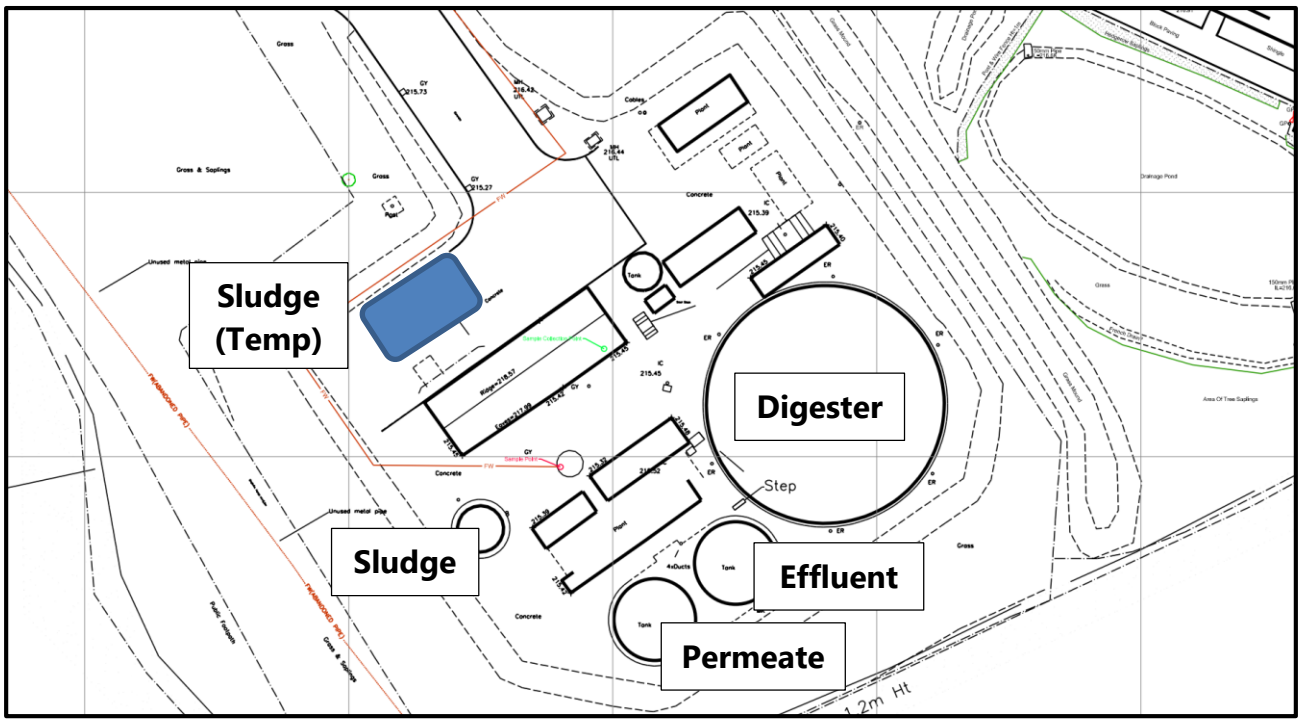


Figure 5 Tank Configuration

Table 2 Summary of Site Observations; Primary Containment	
Functional item	**Observations**
Digester tank	Steel reinforced poured concrete construction, set into reinforced concrete basal slab. Operational volume c1,200m^3. Understood to have a design life of 60 years Inspected by WSG on 23 January 2023. External face of concrete shell and joints found to be in good condition. The exterior of the domed roof is in good condition. Stated to be fit for operation, with three non-mandatory recommendations: 1 Internal inspection, which will require cleaning out. 2 Lightening conductor on the roof requires recalibration. 3 The catch-pot is free to move and requires its feet winding down to re-engage with the floor.
Permeate tank	Glass fused to steel construction Approx. capacity 160m^3. Understood to have a design life of 30 years Inspected by WSG on 23 January 2023. Tank should have been internally cleaned and inspected on a 5 yearly rolling program, however with this has not been carried out. The tank shell was externally lagged so a visual inspection was not possible, however the lagging is all tight and secure with no signs of water ingress. Stated to be fit for operation, with four non-mandatory recommendations: 1. Replace missing bolts to nozzle 2. Remove all product which is in contact with mastic or GRP roof 3. Address corrosion to roof. 4. Internal inspection, which will require cleaning out
Effluent tank	Glass fused to steel construction Approx. capacity 160m^3. Understood to have a design life of 30 years Inspected by WSG on 23 January 2023. Tank should have been internally cleaned and inspected on a 5 yearly rolling program, however with this has not been carried out. The tank shell was externally lagged so a visual inspection was not possible, however the lagging is all tight and secure with no signs of water ingress. Lagging to pipework is starting to deteriorate. Stated to be fit for operation, with three non-mandatory recommendations: 1. Replace missing bolts to roof nozzle 2. Replace areas of failed lagging. 3. Internal inspection, which will require cleaning out
Sludge tank	Glass fused to steel construction Approx. capacity 25m^3.

Table 2 Summary of Site Observations; Primary Containment	
Functional item	**Observations**
	Understood to have a design life of 30 years Inspected by WSG on 23 January 2023. Tank should have been internally cleaned and inspected on a 5 yearly rolling program, however with this has not been carried out. 50mm overflow pipework is showing signs of age hardening with fungal growth build up. Stated to be fit for operation, with two non-mandatory recommendations: 1. Replace age hardened plastic pipework. 2. Internal inspection, which will require cleaning out
Sludge tank (Temporary)	Observed by CQA on 10 January 2023. A temporary sludge storage tank was being used at the time of the inspection. It was observed to be of steel single skin construction. The skip/tank is understood to be emptied twice daily. The current arrangement is understood to be a temporary measure until replacement sludge tank installed. The tank was not inspected by WSG as it did not form part of the sites permanent infrastructure.
Pipework (underground)	CQA understand the underground pipework to be as follows: Permeate feed pipe from factory – orange HDPE 50mm dia. Trade waste from factory – stainless steel 50mm dia. Foul sewer connection – stainless steel 100mm dia Due to the pipework being buried, and where present above ground (adjacent effluent and permeate tanks) being lagged, an inspection to confirm condition was not possible.
Pipework (above ground)	WSG observed that all visible pipework and connections are tight and secure, with adequate support. CQA observed that pipes are mainly stainless steel or HDPE and, where visible, are in good condition. Pipe work is mostly clad so not observed in detail. No evidence of any leaks was observed.
Pumps and valves	CQA observed that the external pumps and valves were in good serviceable condition. No evidence of any leaks was observed.
Sludge press	The sludge press is understood to be currently bypassed and unused.
CHP unit	The CHP building is in good condition. The engine and generator were not inspected. The stack is partly insulated and extends 3 metres above the southern end of the building.

4.3 Secondary Containment Assessment

The secondary containment system on site comprises a basal concrete slab(s) and EPDM lined bund around the perimeter of the site. The AD Plant is situated at a lower elevation than the surrounding areas and is accessed via a ramp into the secondary containment from

the northern edge. The design drawings for the drainage and underground services are presented for reference in Annex A and photographs detailing the infrastructure are presented in Annex B.

Table 3 Summary of Site Observations; Secondary Containment

Functional item	**Observations**
Basal Concrete	The area between the two main tanks, waste input and separator unit is laid to a concrete slab. Concrete slabs generally in good condition. Some joints have mastic/sealant missing or damaged. Concrete appears to have been added to outside of main slabs to fill void between slabs and bund. These were observed to be cracking/lifting in areas. One crack near access ramp needs infilling/sealing.
Drainage system	Drains marked with red paint within the operational area – fall to a central sump. Two blue "clean water" drains identified near the base of the access ramp. The area was flooded indicating no flow via the drains, however they are within the containment area and therefore require isolation. Site mentioned having containment bungs which can be used if there is an incident on site, however these would be hard to install and also unsuitable if an incident occurred outside working hours.
EPDM liner/bunding	Damaged throughout site. Connection detail to basal slabs unconfirmed, however appears to be overlain with concrete only. Site topographical survey exercise advised to confirm containment volume prior to any remedial works being undertaken. EPDM material may be salvageable where intact, however viability of repair versus replacement should be determined when basal tie-in is confirmed and containment volume assessed. Perimeter bunds appeared stable with no slumping noted. Some large clasts behind liner causing tension and damage to EPDM. Where holes were present, these were used to investigate the containment system and it was confirmed that an underlying protective geotextile was present.
Utility Access/Manholes	Two raised manholes were observed near the base of the access ramp within the containment area for the site. They were rendered and c.1.5m above the surface of the basal concrete slab. Believed to be rendered as there may be a penetration through the basal slab directly below them to access utilities. An internal inspection was not possible.

A risk assessment has been carried out based on the findings of the assessments. This is described in the following sections.

4.4 Dynamic & Static Loading on Bunds

The secondary containment is constructed within the local topography, forming a depression with cut slopes.

The dynamic forces from digestate flowing from a catastrophic tank failure will be many orders of magnitude less than the resistive pressure available from the ground in which the secondary containment is constructed.

The strength of the earth bund walls will also be several orders of magnitude greater than required to withstand the likely range of static and dynamic forces from potential spill scenarios.

However, a catastrophic tank failure is not considered to be a realistic scenario on this site, due to the type of tanks, and that they are relatively new and unmodified. This scenario is more relevant to tank farms with flammable inventory, where thermal stresses may also be involved.

5. Risk Assessment & Classification

5.1 Overview

Two forms of risk assessment can be carried out on this, and similar sites:

A site risk rating to determine the overall classification.

Assessment of specific risks to assess the design and construction.

The methodology for the two approaches are described below, followed by the results of applying these approaches to the site.

5.2 Site Risk Rating Methodology

Assessing the risk rating and classification of the site was undertaken using the qualitative approach defined in Chapter 2 of the C736 guidance. This involves assigning "low", "medium" or "high" hazard scores for the sources, pathways and receptors, together with rules for combining the scores to produce a Site Hazard Rating. This is modified by the evaluated loss of containment to produce a Site Risk Rating. This rating is used to define the Site's containment classification, as shown in Table 4.

Table 4 Methodology for Deriving the Site Risk Rating

"Parameter"	Summary of reasons	Hazard Assessment (*tick as applicable*)		
		Low	Moderate	High
Source				
Pathway				
Receptor				
Site Hazard Rating	Low = LLL, MLL, MML, HLL Moderate = MMM, HML, HHL High = HHH, HHM, HMM			
Likelihood of Loss of Containment	Low = <0.001% Moderate = 0.001% - 1% High = >1%			
Site Risk Rating	Low = LL, ML, LM Moderate = MM, HL, LH High = HH, HM, MH			
Result	Site Risk Rating	Low	Moderate	High
(delete as applicable)	Containment Classification	Class 1	Class 2	Class 3

5.3 Site Risk Rating Result

The assessment of the sources, pathways and receptors, necessary to derive a site risk rating, are described below.

Sources	The sources of liquid contamination at the site are the tanks and pipelines that store and transfer the feedstock, process effluent and liquid digestate. The feedstock comprises a slurry of solid and liquid matter derived from trade effluent and permeate from the dairy process. All liquids are considered to be potentially harmful to the environment due to the high nutrient content and oxygen demand. In surface water, high concentrations could cause eutrophication, resulting in mortality of aquatic animals and plants. In surface water or ground water, the liquids in high concentration would render water unusable, due to organic and inorganic loading, and possibly pathogens.
Pathways	The main pathway from the site is overland flow to the small stream, some 700m to the north east of the site. This would be unlikely due to the plant being situated within a local depression lower than the surrounding land. The groundwater in the bedrock is a potential pathway. Flow is most likely towards the stream, and will restricted by low hydraulic gradients of the Chert.
Receptors	The main receptor for liquid contamination is the groundwater within the Melbury Sandstone Member which immediately underlies the Boyne Hollow Chert. The small stream and Wincombe pond, are also potential receptors. The groundwater is a Zone III Total Catchment Source Protection Zone even though there are currently no local abstractions. Whilst the liquid and solid digestate are generally permitted for application to land as fertiliser, this is a controlled process, with limits on the quantity and area which prevent significant infiltration and runoff. It is understood that the digestate is currently not PAS110 compliant. Larger, accidental releases of any of the liquids could have a serious impact on natural water and the ecosystems.

The potential for catastrophic loss of primary containment is assessed to be low because as the tanks are still relatively new (10 years into a design life of 60 years), are of a standard design, have not been modified, there is no or very limited vehicular access into the tank farm and the tanks have been subject to an external inspection.

These assessments are incorporated into the site risk assessment in Table 7.

Table 5 Site Risk Rating and Classification Result				
"Parameter"	Summary of reasons	Hazard Assessment (*tick as applicable*)		
		Low	Moderate	High
Source	Oxygen demand and nutrient levels		✓	
Pathway	Long distance to surface water. Clayey soils will greatly reduce infiltration, and microbiological degradation is likely in the unsaturated zone. Secondary containment will break pathway.	✓		
Receptor	Site is remote from any sources, aquifer is only moderately productive, Class 1B		✓	
Site Hazard Rating	Low = LLL, MLL, MML, HLL Moderate = MMM, HML, HHL High = HHH, HHM, HMM	✓ (MML)		
Likelihood of Loss of Containment	Low = <0.001% Moderate = 0.001% - 1% High = >1%	✓		
Site Risk Rating	Low = LL, ML, LM Moderate = MM, HL, LH High = HH, HM, MH	✓ (ML)		
Result	Site Risk Rating	Low		
(delete as applicable)	Containment Classification	Class 1		

Class 1 containment systems provide a base level of integrity, as defined in C736. For example, masonry walls can be used to provide secondary containment, whereas these would be unacceptable for Class 2 or Class 3. The sectional concrete wall maybe considered analogous to masonry. Subject to site assessment, lagoons may also be unlined, which suggests that unlined soil bunds are acceptable for Class 1 sites due to the reduced residence time.

5.4 Risk Assessment Methodology for Specific Scenarios

The site risk rating defines the level of containment that needs to be used on a site. A further risk assessment is helpful when assessing existing sites, to determine the suitability and performance of the measures that have been installed, and to identify any mitigation that may be required. A relatively common approach has been used, as follows:

Identify realistic, potential hazards to the environment.

Estimate the severity of each hazard.

Estimate the probability of each hazard occurring.

Combine the hazard and severity scores to produce a risk rating.

The risk rating can be used to determine if the containment system is suitable for the scenario in question, or if mitigation measures are necessary.

A semi-quantitative approach is used to assess the risk. Values are assigned to the severities and probabilities, using the scheme presented in Table 6. These values are then multiplied to produce a numerical assessment, or risk rating.

The rating system is applied to each identified hazard to determine the level of risk in each case, and whether any mitigation measures are required.

Table 6 Risk Assessment Scheme

Probability (P)	**Severity (S)**	**Risk Rating (R) = P x S**
0 Highly unlikely	0 No environmental impact	0 – 6 Low
1 Very unlikely	1 Minor impact, potentially not requiring clean-up	7 – 15 Medium
2 Unlikely	2 Minor impact, requiring simple clean-up	15+ High
3 Likely	3 Moderate impact, requiring local intervention	"R = Low" activities can be undertaken as planned.
4 Very likely	4 Major impact, requiring emergency intervention	"R = Medium" additional control measures required.
5 Almost certain	5 Severe impact, requiring emergency and longer-term, wider-area intervention	"R = High" activities should not be undertaken without design revisions.

5.5 Risk Assessment of the Current Situation

A table of the identified hazard scenarios and assessed risk ratings is shown in Table 7. Highly improbable hazards, which may be considered force majeure, were not included in the assessment.

Table 7 Risk Assessment of Current Situation

Hazard Scenario	**Receptor at risk**	**Severity, S**	**Probability, P**	**Risk, R**
Construction risks				

A. Failure of concrete tanks due to age, corrosion etc, resulting in major release	Site & local receptors (River Nadder, via groundwater and Melbury Sandstone aquifer)	4 Major, high oxygen demand but low toxicity and long distance to receptor.	1 Very Unlikely, concrete tanks in good condition and within design life. Catastrophic failure very unlikely	4 Low
B. Failure of smaller tanks due to age, corrosion etc, resulting in release	Site	3 Moderate, due to smaller quantity of inventory released	2 Unlikely, tanks in good condition and within design life..	6 Low
C. Failure of pipework, pumps and valves, due to age, corrosion etc, resulting in major release	Site & local receptors (River Nadder, via groundwater and Melbury Sandstone aquifer)	3 Moderate. High oxygen demand but low toxicity and long distance to receptor. Pipe outlets at mid-to high level in tank will reduce quantities.	2 Unlikely, items constructed using appropriate materials	6 Low
D. Spills of liquid feedstock from tank or pipelines	Site	3 Moderate, due to smaller quantity of slurry or digestate released	2 Unlikely, tanks in good condition and pipes constructed using appropriate materials	6 Low
Operational Risks				
E. Damage to digestate transfer system (pipes, pumps and valves), leading to release	Site & local receptors (River Nadder, via groundwater and Melbury Sandstone aquifer)	3 Moderate, due to low quantities that could be released. High oxygen demand but low toxicity, and long distance to receptor.	2 Unlikely, tanks and pipes in good condition and SCADA system would reduce losses	6 Low
F. Collision of vehicle with the digestate tank leading to release of liquid fraction digestate	Site & local receptors (River Nadder, via groundwater and Melbury Sandstone aquifer)	4 Major, high oxygen demand but low toxicity and a long distance to receptor.	1 Very Unlikely, concrete tank in good condition, other infrastructure prevents vehicles accessing area.	4 Low
G. Break of input / outlet pipe on digestate tank leading to release of liquid fraction digestate	Site & local receptors (River Nadder, via groundwater and Melbury Sandstone aquifer)	4 Major, high oxygen demand but low toxicity and a long distance to receptor.	1 Very Unlikely, Steel double flanged outlet and valve	4 Low

H. Collision of vehicle with the digester tank, leading to release of process slurry	Site & local receptors (River Nadder, via groundwater and Melbury Sandstone aquifer)	4 Major, due to oxygen demand of the slurry, but. Low toxicity. Long distance to receptor.	1 Very Unlikely, no vehicle access. Concrete tank in good condition.	4 Low
I. Overtopping of tanks during filling	Site	3 Moderate, high oxygen demand but low toxicity. Long distance to receptor. Small quantity.	2 Unlikely, due to SCADA controls	6 Low
J. Rainfall runoff becoming contaminated from contact with feedstock or solid residue and escaping from site	Site	2 Minor, due to small quantity of liquid, drainage measures	3 Likely, but only if spillages have remained uncleaned on site	6 Low
K. Loss of inventory following an incident due to failure of secondary containment	Site & local receptors (River Nadder, via groundwater and Melbury Sandstone aquifer)	3 Moderate, high oxygen demand but low toxicity. Long distance to receptor. Small quantity.	3 Likely as secondary containment lining system requires attention, however volumes likely to be low due to natural attenuation	9 Medium
L. Contamination of groundwater from surface water drainage	Site & local receptors (Melbury Sandstone aquifer and possibly River Nadder)	4 Major, due to oxygen demand of the slurry, but low toxicity. Long distance to receptor.	3 Likely as surface water understood to drain to soakaway, however this appears to have low permeability due to ponding on site	12 Medium
M. Overtopping of secondary containment	Site & local receptors (Melbury Sandstone aquifer and possibly River Nadder)	3 Moderate, high oxygen demand but low toxicity. Long distance to receptor. Small quantity.	3 Likely as secondary containment volume unconfirmed	9 Medium

Three of the assessed risks scored “medium”, indicating that mitigation is required. The risks identified and the potential effects are summarised below:

1. Risk of a release due to failures identified in the secondary containment - Volumes discharged are likely to be low due to natural attenuation within the earthworks forming the secondary containment.

2. Risk of a release due to surface water drainage form site being understood to report to a soakaway which requires manual isolation using a bung - Volumes discharged are likely to be low due based on the assumption that the surface water soakaway offers low permeability due to ponding water evident around the drainage points on site.

3. the risk of a release due to the secondary containment storage volume being unconfirmed - Volumes discharged are likely to be low due to the secondary containment present which appears to have an appropriate containment volume from outline calculations, however this requires confirmation.

6. Assessment and Recommendations

6.1 Compliance

The compliance of the containment system and a gap analysis is presented in Table 8.

Table 8 Containment Compliance Gap Analysis

	Item	**Requirement from C736**	**Equivalent Site Infrastructure**	**Additional requirement**
1	Primary containment - construction	Table 9.1 lists a range of possible types.	Steel reinforced poured concrete & GFS tanks bolted to concrete bases are satisfactory	N/A
2	Secondary containment - construction	Figure 8.4 Impermeable embankment (Class 1 only)	Concrete slab and impermeable lining system satisfactory **Criterion not satisfied**	Repairs to lining system & connection to basal slab
3	Secondary containment - volume	110% of largest tank volume	Secondary containment present, volume unconfirmed **Criterion not satisfied**	Topographic survey and volumetric calculation required
4		25% of total volume of inventory	N/A	N/A
5	Drainage	Isolated, pumped and sealed drainage system	**Criterion not satisfied**	Modifications to surface water drainage system
	Outstanding requirements	**See Section 6.3**		

The main protection is afforded by the primary containment system. The concrete and steel tanks have been assessed as fit for purpose and appropriate in their use.

The tanks are located within secondary containment, the construction of which is appropriate for the risk, however remedial works are required to bring this up to a satisfactory standard and the containment volume is unconfirmed.

A surface water drainage system is present on site which requires modification to meet satisfactory standards.

The site has a recently updated and comprehensive management system in place. The aim of the management system is to summarise procedures and work instructions which are used and maintained on site and ensure the requirements of the permit are met.

The risk of fire on this site is understood to be low and an estimated fire-fighting water volume has not been ascertained.

6.2 Expected Performance

The design, general construction and materials used for the secondary containment system was found to be compliant with the requirements of industry best practice (C736), however CQAI identified some issues that required attention/remediation. Additionally, WSG have recommended that improvements be made to the primary containment systems on site. These are presented as required and recommended improvements. Requirements should be carried out in order to demonstrate compliance.

6.3 Required Improvements

As a result of CQAI's inspection of the site, a number of additional mitigation measures are required to reduce specific risks on the site. These will address the risks which are rated as medium.

1) Containment volume to be confirmed following topographic survey
2) Impermeable lining system to earth embankment to be appropriately repaired or replaced
3) Tie-in to basal concrete slab to be confirmed, or replaced
4) Surface water drainage system to be sealed

It is recommended that the topographic survey is undertaken prior to any remedial works to the lining system commencing as this will inform if any remedial works are required to increase the containment volume.

Due to the age and risk of repeated failure, it is recommended that the EPDM lining system is replaced in entirety. However, this is not essential. This decision may be determined following confirmation of the tie in of the lining system to the basal concrete slab. If no mechanical connection (i.e. baton strip) is present, then the lining system will require extension to form a compliant connection.

The surface water drainage system will require isolation. Any solution should require a manual override system to open the drainage system or operate a pump and should be set to a default sealed position.

Required improvement works should be undertaken within a reasonable timeframe, deemed to be 12 months from the date of this report and completed in accordance with an

appropriate design and specification in place. Works should be subjected to the Construction Quality Assurance (CQA) process to confirm compliance with requirements. Evidence of remedial works should be included in a validation report and presented to the EA as proof of compliance.

6.4 Recommended Improvements

Following CQAI's and WSG's inspections of the site, a number of additional recommended mitigation measures have been identified which aim to reduce specific risks on the site.

Primary Containment

It is recommended that all tanks are fully inspected internally at the next available opportunity when taken out of commission and cleaned out. This will ensure long term performance and facilitate any repairs which could lead to future increased risks. This will assist in demonstrating continued low risk of primary containment failure. In addition, the following recommendations were made following the tank inspection:

1 Digester Tank

a) Lightening conductor on the roof requires recalibration.
b) The catch-pot is free to move and requires its feet winding down to re-engage with the floor.

2 Permeate Tank

a) Replace missing bolts to nozzle
b) Remove all product which is in contact with mastic or GRP roof
c) Address corrosion to roof.

3 Effluent Tank

a) Replace missing bolts to roof nozzle
b) Replace areas of failed lagging.

4 Sludge Tank

a) Replace age hardened plastic pipework.

Secondary Containment

It is recommended that all secondary containment is inspected on a frequent basis and this be included in the sites operational inspection and maintenance regime. The following areas have been identified from the inspection and assessment undertaken by CQAI, and any remedial works undertaken should be recorded and appropriately filed on site.

Due to the age of the site, joint seals on the basal containment slab should be inspected and replaced with a suitable mastic sealant where deemed necessary. The same should be applied to any minor cracks identified. Any major cracks identified should be investigated to determine the reason.

Raised manholes are present on site which are understood to be inspection points for feed pipework. This was unconfirmed as the covers were sealed, however the elevation should be confirmed to be above the design height for the secondary containment and that they are appropriately sealed externally.

A temporary sludge tank is located within the secondary containment. While this does not greatly increase risk due to its location, a more permanent solution may be beneficial. Emptying of the tank without needing to fully enter the secondary containment area would also reduce the risk of damage to the lining system or infrastructure. This could be undertaken near the top of the sloped entrance to the secondary containment to reduce risk of damage while still providing containment for any spills occurring during filling.

6.5 Inspection and Maintenance Regime

The inspection regime should comprise daily inspection of the entire site, which is recorded as part of the HAZOP procedures.

The inspection should include the assessment of elements such as tanks, pipework, drains, sumps and containment systems.

The daily inspection report should be signed off by one of the operations team.

Tanks should be subject to 5-yearly inspections by a specialist company.

Emptying of the drainage system should be manual and operation of it recorded.

CQAI suggests that the above items be included, if not already in the sites inspection and maintenance regime. Additional operational requirements should be included and the requirements be appropriate for the site. CQAI suggests that this regime would usefully be incorporated into the standard operating procedures for the site.

6.6 Effect of Mitigation Measures on Risk Rating

The effect of these modifications will be to reduce the risk of the current situation as identified above and in section 5.5.

In particular, the three scenarios with "Medium" risk rating would be reduced to "Low" as a result of the probability score being reduced. The overall risk rating of the site will be low.

Table 9 Risk Assessment Following Required Mitigation Measures

Hazard Scenario	**Receptor at risk**	**Severity, S**	**Probability, P**	**Risk, R**
K1. Loss of inventory following an incident due to failure of secondary containment	Site	3 Moderate, high oxygen demand but low toxicity. Long distance to receptor. Small quantity.	1 Very Unlikely, Containment system appropriate to Class and correctly constructed	3 Low
L1. Contamination of groundwater from surface water drainage	Site	4 Major, due to oxygen demand of the slurry, but. Low toxicity. Long distance to receptor.	1 Very Unlikely, Drainage system sealed	4 Low
M1. Overtopping of secondary containment	Site	3 Moderate, high oxygen demand but low toxicity. Long distance to receptor. Small quantity.	1 Very Unlikely, 110% containment confirmed	3 Low

7. References

"CIRIA C736: Containment systems for the prevention of pollution, Secondary, tertiary and other measures for industrial and commercial premises, 2014"

Biological waste treatment: appropriate measures for permitted facilities
https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities

Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC

The Environment Agency's approach to groundwater protection. February 2018 Version 1.2

UK Gov guidance no climate change allowances

https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

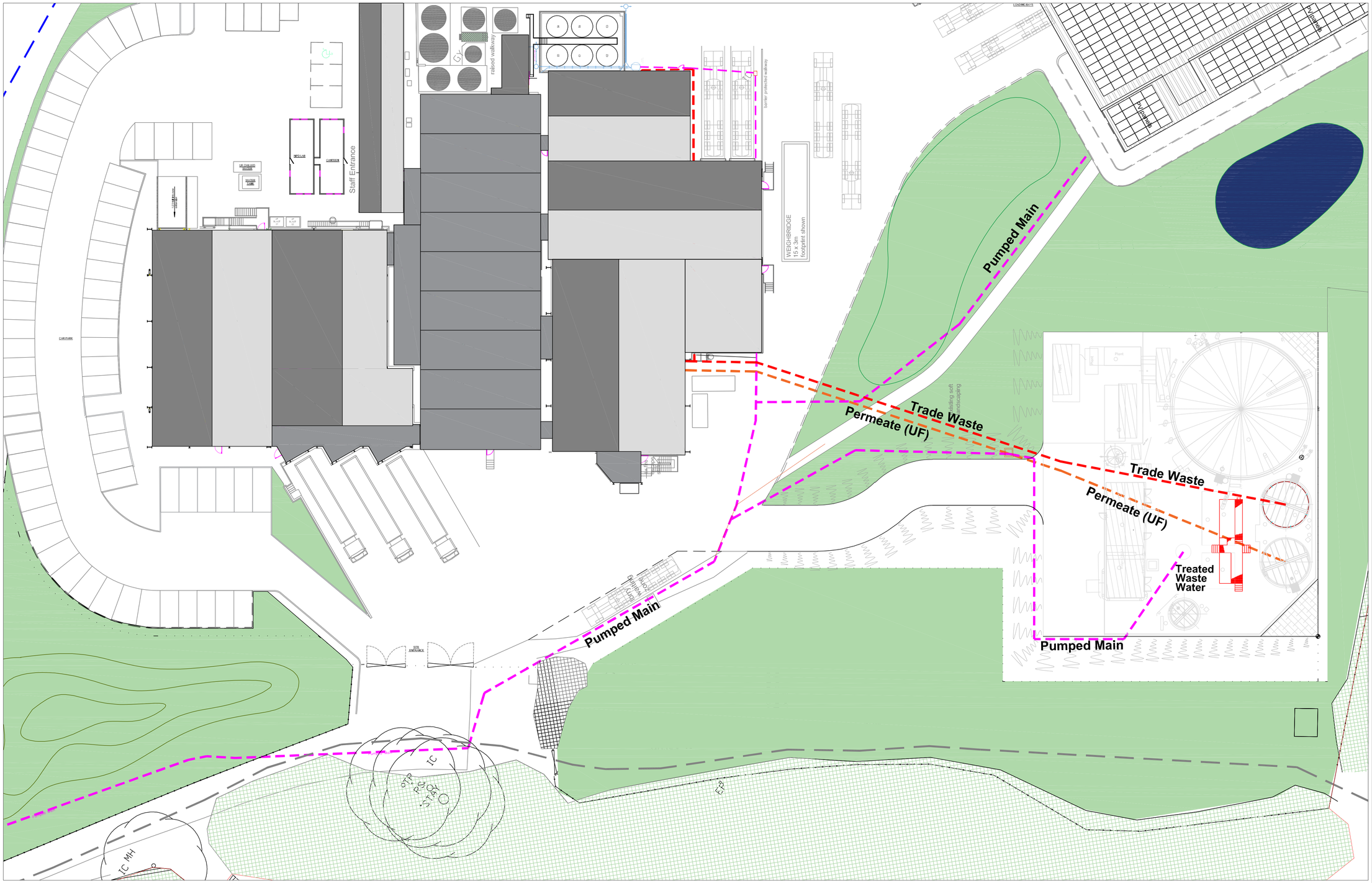
British Geological Society – Geology of Britain Viewer
https://mapapps.bgs.ac.uk/geologyofbritain/home.html

Natural England MAGIC website
https://magic.defra.gov.uk/

Ordnance Survey Maps
https://osmaps.ordnancesurvey.co.uk/

Historic imagery: Google Earth

Annex A Site Drawings



PLAN VIEW OF AREA: SCALE @ 1:250

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS & SPECIALISTS LATEST DRAWINGS, TOGETHER WITH THEIR SPECIFICATIONS.
2. IF IN DOUBT ON ANY ITEM OF BUILDING STRUCTURE, CONSULT THE STRUCTURAL ENGINEER. NO RESPONSIBILITY WILL BE ACCEPTED ON STRUCTURAL WORKS
3. DO NOT SCALE OFF THIS DRAWING. FIGURED DIMENSIONED ONLY TO BE USED WITH SETTING OUT DIMENSIONS TAKEN FROM ARCHITECTS DRAWINGS AND/OR SITE.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH RELEVANT SPECIFICATION CLAUSES.
5. CONTRACTOR TO ENSURE ALL WORKS ARE INSPECTED AND APPROVED BY THE BUILDING INSPECTOR BEFORE COVERING UP.
6. DRAWING IS FOR GENERAL LAYOUT PURPOSES ONLY. POSITIONS ARE SHOWN INDICATIVELY NOT ACCURATELY. CONTRACTORS UNDERTAKING WORKS MUST ENSURE THEY CHECK POSITIONS & DESIGN TO MEET MANUFACTURES, ENGINEERS & BUILDING CONTROL SPECIFICATIONS.

KEY:

PUMPED MAIN (TRADE EFFLUENT) ROUTES EXTERNALLY GO UNDER CULTURE & PACK STORE)

PERMEATE
2" PERMEATE - FROM UF AREA (THROUGH ROOF VOIDS)

TRADE WASTE
UNTREATED WASTE FROM FACTORY.

NOTE: This drawing shows an indicative position of the Pumped Main & Permeate Underground plpework taken from Brunel Surveys drawing. For full survey details on positions & depths please refer to Brunel Surveys drawings.

Rev	Date	Description	Drawn By	Chk'd By

STATUS: INFORMATION ■ APPROVAL □ TENDER □ CONSTRUCTION □

2 LAUREL HOUSE
1 STATION ROAD
WORLE, WESTON-SUPER-MARE
NORTH SOMERSET, BS22 6AR
T: 07523187399 @: admin@orustprojectsltd.co.uk

ORUST PROJECTS LTD

CLIENT: BLACKMORE VALE FARM CREAM LTD

PROJECT:
SITE LAYOUT
WINCOMBE LANE
SHAFTESBURY, DORSET, SP7 8QD

DATE DRAWN:	DRAWN BY:	CHECKED BY:
28/06/2022	CKS	–

JOB NUMBER:	DRAWING NUMBER:	DOC Rev:
20216	201	–

DRAWING NAME: EXTERNAL SITE DRAINGE
SCALE: 1:100 A1

A 1

Sample/Flow Key

Sample Point-⊸
Sample Collection Point-⊸
Flow Meter-⊸
Flow Meter Display-⊸

Station Coordinates

Stn	Easting	Northing	Level	Desc
L1	387520.325	123695.814	219.286	Nail
L2	387486.605	123666.391	219.099	Nail
L3	387499.895	123625.131	217.703	Nail
L4	387548.127	123607.898	217.743	Nail
L5	387592.444	123596.114	216.542	Nail
L6	387636.832	123578.976	216.746	Nail
L7	387654.144	123615.192	218.225	Nail
L8	387604.626	123636.200	218.410	Nail
L9	387580.508	123650.539	218.482	Nail
L10	387595.865	123670.217	218.963	Nail
L11	387593.297	123681.377	218.887	Nail
L12	387608.167	123682.072	219.043	Nail
T1	387564.042	123671.471	220.822	Target

N

Grid and Levels to National Grid
Projection OSTN15 and OSGM15
Scale factor = 1

Underground Utilities Legend

- STORM WATER SEWER (SWS)
- FOUL WATER SEWER (FWS)
- COMBINED SEWER (CWS)
- ELECTRIC CABLE
- HV — HIGH VOLTAGE CABLE
- LV — LOW VOLTAGE CABLE
- BT — TELECOMS CABLE
- CATV — CABLE TELEVISION
- TLS — TRAFFIC LIGHT SIGNAL CABLE
- WATER — UNDERGROUND WATER SUPPLY
- GAS — GAS
- GAS (MP) — GAS MEDIUM PRESSURE
- GAS (IP) — GAS INTERMEDIATE PRESSURE
- GAS (HP) — GAS HIGH PRESSURE
- OIL — OIL PIPE
- MSR — MULTIPLE SERVICE ROUTE
- MSD — MULTIPLE SERVICE DUCT
- UNK — M — UNKNOWN SERVICE METALLIC
- UNK — GPR — UNKNOWN SERVICE FOUND WITH GPR
- UNK — CABLE — UNKNOWN SERVICE CABLE
- ED — EMPTY DUCT

BT 0.6 B2 — Type Depth Quality

SURVEY STATION · GATE · BANK · FOLIAGE · CLIFF

50m — MAJOR CONTOUR
MINOR CONTOUR (0.25m interval)

UNDERGROUND UTILITY SURVEY NOTES:
This survey has been carried out to the standard, as described by The Survey Association (TSA), for a Level 4 Survey, (PAS128 Type B) Utilities on this drawing have been detected using non invasive technologies. The performance of these technologies can be adversely affected by ground conditions which are out of the control of Brunel Surveys . Consequently some utilities may be undetectable and therefore, whilst Brunel Surveys uses best endeavours to detect all utilities we cannot guarantee that 100% detection can always be achieved.
Irrespective of the information provided by a utility survey and statutory plans, any groundworks should be undertaken with extreme caution and in accordance with health and safety executive guidelines HSG 47 AVOIDING DANGER FROM UNDERGROUND SERVICES

Legend

AV	Air Valve	MK	Marker Post
BH	Bore Hole	MK-BT	Marker Post (Telecoms)
BN	Litter Bin	MK-FH	Marker Post (Fire Hydrant)
BL	Bollard	MK-GV	Marker Post (Gas Valve)
BS	Bus Stop	MK-SV	Marker Post (Stop Valve)
BT	Telecom Cover	MK-WM	Marker Post (Water Meter)
BT CAB	Telecom Cabinet	OHC	Overhead Cable
CATV	Cable TV Cover	PB	Post Box
CL	Cover Level	RE	Rodding Eye
DP	Down Pipe	RS	Road Sign
EB	Electricity Box	SC	Stop Cock (Water)
ECAB	Electrical Cabinet	SL	Sottle Level
EIC	Electrical Inspection Cover	SNP	Street Name Plate
EOT	End of Trace	SP	Sign Post
EP	Electricity Pole	SV	Stop Valve (Water)
ER	Earth Rod	THL	Threshold Level
FFL	Finished Floor Level	TL	Traffic Light
FH	Fire Hydrant	TL CAB	Traffic Light Cabinet
FP	Fence Post	TP	Telegraph Pole
GP	Gate Post	TS	Traffic Sign
GPR	Ground Penetrating Radar	TVIC	Cable TV Inspection Cover
GV	Gas Valve	UTL	Unable to Lift
GY	Gulley	UTS	Unable to Survey
Ht	Height	UTT	Unable to Trace

SCALE
0m 12.5m 25m 50m

Brunel Surveys Ltd
UNIT 59, SHRIVENHAM HUNDRED BUSINESS PARK
WATCHFIELD, SWINDON, WILTSHIRE, SN6 8TY
TEL : (01793) 784700
WEB : www.brunelsurveys.com
Email:admin@brunelsurveys.com
Land and Measured Building Surveyors
Photomontage, 3D Visualisations and
Underground Utility Surveyors

CLIENT

BV Dairy
Wincombe Lane
Shaftesbury
Dorset
SP7 8QD

JOB TITLE

Topographical Survey
BV Dairy
Wincombe Lane
Shaftesbury
Dorset
SP7 8QD

REVISIONS

SITE LEVEL

Note: Some information has been gathered from records, whilst others have been surveyed. These have been identified in the drawing appropiately.

SCALE	
A1 Sheet @ 1 to 500	
Feb 2020	SURVEYED BY: LB
DRAWN BY: LB/JM	CHECKED BY: MR

DRAWING No.
21314-500-01-REV D (SITE LEVEL)

Annex B Site Photographs

CQA Engineer's Photographic Record

1. View of site looking south at top of access ramp.

2. Overview of digester and storage tanks.

3. Slurry storage tank

4. General condition of concrete very good,

5. Concrete in good condition

6. Concrete joints require sealant.

7. Some cracking and lifting of concrete around connection perimeter bund

8. Cracking and lifting of concrete around connection perimeter bund

9. Crack in concrete pavement that requires remediation.

10. Rendered raised manholes near base of access ramp.

11. Marked dirty water collection drains within the operational area.

12. Dirty water collection sump.

13. Secondary containment bund; South bund looking west

14. Secondary containment bund; South bund looking east

15. Secondary containment bund; South west corner bund looking west

16. Secondary containment bund; North bund looking east

17. Example of damage to EPDM lining system.

18. Previous repairs undertaken on EPDM liner

19. Storage of chemicals within locked containers and on bunded bases.

20. Storage of chemicals on bunded bases.

21. Photograph of temporary slurry skip. Note postion near to clean water drain.

22. Clean water drain at base of access ramp. Note: Drain is within the proposed containment area.

23. Photograph of engine/flare.

Annex C Tank Survey

Site: Wincombe lane,
Shaftesbury,
SP7 8QD.

Visual Tank Inspection Report

Digester Tank

Client Contact: Paula Boult

Date of Test: 23rd January 2023

Report Number: 23-004

API 653 Inspector: Ian Hooley

Contents

Summary

The Digestor tank should have been internally cleaned and inspected, this could prevent leakage and reduce the risk of repair. This action has not been carried out and it is now advisable for the integrity of the tank that this program is implemented in the soonest possible timeframe.

The catch-pot is free to move and requires its feet winding down to re-engage with the floor.

Lightening conductors to the tank roof require recalibration.

Results Summary

Base			
	Pass	Fail	Not Applicable
Visual	☐	☐	☒
Vacuum Box	☐	☐	☒
Hydrostatic Testing	☐	☐	☒
Shell Results			
Visual	☒	☐	☐
Hydrostatic Testing	☐	☐	☒
Roof			
Visual	☒	☐	☐
Nozzles			
Visual	☐	☐	☒
Hydrostatic Testing	☐	☐	☒
Foundation			
Settlement	☒	☐	☐
Planer Tilt	☒	☐	☐
Accessories			
Access Structures	☒	☐	☐
Mixers/Agitators	☒	☐	☐
Safety Critical			
Venting Capabilities	☐	☐	☒
Alarms	☒	☐	☐
Pipework			
Tank Piping	☒	☐	☐
Fire Deluge	☐	☐	☒

Actions & Conclusions

Mandatory actions

No Mandatory Actions.

Recommendations

Feature	Action	Time Frame	Page Reference
Catch pot			
Loose/movement	Re-Engauge the legs to be fully in contact with the ground.	3 months	12
Lightening Conductor			
Calibration	Re-calibrate the lightening conductors	ASAP	13
Internal Surfaces			
Internal Inspection	Clean out and inspect internal surfaces.	ASAP	2

Report Conclusion

Based on the inspection results, the tank is fit for operation.

Next Recommended Scheduled Inspections taken from Table B-1 Inspection frequencies: -

- Group 9
- Unknown corrosion rates
- Climate Code B

External Inspection (Visual) **January 2024**
Internal Inspection (Detailed) **ASAP**

WSG Inspection Tank Assessor

Name: Ian Hooley Signature: 

Client Storage Tank Engineer

Name: Signature:

Date: 30 January 2023

Introduction

WSG Eagle Eye Ltd conducted an in-service Visual inspection to the Digestor Tank.

Scope:

The inspection Methods: -

- A Close Visual inspection for surface defects.

Areas Inspected (where accessible): -

- Delamination due to corrosion of the reinforcing.
- Visual signs of joints leaking.
- General condition of permanent fixtures eg ladders & platforms.
- The condition of the Joints.
- Impact damage to shell.
- Any movement or displacement of the shell
- Any rips or tears to Biodome roof.
- Freeze-Thaw damage.
- Cracks and fissures.

The inspection assumes that the tank has been designed and constructed in accordance with - Specifications for design and construction of Concrete sectional tanks.
The inspection report should be referenced alongside the Fabrication Monitoring and Installation reports produced when the tank was first constructed.
The inspection is based around BS 8110 & BS 8007
The purpose of the report is to ensure that the tank is suitable for the intended use, is maintained in an efficient state, efficient working order and in good repair for continued safe use.

Tank Details

Tank Details

General	
Tank Identification	Digester Tank
Tank Type	Concrete.
Design Standard	BS 8110 & BS 8007
Manufacturer	Kirk Environmental Ltd
Drawing Number	K31703-200
Year of Build	2010
Tank Diameter	17.5m.
Tank Height	5.5m. Above ground concrete shell
Tank Volume (m^3)	Unknown
Construction Material Grade	Unknown
Design Pressure (mBar)	Unknown
Design Vacuum (mBar)	Unknown
Design Gravity	1.05
Design Wind Speed	45m/s.
Max Pump-In Rate	Unknown
Max Pump-out Rate	Unknown
Tank Shell	
Maximum Fill Height	5.6m
Insulation External	No
Lining Internal	Yes
Number of Nozzles	12
Tank Base	
Design Type	Concrete Base
Number of Sumps/Nozzles	None
Tank Roof	
Roof Type	Biodome
Number of Nozzles	5
Tank Appendage & Area Details	
Foundation Type	Type D/E Concrete Raft/Raft Piled.
Bund Type	Earthen bund wall
Roof Vent PRV Details	150mm NB free vent
Roof Access Details	Access ladder

In-Service Visual Inspection

Tank Shell Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
External Condition	The external concrete shell is in good condition with no cracking, spalling or displacement observed.	√		
Internal Condition	Not Applicable			
External Joints	The concrete joints are in serviceable condition with no evidence of delamination due to the corrosion of reinforcing or freeze thaw damage.	√		
External Nozzles	Not Visible			
Internal Nozzles & Pipework Connections	Not Applicable			
Patched areas	Not Applicable			
Ripples/Buckles/Deformation	Not Visible	√		
Voids	Not Applicable			
Pipework & Pipework connections	The gas catchpot is not correctly secured and is free to move. (See photo 5)		√	
Lagging to pipework	Not Applicable			

Tank Roof Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
External Condition	The external Bio dome roof is in good condition with no tears or rips noted.	√		
Internal Condition	Not Applicable			
External Joints	Not Applicable			
Internal Joints	Not Applicable			
External Nozzles & Pipework Connections	The blower ducting attachment points visually look to be in good condition	√		
Internal Nozzles & Pipework Connections	Not Applicable			
Patched areas	Not Applicable	√		
Ripples/Tears	Not Applicable	√		
Voids	Not Applicable			
Pipework Hazardous to Shell Condition	None. All Ducting is secured.	√		
Lightening conductor	The calibration certification has expired.		√	

Foundation Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
Foundation Type	Type D/E Concrete Raft/Raft Piled.	√		
Shoulder	N/A.			
Cracking/Spalling of Concrete	None.	√		
Cavities Under Foundation	N/A			
Drainage issues	No standing water was noted to the bund floor.	√		
Tell Tail Drains	N/A			
Bit-Sand condition/Settlement	N/A			
Visible Settlement	None.	√		
Foliage/Growth	None.	√		
Evidence of Leakage	None.	√		
Anchor Points	The tank is concreted into the floor and has no anchor bolts fitted.			
Other				

Tank Accessories Inspection

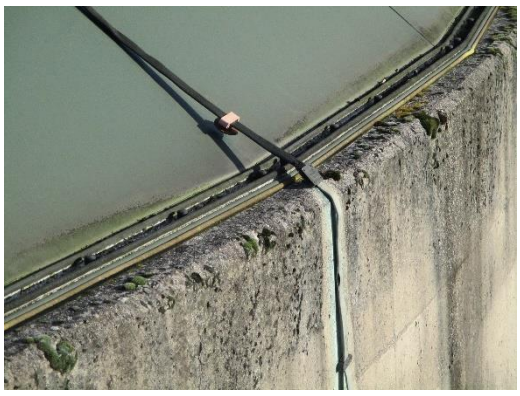
Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
Access Stairs	Not installed			
Access Ladder	Access ladders in good condition.	√		
Access Platform	In good condition	√		
Blowers	In serviceable condition with no signs of leaks, vibration or noise	√		
Fire Deluge	Not installed			

Appendix A – Photographs

Photo 1	Photo 2
Shell	Concrete Outstand
General View	No cracking to Base
	

Photo 3	Photo 4
Concrete Shell	Roof
No cracking or spalling to concrete	General overview of blower pipework + roof
	

Photo 5	Photo 6
Venting /Overflow	Ligtening Conducter
Catch pot not secure.	General Overview
	

Appendix B – Qualifications

API INDIVIDUAL CERTIFICATION PROGRAMS

ANAB
ANSI National Accreditation Board
ACCREDITED
ISO/IEC 17024
PERSONNEL CERTIFICATION BODY

verifies that

Ian William Hooley

HAS MET THE ESTABLISHED AND PUBLISHED REQUIREMENTS FOR API CERTIFICATION AS AN

API 653 ABOVEGROUND STORAGE TANK INSPECTOR

IN ACCORDANCE WITH THE KNOWLEDGE DEFINED IN THE **API Standard 653**

CERTIFICATION NUMBER **56108**

ORIGINAL CERTIFICATION DATE	January 31, 2015
CURRENT CERTIFICATION DATE	January 31, 2021
EXPIRATION DATE	January 31, 2024

Manager, Individual Certification Programs

API | ICP

WSG
Eagle Eye Integrity Specialists

Visual Tank Inspection Report

Report Number: 23-004
Client: BV Dairy
Product Identification: Digester
Date: 25/01/2023
Revision: 01

Site: Wincombe lane,
Shaftesbury,
SP7 8QD.

Visual Tank Inspection Report

Permeate Tank

Client Contact: Paula Boult

Date of Test: 23rd January 2023

Report Number: 23-004

API 653 Inspector: Ian Hooley

Contents

Summary

Tank T1 should have been internally cleaned and inspected on a 5 yearly rolling program, however with this has not been carried out. It is now vital to the integrity of the tank that this program is implemented in the soonest possible timeframe.

The tank shell was externally lagged so a visual inspection was not possible, however the lagging is all tight and secure with no signs of water ingress.

A flange belonging to an 80mm roof nozzle has missing bolts that require installing.

The top curb angle directly above the access ladder has an area of corrosion which needs arresting. All surface corrosion should be removed from the area and a paint layer applying.

Results Summary

	Pass	Fail	Not Applicable
Base			
Visual	☐	☐	☒
Vacuum Box	☐	☐	☒
Hydrostatic Testing	☐	☐	☒
Shell Results			
Visual	☐	☐	☒
Hydrostatic Testing	☐	☐	☒
Roof			
Visual	☒	☐	☐
Nozzles			
Visual	☒	☐	☐
Hydrostatic Testing	☐	☐	☒
Foundation			
Settlement	☒	☐	☐
Planer Tilt	☒	☐	☐
Accessories			
Access Structures	☒	☐	☐
Mixers/Agitators	☒	☐	☐
Safety Critical			
Venting Capabilities	☒	☐	☐
Alarms	☒	☐	☐
Pipework			
Tank Piping	☒	☐	☐
Fire Deluge	☐	☐	☒

Actions & Conclusions

Mandatory actions

No Mandatory Actions.

Recommendations

Feature	Action	Time Frame	Page Reference
Roof Nozzles			
Missing bolts	Replace Missing bolts to nozzle.	6 months	13
Roof vent			
Product to roof	Remove all product which is in contact with mastic or GRP roof,	1 months	13
Top curb angle			
Corrosion	Remove surface corrosion and over paint affected area,	3 months	13
Internal Surfaces			
Internal Inspection	Clean out and inspect internal surfaces.	ASAP	2

Report Conclusion

Based on the inspection results, the tank is fit for operation.

Next Recommended Scheduled Inspections taken from Table B-1 Inspection frequencies: -

- Group 9
- Unknown corrosion rates
- Climate Code B

External Inspection (Visual) **January 2024**
Internal Inspection (Detailed) **ASAP**

WSG Inspection Tank Assessor

Name: Ian Hooley Signature:

Client Storage Tank Engineer

Name: Signature:

Date: 30 January 2023

Introduction

WSG Eagle Eye Ltd conducted an in-service Visual inspection to T1 Permeate Tank.

Scope:

The inspection Methods: -

- A Close Visual inspection for surface defects.

Areas Inspected (where accessible): -

- Change of surface condition.
- Visual signs of joints leaking.
- General condition of permanent fixtures eg ladders & platforms.
- The condition of the mastic fillets.
- Impact damage to shell.
- The condition of GFS coating to the face of the tank sheets
- Discolouration to the shell.
- White or coloured spots.
- Cracks and fissures.

The inspection assumes that the tank has been designed and constructed in accordance with - Specifications for design and construction of Bolted steel sectional tanks.
The inspection report should be referenced alongside the Fabrication Monitoring and Installation reports produced when the tank was first constructed.
The inspection is based around ISO 28765 & BS7543 :2003
The purpose of the report is to ensure that the tank is suitable for the intended use, is maintained in an efficient state, efficient working order and in good repair for continued safe use.

Tank Details

Tank Details

General	
Tank Identification	Permeate Tank T1
Tank Type	Steel Bolted Tank.
Design Standard	BS 7543:2003
Manufacturer	Permastore
Drawing Number	K31703-102-1110
Year of Build	2010
Tank Diameter	5.9m.
Tank Height	6.1m.
Tank Volume (m^3)	160
Construction Material Grade	Glass fused to steel
Design Pressure (mBar)	Unknown
Design Vacuum (mBar)	Unknown
Design Gravity	1.05
Design Wind Speed	45m/s.
Max Pump-In Rate	Unknown
Max Pump-out Rate	Unknown
Tank Shell	
Maximum Fill Height	5.6m
Insulation External	Yes
Lining Internal	Glass lined.
Number of Nozzles	5
Tank Base	
Design Type	Concrete Base
Number of Sumps/Nozzles	None
Tank Roof	
Roof Type	Flat (Grp)
Number of Nozzles	3
Tank Appendage & Area Details	
Foundation Type	Type D/E Concrete Raft/Raft Piled.
Bund Type	Earthen bund wall
Roof Vent PRV Details	150mm NB free vent
Roof Access Details	Access ladder

In-Service Visual Inspection

Tank Shell Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
External Condition	Steel jacketing visually in good condition	√		
Internal Condition	Not Applicable			
External Joints	Not Visible			
External Nozzles	Not Visible			
Internal Nozzles & Pipework Connections	Not Applicable			
Patched areas	Not Visible			
Ripples/Buckles/Deformation	Not Visible			
Voids	Not Visible			
Pipework & Pipework connections	All pipework and connections are tight and secure, with adequate support.	√		
Other	N/A			

Tank Roof Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
External Condition	The GRP roof is in good condition with no cracking or delamination noted.	√		
Internal Condition	Not Applicable			
External Joints	No joints. One piece Grp Roof	√		
Internal Joints	Not Applicable			
External Nozzles & Pipework Connections	Missing bolts noted to 80mm nozzle. (See photo 5) Vent pipework is out breathing product on to roof. (See photo 3)		√	
Internal Nozzles & Pipework Connections	Not Applicable			
Patched areas	Not Applicable	√		
Ripples/Buckles/Deformation	Not Applicable	√		
Voids	Not Applicable	√		
Pipework Hazardous to Shell Condition	None. All pipework is secured.	√		
Top curb angle	Area of corrosion noted directly above the access ladder (See photo 4)		√	

Foundation Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
Foundation Type	Type D/E Concrete Raft/Raft Piled.	√		
Shoulder	N/A.			
Cracking/Spalling of Concrete	None.	√		
Cavities Under Foundation	None.	√		
Drainage issues	No standing water was noted to the bund floor.	√		
Tell Tail Drains	N/A			
Bit-Sand condition/Settlement	N/A			
Visible Settlement	None.	√		
Foliage/Growth	None.	√		
Evidence of Leakage	None.	√		
Anchor Points	The tank is concreted into the floor and has no anchor bolts fitted.			
Other				

Tank Accessories Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
Access Stairs	Not installed			
Access Ladder	Access ladders in good condition.	√		
Access Platform	In good condition	√		
Mixers/Agitators	In serviceable with no signs of leaks, vibration or noise	√		
Fire Deluge	Not installed			

Appendix A – Photographs

Photo 1	Photo 2
Shell	External jacketing
General View	All lagging is secure with no water ingress
	
Photo 3	Photo 4
Roof	Top curb angle
Product venting onto roof, may be detrimental to mastic seals & GRP roof outer layer.	Corrosion evident to top curb angle.
	
Photo 5	Photo 6
Roof Nozzles	Access Ladder
No bolts fitted to nozzle,	General View
	

Appendix B – Qualifications

API INDIVIDUAL CERTIFICATION PROGRAMS

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ISO/IEC 17024
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verifies that

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API 653 ABOVEGROUND STORAGE TANK INSPECTOR

IN ACCORDANCE WITH THE KNOWLEDGE DEFINED IN THE **API Standard 653**

CERTIFICATION NUMBER **56108**

ORIGINAL CERTIFICATION DATE	January 31, 2015
CURRENT CERTIFICATION DATE	January 31, 2021
EXPIRATION DATE	January 31, 2024

Manager, Individual Certification Programs

API | ICP

Site: Wincombe lane,
Shaftesbury,
SP7 8QD.

Visual Tank Inspection Report

Effluent Tank

Client Contact: Paula Boult

Date of Test: 23rd January 2023

Report Number: 23-004

API 653 Inspector: Ian Hooley

Contents

Summary

Tank T2 should have been internally cleaned and inspected on a 5 yearly rolling program, however this has not been carried out. It is now vital to the integrity of the tank that this program is implemented in the soonest possible timeframe.

The tank shell was externally lagged so a visual inspection was not possible, however the lagging is all tight and secure with no signs of water ingress.

A flange belonging to an 80mm roof nozzle has missing bolts that require installing

Lagging to pipework is starting to deteriorate. This requires replacement.

.

Results Summary

	Pass	Fail	Not Applicable
Base			
Visual	☐	☐	☒
Vacuum Box	☐	☐	☒
Hydrostatic Testing	☐	☐	☒
Shell Results			
Visual	☐	☐	☒
Hydrostatic Testing	☐	☐	☒
Roof			
Visual	☐	☒	☐
Nozzles			
Visual	☒	☐	☐
Hydrostatic Testing	☐	☐	☒
Foundation			
Settlement	☒	☐	☐
Planer Tilt	☒	☐	☐
Accessories			
Access Structures	☒	☐	☐
Mixers/Agitators	☒	☐	☐
Safety Critical			
Venting Capabilities	☒	☐	☐
Alarms	☒	☐	☐
Pipework			
Tank Piping	☒	☐	☐
Fire Deluge	☐	☐	☒

Actions & Conclusions

Mandatory actions

No Mandatory Actions.

Recommendations

Feature	Action	Time Frame	Page Reference
Roof Nozzles			
Missing bolts	Replace missing bolts to roof nozzle	6 months	13
Lagging			
Failed lagging	Replace areas where lagging has failed	6 months	12
Internal Surfaces			
Internal Inspection	Clean out and inspect internal surfaces.	ASAP	2

Report Conclusion

Based on the inspection results, the tank is fit for operation.

Next Recommended Scheduled Inspections taken from Table B-1 Inspection frequencies: -

- Group 9
- Unknown corrosion rates
- Climate Code B

External Inspection (Visual) **January 2024**
Internal Inspection (Detailed) **ASAP**

WSG Inspection Tank Assessor

Name: Ian Hooley Signature:

Client Storage Tank Engineer

Name: Signature:

Date: 30 January 2023

Introduction

WSG Eagle Eye Ltd conducted an in-service Visual inspection to T2 Effluent Tank.

Scope:

The inspection Methods: -

- A Close Visual inspection for surface defects.

Areas Inspected (where accessible): -

- Change of surface condition.
- Visual signs of joints leaking.
- General condition of permanent fixtures eg ladders & platforms.
- The condition of the mastic fillets.
- Impact damage to shell.
- The condition of GFS coating to the face of the tank sheets
- Discolouration to the shell.
- White or coloured spots.
- Cracks and fissures.

The inspection assumes that the tank has been designed and constructed in accordance with - Specifications for design and construction of Bolted steel sectional tanks.
The inspection report should be referenced alongside the Fabrication Monitoring and Installation reports produced when the tank was first constructed.
The inspection is based around ISO 28765 & BS7543 :2003
The purpose of the report is to ensure that the tank is suitable for the intended use, is maintained in an efficient state, efficient working order and in good repair for continued safe use.

Tank Details

Tank Details

General	
Tank Identification	Effluent Tank T2
Tank Type	Steel Bolted Tank.
Design Standard	BS 7543:2003
Manufacturer	Permastore
Drawing Number	K31703-101-2205
Year of Build	2010
Tank Diameter	5.9m.
Tank Height	6.1m.
Tank Volume (m^3)	160
Construction Material Grade	Glass fused to steel
Design Pressure (mBar)	Unknown
Design Vacuum (mBar)	Unknown
Design Gravity	1.05
Design Wind Speed	45m/s.
Max Pump-In Rate	Unknown
Max Pump-out Rate	Unknown
Tank Shell	
Maximum Fill Height	5.6m
Insulation External	Yes
Lining Internal	Glass lined.
Number of Nozzles	5
Tank Base	
Design Type	Concrete Base
Number of Sumps/Nozzles	None
Tank Roof	
Roof Type	Flat (Grp)
Number of Nozzles	3
Tank Appendage & Area Details	
Foundation Type	Type D/E Concrete Raft/Raft Piled.
Bund Type	Earthen bund wall
Roof Vent PRV Details	150mm NB free vent
Roof Access Details	Access ladder

In-Service Visual Inspection

Tank Shell Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
External Condition	Steel jacketing visually in good condition	√		
Internal Condition	Not Applicable			
External Joints	Not Visible			
External Nozzles	Not Visible			
Internal Nozzles & Pipework Connections	Not Applicable			
Patched areas	Not Visible			
Ripples/Buckles/Deformation	Not Visible			
Voids	Not Visible			
Pipework & Pipework connections	All pipework and connections are tight and secure, with adequate support.	√		
Lagging to pipework	Areas of failed lagging to external pipework (See photo 3)		√	

Tank Roof Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
External Condition	The GRP roof is in good condition with no cracking or delamination noted.	√		
Internal Condition	Not Applicable			
External Joints	No joints. One piece Grp Roof	√		
Internal Joints	Not Applicable			
External Nozzles & Pipework Connections	Missing bolts noted to 80mm nozzle. (See photo 5)		√	
Internal Nozzles & Pipework Connections	Not Applicable			
Patched areas	Not Applicable	√		
Ripples/Buckles/Deformation	Not Applicable	√		
Voids	Not Applicable	√		
Pipework Hazardous to Shell Condition	None. All pipework is secured.	√		
Other				

Foundation Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
Foundation Type	Type D/E Concrete Raft/Raft Piled.	√		
Shoulder	N/A.			
Cracking/Spalling of Concrete	None.	√		
Cavities Under Foundation	N/A			
Drainage issues	No standing water was noted to the bund floor.	√		
Tell Tail Drains	N/A			
Bit-Sand condition/Settlement	N/A			
Visible Settlement	None.	√		
Foliage/Growth	None.	√		
Evidence of Leakage	None.	√		
Anchor Points	The tank is concreted into the floor and has no anchor bolts fitted.			
Other				

Tank Accessories Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
Access Stairs	Not installed			
Access Ladder	Access ladders in good condition.	√		
Access Platform	In good condition	√		
Mixers/Agitators	In serviceable condition with no signs of leaks, vibration, or noise	√		
Fire Deluge	Not installed			

Appendix A – Photographs

Photo 1	Photo 2
Shell	Steel Jacketing
General View	General View
	
Photo 3	Photo 4
Pipework Lagging	Roof
Lagging showing signs of deteriation	General overview
	
Photo 5	Photo 6
Roof Nozzles	Access ladder
Missing bolts to roof nozzle,	General overview
	

Appendix B – Qualifications

API INDIVIDUAL CERTIFICATION PROGRAMS

ANAB
ANSI National Accreditation Board
ACCREDITED
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API 653 ABOVEGROUND STORAGE TANK INSPECTOR

IN ACCORDANCE WITH THE KNOWLEDGE DEFINED IN THE **API Standard 653**

CERTIFICATION NUMBER **56108**

ORIGINAL CERTIFICATION DATE	January 31, 2015
CURRENT CERTIFICATION DATE	January 31, 2021
EXPIRATION DATE	January 31, 2024

Manager, Individual Certification Programs

API | ICP

WSG
Eagle Eye Integrity Specialists

Visual Tank Inspection Report

Report Number: 23-004
Client: BV Dairy
Product Identification: T2
Date: 25/01/2023
Revision: 01

**Site: Wincombe lane,
Shaftesbury,
SP7 8QD.**

Visual Tank Inspection Report

Sludge Tank

Client Contact: Paula Boult

Date of Test: 23rd January 2023

Report Number: 23-004

API 653 Inspector: Ian Hooley

Contents

Summary

Tank T3 should have been internally cleaned and inspected on a 5 yearly rolling program, however this has not been carried out. It is now vital to the integrity of the tank that this program is implemented in the soonest possible timeframe.

The 50mm overflow pipework from course two is exhibiting signs of age hardening, with fungal growth build-up. This should be replaced within the next 6 months.

.

Results Summary

	Pass	Fail	Not Applicable
Base			
Visual	☐	☐	☒
Vacuum Box	☐	☐	☒
Hydrostatic Testing	☐	☐	☒
Shell Results			
Visual	☒	☐	☐
Hydrostatic Testing	☐	☐	☒
Roof			
Visual	☒	☐	☐
Nozzles			
Visual	☒	☐	☐
Hydrostatic Testing	☐	☐	☒
Foundation			
Settlement	☒	☐	☐
Planer Tilt	☒	☐	☐
Accessories			
Access Structures	☒	☐	☐
Mixers/Agitators	☒	☐	☐
Safety Critical			
Venting Capabilities	☒	☐	☐
Alarms	☒	☐	☐
Pipework			
Tank Piping	☐	☒	☐
Fire Deluge	☐	☐	☒

Actions & Conclusions

Mandatory actions

No Mandatory Actions.

Recommendations

Feature	Action	Time Frame	Page Reference
Shell			
Overflow Pipework	Replace age hardened plastic pipework	6 months	12
Internal Surfaces			
Internal Inspection	Clean out and inspect internal surfaces.	ASAP	2

Report Conclusion

Based on the inspection results, the tank is fit for operation.

Next Recommended Scheduled Inspections taken from Table B-1 Inspection frequencies: -

- Group 9
- Unknown corrosion rates
- Climate Code B

External Inspection (Visual)	**1 year from entry into service**
Internal Inspection (Detailed)	**5 years from entry into service**

WSG Inspection Tank Assessor

Name: Ian Hooley Signature: 

Client Storage Tank Engineer

Name: Signature:

Date: 30 January 2023

Introduction

WSG Eagle Eye Ltd conducted an IN-SERVICE Visual inspection to T3 Sludge Tank.

Scope:

The inspection Methods: -

- A Close Visual inspection for surface defects.

Areas Inspected (where accessible): -

- Change of surface condition.
- Visual signs of joints leaking.
- General condition of permanent fixtures eg ladders & platforms.
- The condition of the mastic fillets.
- Impact damage to shell.
- The condition of GFS coating to the face of the tank sheets
- Discolouration to the shell.
- White or coloured spots.
- Cracks and fissures.

The inspection assumes that the tank has been designed and constructed in accordance with - Specifications for design and construction of Bolted steel sectional tanks.
The inspection report should be referenced alongside the Fabrication Monitoring and Installation reports produced when the tank was first constructed.
The inspection is based around ISO 28765 & BS7543 :2003
The purpose of the report is to ensure that the tank is suitable for the intended use, is maintained in an efficient state, efficient working order and in good repair for continued safe use.

Tank Details

Tank Details

General	
Tank Identification	Sludge Tank T3
Tank Type	Steel Bolted Tank.
Design Standard	BS 7543:2003
Manufacturer	Permastore
Drawing Number	K31703-102-1110
Year of Build	2010
Tank Diameter	3.4m.
Tank Height	2.8m.
Tank Volume (m^3)	25
Construction Material Grade	Glass fused to steel
Design Pressure (mBar)	Unknown
Design Vacuum (mBar)	Unknown
Design Gravity	1.05
Design Wind Speed	45m/s.
Max Pump-In Rate	Unknown
Max Pump-out Rate	Unknown
Tank Shell	
Maximum Fill Height	2.1m
Insulation External	No
Lining Internal	Glass lined.
Number of Nozzles	6
Tank Base	
Design Type	Concrete Base
Number of Sumps/Nozzles	None
Tank Roof	
Roof Type	Flat (Grp)
Number of Nozzles	2
Tank Appendage & Area Details	
Foundation Type	Type D/E Concrete Raft/Raft Piled.
Bund Type	Earthen bund wall
Roof Vent PRV Details	150mm NB free vent
Roof Access Details	No Access

In-Service Visual Inspection

Tank Shell Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
External Condition	Visually in good condition	√		
Internal Condition	Not Applicable			
External Joints	The mastic fillets are in good condition with no signs of leakage	√		
External Nozzles	All nozzle connections are tight and secure, with no cracking of mastic sealant.	√		
Internal Nozzles & Pipework Connections	Not Applicable			
Patched areas	None.	√		
Ripples/Buckles/Deformation	None	√		
Voids	None	√		
Pipework & Pipework connections	The 50 mm overflow pipework is exhibiting sign of age hardening and fungal growth (See Photo 4)		√	
Other	N/A			

Tank Roof Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
External Condition	The GRP roof is in good condition	√		
Internal Condition	Not Applicable	√		
External Joints	No joints. One piece Grp Roof	√		
Internal Joints	Not Applicable			
External Nozzles & Pipework Connections	All nozzle connections are tight and secure, with no cracking of mastic sealant.	√		
Internal Nozzles & Pipework Connections	Not Applicable	√		
Patched areas	None	√		
Ripples/Buckles/Deformation	None	√		
Voids	None	√		
Pipework Hazardous to Shell Condition	None	√		
Other	None			

Foundation Visual Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
Foundation Type	Type D/E Concrete Raft/Raft Piled.	√		
Shoulder	N/A.			
Cracking/Spalling of Concrete	None.	√		
Cavities Under Foundation	None.	√		
Drainage issues	No standing water was noted to the bund floor.	√		
Tell Tail Drains	N/A			
Bit-Sand condition/Settlement	N/A			
Visible Settlement	None.	√		
Foliage/Growth	None.	√		
Evidence of Leakage	None.	√		
Anchor Points	The tank is concreted into the floor and has no anchor bolts fitted.			
Other				

Tank Accessories Inspection

Action Status		
Fit for Continued Use	Maintenance/Repair Required	Major Repair/Action Required

Feature	Comments	Action Status		
		1	2	3
Access Stairs	Not installed			
Access Ladder	Not installed			
Access Platform	Not installed			
Mixers/Agitators	In serviceable with no signs of leaks, vibration or noise	√		
Fire Deluge	Not installed			

Appendix A – Photographs

Photo 1	Photo 2
Shell	Roof
General View	General View
	
Photo 3	Photo 4
Concrete to base	Pipework
No cracking or spalling of concrete around base of tank	Overflow pipework is exhibiting signs of aging & previous repairs to joints
	
Photo 5	Photo 6
Shell Nozzles	Joints
No signs of leakage with good mastic condition,	Mastic joints free from cracking or deterioration
	

Appendix B – Qualifications

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Ian William Hooley

HAS MET THE ESTABLISHED AND PUBLISHED REQUIREMENTS FOR API CERTIFICATION AS AN

API 653 ABOVEGROUND STORAGE TANK INSPECTOR

IN ACCORDANCE WITH THE KNOWLEDGE DEFINED IN THE **API Standard 653**

CERTIFICATION NUMBER **56108**

ORIGINAL CERTIFICATION DATE	January 31, 2015
CURRENT CERTIFICATION DATE	January 31, 2021
EXPIRATION DATE	January 31, 2024

Manager, Individual Certification Programs

API | ICP

WSG
Eagle Eye Integrity Specialists

Visual Tank Inspection Report

Report Number: 23-004
Client: BV Dairy
Product Identification: T3
Date: 25/01/2023
Revision: 01

Annex D Tank Operation & Maintenance Manuals

KIRK ENVIRONMENTAL

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Project Title	Blackmore Vale Dairies
Document Title	Operation & Maintenance Manual – Concrete Tank
Document Number	K31703-O&M01
Client Name	Clearfleau Ltd

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Contents

1. PROJECT DESCRIPTION

To supply and install a total of five tanks, one of which shall be a concrete digester which will be fitted with a BIODOME™ Gas Holder Roof. The other tanks include three Glass Fused to Steel tanks all complete with GRP roofs and one small open topped fabricated steel tank.

This document only covers information regarding the concrete tank.

Data Sheet	**Tank 01**
Tank Diameter	Ø17.5M (internal)
Tank Height	5.5M
Wall Thickness	250mm
Capacity	m³ Assuming a mm Freeboard
Design Criteria	Digester Tank
Design Life	Life expectancy of 60 years.
Date Of Handover	9th July 2010

2. BRIEF DESCRIPTION OF STRUCTURE

A vertical cylindrical water retaining structure constructed from steel reinforced concrete. The walls were poured in-situation using a bespoke tank-construction modular formwork system.

Roof – The roof that has been installed onto the tank is our BIODOME™ gasholder, a separate document to cover the operation and maintenance of the roof will be submitted.

3. TECHNICAL SPECIFICATIONS

DESIGN CRITERIA

- The **Design** of the tank conforms to BS8110 & BS8007 or Eurocode 2.
- The Tank has been designed for contents of specific gravity 1.05. The tank must not be used for the storage of any other product or material other than that for which it was designed forwithout prior consultation with KIRK Environmental Ltd.

DESIGN LIFE

Concrete Tanks have a life expectancy of 60 Years.

CHANGE OF USE Owners and Users of industrial liquid storage tanks should be aware that changes in the use or structure of a tank can result in dramatic changes to the operating environment and affect the structure and design limitations of the tank. Kirk Environmental will offer advice on request.

4. BACKFILLING

Where the tank has been designed to accommodate backfilling the following criteria must be adhered to: -

- The backfilling material must be agreed with the manufacturer.
- Before backfilling material is laid the tank must be fully filled with water to ensure complete ring tension. The water level must be maintained during backfilling to prevent any possible eccentric loading.
- The backfill should be in maximum layers of 300mm deep. Each layer must be fully circumferential.
- If the backfill material is to be compacted, the density of the compacted material should not be greater than that designed for. Ensure the machinery used for the compaction does not damage the tank walls.
- Heavy vehicles or equipment should not be allowed close to the tank wall. An angle drawn at 45° from the tank wall/base level gives the intersection.
- Where tanks are designed to be backfilled with a fully drained material a positive drainage system should be provided.

5. WATERTESTING

The following procedure must be followed to undertake a water test on the concrete tank: -

- Inspection should be undertaken on a dry day.
- The tank walls are designed for taking full hydrostatic pressure 28 days after completion.
- The guidelines according to Section 9 of BS8007, referring to a filling rate of not greater than 2m in 24 hours, is applicable.
- When first filled, the liquid level should be maintained by the addition of further liquid for a stabilising period whilst swelling of sealant materials, absorption and any autogenous healing of the base takes place.
- After the stabilising period, a 7-day test according to BS8007 is undertaken.

6. PERIODIC INSPECTIONS

To increase the lifetime of the tank, and to prevent leakages occurring, a regular inspection should be undertaken.

Regular inspection, and if necessary restoration, reduces the risk of comprehensive and expensive repair.

The tank must never be emptied below any external ground water level unless it has been specifically designed for the load-case.

7. ACCIDENTAL DAMAGE

Should the tank be exposed to unintended influences such as collision, fire or similar act that might affect the structural integrity of the construction, Kirk Environmental should be contacted within 48 hours of the occurrence. A survey of the damage will be undertaken.

8. MECHANICAL EQUIPMENT, PENITRATIONS AND ROOFS

The installation of any mixers, pumps or the drilling into the tank walls and the installation of any roofs should not be undertaken without the prior approval of Kirk Environmental, unless it formed part of the original design.

9. DRILLING AND CUTTING HOLES IN WALLS OF THE TANK.

Always obtain approval from KIRK Environmental prior to any work being undertaken.

As this may affect any warranties given and the structural integrity of the tank.

10. DECOMMISSIONING

Introduction

The following information covers the decommissioning of a structure and forms the basis of a **site specific Method Statement** to be used and developed by a **competent contractor**.

References

All decommissioning work shall comply with the following :-

BS5228 – Noise control on construction and open sites.

BS6187 – Code of Practice for Demolition

GS29 – Health & Safety in Demolition Work (Produced by HSE)

CDM – The Construction (Design & Management) Regulations.

Documentation

The contractor shall prepare the following documentation :-

Detailed (Site Specific) Method Statements.

Drawings of temporary works (for example, protective measures).

Survey of any existing services.

Preliminary Procedures

Survey

A detailed examination (or survey) should be carried out of the affected area. Sketches and photographs retained as necessary.

Services

Ensure all services affected by the operation are removed, diverted and rendered completely safe at the outset.

Precautionary Measures

Safety

Prior to commencement, ensure all documentation is copied / submitted to all appropriate persons. (Note requirements under the CDM Regulations). Tanks with roofs may involve working in confined spaces and appropriate extra precautions must be taken in line with current guidelines.

Care of existing works

Take measures to protect existing works from the decommissioning process.

Materials from works

Materials arising from the operation shall be recovered and recycled where possible, otherwise, shall be removed from site and disposed of under an appropriate Waste Management Licence. The contractor shall comply with legislation governing the state and the location of proposed tipping areas if carting away is to be sub-let.

Methodology

The tank is to be empty and excavated before commencing work.

The Tank is to be cleaned to remove waste etc before dismantling of equipment. A reinforced concrete tank can be decommissioned using traditional methods of demolition.

If roofs are involved these should be removed before commencing the demolishing of the tank. Likewise, any launders, weir plates etc. should be dismantled before taking down the concrete walls.

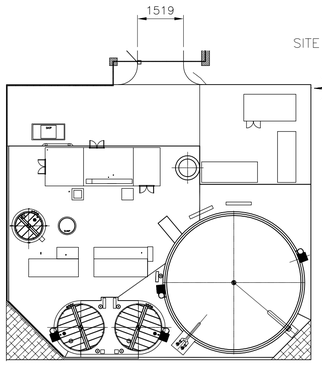
11. CLEANING

Concrete Tanks can be cleaned relatively easily using water at medium pressure. However, reputable contractors only should undertake the cleaning.

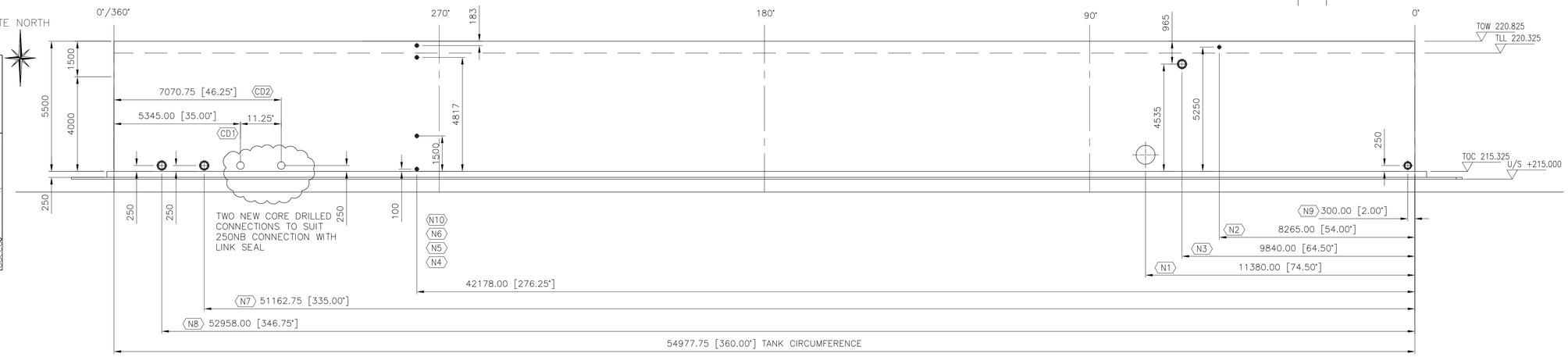
ALL DIMENSIONS IN MM

DEBURR ALL SHARP EDGES AND CORNERS

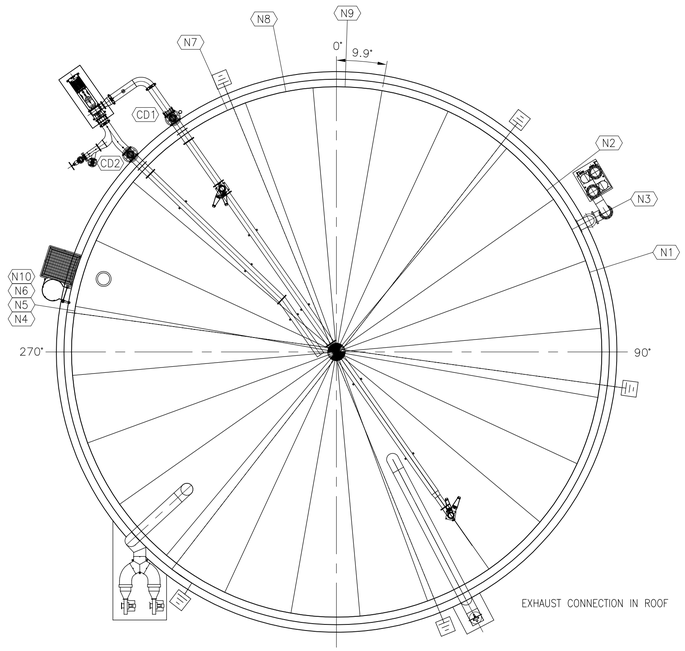
ITEM	MATERIAL	QTY PER

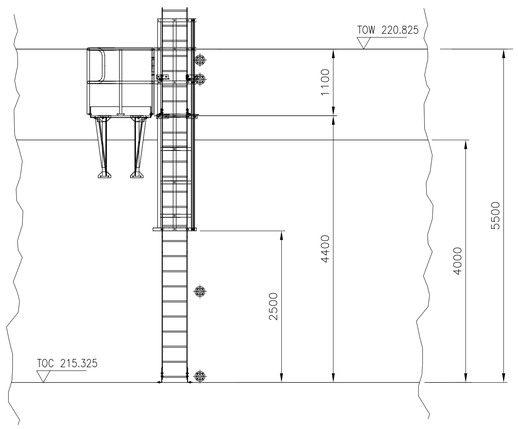


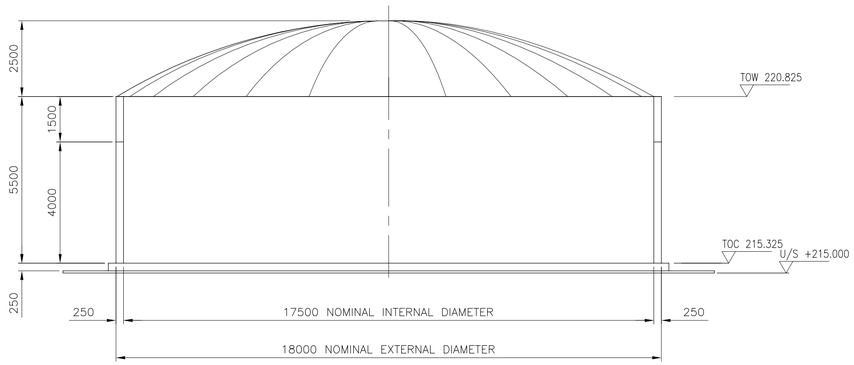
SITE PLAN
NTS



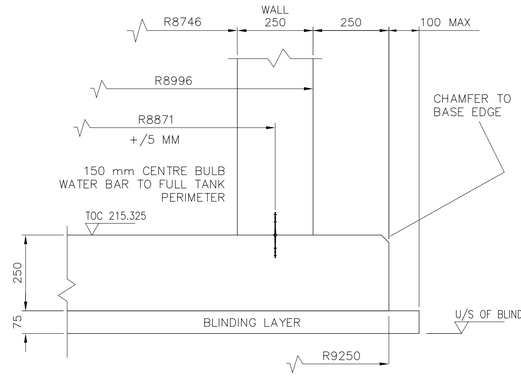
1 TANK WALL DEVELOPMENT - VIEWED FROM EXTRNAL SIDE
Scale: 1:100







3 SECTIONAL ELEVATION
Scale: 1:100



4 ENLARGED WALL DETAIL
Scale: 1:10

STEELWORK:

NOTES:

1) ALL MATERIAL S275 MILD STEEL, HOT DIP GALVANISED TO BS EN 1461 AFTER FABRICATION U.N.O.
2) HANDRAIL BALUSTERS – Ø42.4 X 3.2 C.H.S., Ø75 BALLS C/W GRUB SCREW FIXINGS. HORIZONTAL SIDE PALM C/W WITH 2–OFF M16 Gr. 8.8 BOLTS PER STANDARD.
3) HANDRAIL TUBE – Ø42.4 X 3.2 PRE–GALVED C.H.S., INTERNAL EXPANSION CONNECTERS FOR JOINTS, 150 MAX. DISTANCE FROM BALUSTERS.
4) FLOORING – 25 X 5 41/100 FLOWFORGE.
5) TOE BOARD – 150 X 6 FLAT BAR.
6) ALL FIXINGS Gr. 8.8 H.D.G. C/W NUT & WASHER.
7) ALL ANCHOR BOLTS H.D.G. CHEMICAL RESIN TYPE STUDS.
8) FLOORING FASTENERS – MECHANICAL FLOOR CLIPS.

NOZZLE SCHEDULE:

REF	DUTY	SIZE	RATING	TYPE	OFFSTAND EXT./INT.	MATERIAL	FITTINGS
N1	ACCESS HATCH	Ø 800	--	--	--	GMS	DAVIT ARM
N2	SPRAY BAR	40NB	PN 16	DOUBLE	--	316L	--
N3	GAS OUTLET	300NB	PN 16	DOUBLE	--	316L	--
N4	TAPPING POINT	50NB	PN 16	SINGLE	--	GMS	--
N5	TAPPING POINT	50NB	PN 16	SINGLE	--	GMS	--
N6	TAPPING POINT	50NB	PN 16	SINGLE	--	316L	--
N7	BOWSER CONNECTION	250NB	PN 16	DOUBLE	--	GMS	--
N8	FEED TO HEATER PUMP	250NB	PN 16	DOUBLE	--	GMS	--
N9	SPARE	200NB	PN 16	SINGLE	--	GMS	--
N10	TAPPING POINT	50NB	PN 16	SINGLE	--	316L	--
CD1	DISCHARGE FROM MIXER	250NB	PN 16	DOUBLE	--	GMS	--
CD1	FEED TO MIXER	250NB	PN 16	DOUBLE	--	GMS	--

REV.	DATE	DETAILS	DRAWN
J	15.10.10	AS BUILT	MP
H	16.02.10	ALL CONNECTIONS MOVED	B.L
		CORE DRILL POSITIONS ADDED	B.L
G	20/01/10	CONNECTION N3 WAS 150	B.L
		CENTRE DIM WAS 5250	B.L
F	23/12/09	LADDER WAS AT 268°	B.L
		N10,N6,N5 AND N4 WERE 260°	B.L
E	21/12/09	OFFSTAND TABLE REDUCED TO	B.L
		ZERO DOME WAS 2.0M HIGH	
		N2,N3,N6 AND N10 WERE GMS	
		JOINT AT 4.0M ADDED	
D	16/12/09	CONNECTION N7 WAS 308°	B.L
		CONNECTION N8 WAS 320°	
C	11/12/09	RADII UPDATED FOR PANELS	B.L
B	10/12/09	CONNECTION N10 ADDED	B.L
A	08/12/09	FOR CONSTRUCTION – BASE	B.L
P1	17/11/09	FIRST ISSUE	B.L

STATUS: AS BUILT

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APPROVED	CHECKED	DRAWN	DATE	SCALE
--	--	CMR	20/11/09	1:100(A1)

REINFORCED CONCRETE TANK
G.A – BV DAIRIES

DRAWING No.	ISSUE	SHEET
K31703–200	J	1/1

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Document Title	Operation & Maintenance Manual – Steel Bolted Tanks
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Client Name	Clearfleau Ltd

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Contents

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To supply and install a total of five tanks, one of which shall be a concrete digester which will be fitted with a BIODOME™ Gas Holder Roof. The other tanks include three Glass Fused to Steel tanks all complete with GRP roofs and one small open topped fabricated steel tank.

This document only covers information regarding the steel bolted tanks.

Data Sheet	**Tank 01**	**Tank 02**
Tank Diameter	Ø5.977M	Ø5.977M
Tank Height	6.185M	6.185M
Model Diameter	7R	7R
Model Height	4½H	4½H
Capacity	160m³ Assuming a 500mm Freeboard	160m³ Assuming a 500mm Freeboard
Design Criteria	Permeate Tank	Trade Waste Tank
Colour External	BS4800 12-B-29	
Design Life	British Standard 7543:2003 – 30 years	
Date Of Handover	Check Field Report	

2. BRIEF DESCRIPTION OF STRUCTURE

The application range is wide and the task of the enamelling technology is to adapt itself to the special requirements of the goods stored in respect of the chemical composition, intended working temperature and pH range, in order to find the optimum solution. According to the current experience vitreous enamel coating may be used within a pH range from 2 to 11 and a working temperature up to 40°C.

For increased resistance, the enamel is fused onto the steel sheets in different coats from a basic coat to a finish and chemical coat (total thickness approx. 280 - 460 µm). It is aimed at achieving a coat as homogenised and pinhole-free as possible, and at the same time not too thick to prevent the coats from breaking (a glass rod would easily break, whereas a glass fibre will not).

The firing process forms an interlocking coat between vitreous enamel and metal, where the materials are inseparably fused into each other. Therefore, being a union of glass and metal, glass coatings combine the advantages of both materials – resistance and elasticity of the metal, plus the hardness and chemical resistance of glass.

The quality of a glass coating essentially depends on its lack of porosity. Therefore during the manufacturing process the sheets are inspected and tested with high voltage 1100V test equipment.

The enamel coating shows a large number of positive properties; long service life, shock resistance, lacquer rejection and biophobe, due to its glass-like surface. It is also resistant to chemicals and heat (in particular - incombustible), electrically neutral, weatherproof, UV resistant and last, but not least, environmentally friendly when manufactured.

The steel tanks are made of standardised sheets assembled with galvanised and plastic capped bolts, washers and nuts and sealed with mastic.

System (net, assembled) sheet dimensions:

circumference	2.683 M
height	1.400 M

Wall thicknesses of the sheets:

All tank sheets have a thickness of 2mm.

Rim- and wall-bracings on the outer side of the tank, made of galvanized steel:

The tank is braced at the upper rim by a profiled ring (= top angles). On the bottom rim, the tank is braced with a profiled ring (= base angles), for the connection to the foundation with anchoring bolts. According to the design requirements one or several additional bracing rings (= wall bracings) on the tank wall outside secure the tank shell against wind loads.

3. TECHNICAL SPECIFICATIONS

DESIGN CRITERIA

- The **Design** of the tank conforms to ISO 28765.
- The Tank has been designed for contents of specific gravity 1.05. The tank must not be used for the storage of any other product or material without prior consultation with KIRK Environmental Ltd.
- **Wind speeds** are determined in accordance with BS.6399 Part 2.

DESIGN LIFE

Our Glass-Fused-to-Steel structures have been utilised extensively for the storage and treatment of drinking water, agricultural feed crops and animal waste, industrial effluents and municipal sewage. Our structures have proven to be reliable and to provide a cost effective containment solution for world-wide environmental problems.

During August 2000 we undertook a detailed Design Life review of our Glass-Fused-to-Steel tanks and silos and determined that our products are suitable for a minimum design life in excess of 30 years.

Our evaluation included the experience we have accrued over a period extending over 40 years in association with the evolution of the design, third party assessment and an ongoing commitment to a programme of continuous product development and improved quality. The conclusion of this evaluation provides a sound basis for a minimum 30 year Design Life compliant with ISO 28765

It is also important to differentiate between the terms 'Design Life' and 'Service Life'

- Design Life is the service life intended by the designer.
- Service Life is the period of time after installation during which a building or its parts meets or exceeds the performance requirements.

The expected Service Life should therefore be equal to or greater than the Design life.

The earliest Glass-Fused-to-Steel tanks supplied for Industrial/Municipal applications have a proven service history of at least 40 years and therefore it is reasonable to conclude that Glass-Fused to Steel tanks will provide a Service Life in excess of 50 years.

We have absolute confidence that our products are equal to or significantly better than any other containment solutions currently available. Glass-Fused-to-Steel tanks provide well proven, cost effective, readily adaptable and easily maintainable storage solution with an established performance pedigree.

British Standard 7543:2003 (Guide to Durability of Buildings and Building Elements, Products and Components) provides information regarding the assessment of service life based on the product components, and we confirm that the components used in our sectional steel tanks will provide a predicted minimum 30 year design life in accordance with this standard.

CHANGE OF USE Owners and Users of industrial liquid storage tanks should be aware that changes in the use or structure of a tank can result in dramatic changes to the operating environment and affect the coating and design limitations of the tank. Kirk Environmental will offer advice on request.

4. BACKFILLING

Where the tank has been designed to accommodate backfilling the following criteria must be adhered to: -

- During construction it is essential that all the stiffener bands are positioned as shown on the assembly drawing.
- The backfilling material must be agreed with the manufacturer.
- Before backfilling material is laid the tank must be fully filled with water to ensure complete expansion and as a check on all joints. The water level must be maintained during backfilling to prevent possible load damage.
- The backfill should be in layers 300mm deep. Each layer must be fully circumferential.
- If the backfill material is to be compacted, the density of the compacted material should not be greater than that designed for. Ensure the machinery used for the compaction does not damage the tank walls.
- Heavy vehicles or equipment should not be allowed close to the tank wall. An angle drawn at 45^{o} from the tank wall/base level gives the intersection.
- Where tanks are designed to be backfilled with a fully drained material a positive drainage system should be provided.
- The tank must be filled with water up to a maximum volume during backfilling.

5. WATERTESTING

The following procedure must be followed to undertake a water test on the glass coated steel tank: -

- Ensure that the rebate seal has been cast for a minimum of 7 days before the test commences.
- Inspection should be undertaken on a dry day.
- The tank walls are designed for taking full hydrostatic pressure immediately after completion.
- The guidelines according to Section 9 of BS8007, referring to a filling rate of not greater than 2m in 24 hours, does not need to be applied to steel tanks.
- When first filled, the liquid level should be maintained by the addition of further liquid for a stabilising period whilst swelling of sealant materials, absorption and any autogenous healing of the base takes place.
- After the stabilising period, a 7-day test according to BS0007 is undertaken.
- Should the structure not satisfy the 7 day test, after remedial work, including sufficient curing time for sealant or other materials used, the structure can be refilled to the maximum level within 24 hours.

6. PERIODIC INSPECTIONS

To increase the lifetime of the tank, and to prevent leakages occurring, a regular inspection should be undertaken.

It is recommended that the glass coated steel tank be visually inspected annually for any signs of glass chippage and rust marks.

The tank should be inspected each time it is emptied to check for early signs of any damage. At least every five years, in conjunction with emptying, the tank should be cleaned inside with a high-pressure water cleaner. At the same time the following checks should be carried out: -

- The surface of the tank wall – inside and out – for signs of damage or wear.
- The construction joints between the base and the wall show no signs of deterioration.
- The mastic fillets at the panel lap joints to ensure no deterioration and that all sheet edges are fully encapsulated.

Regular inspection, and where necessary restoration, reduces the risk of comprehensive and expensive repair.

The tank must never be emptied below any external ground water level unless the tank has been specifically designed for the load-case.

7. REPAIRS

LEAKAGE REPAIRS

1. In the unlikely event that leaks are evident on the structure it may only be possible to effect a reseal from the inside. The structure must then be drained completely and the affected area thoroughly dried before commencing the repair.

Special Note:

2. Should the leak appear on the outside at a bolt, the source of the leak is not necessarily at the bolt head, but may well start through the sheet overlap.

3. Should the leak appear on the outside at a sheet overlap, the source of the leak is not necessarily at the same point of the sheet overlap, but may well start from a bolt head.

4. To repair, mark the point of the leak precisely on the outside of the tank before draining the tank.

5. Remove all structure bolts completely within 150mm of the leak. Insert fresh mastic into the bolt hole (from the inside of the structure) and cover the bolt head area of the sheet liberally with mastic.

6. Reinsert the bolt and tighten to the prescribed torque. Cover the internal fillet liberally with mastic over an area of 300mm in all directions of the leak. If the leak is at a corner joint ensure that the intersection sheet is inserted and cover the whole internal area with mastic.

7. Should the leak be serious, i.e. more than a dribble, it may be necessary to part the sheets with a small hard wooden wedge and insert mastic to the complete overlap area with a pallet knife.

8. If the leak is from the base area, again remember that the point of the leak showing externally is not necessarily the source. It may start from any point of the perimeter seal up to 3m from the leak. The source may also be from an area of the floor because of porous concrete. Examine the complete floor area and perimeter seal and repair as required.

IMPORTANT:

If the structure has been in use there may be potential hazards from toxic substances or gasses. Ventilation may be necessary and all relevant Health and Safety regulations must be strictly adhered to.

REPAIRS TO GLASS COATING

Damage around bolt head/washer and nut

1. Remove bolt.

2. Ensure that any loose fragments of glass and all mastic are removed using a scraper and wire brush.

3. If any evidence of corrosion has taken place then clean down, apply one coat of Anti Corrosion Primer and allow drying.

4. Spread a 2mm layer of mastic around the bolthole and extending 20mm beyond.

5. Apply mastic inside the bolt head, install and tighten to torque.

Repairs to internal and external faces of sheets

1. Ensure that all loose fragments of glass are removed using a scraper and wire brush.

2. If any evidence of corrosion has taken place then clean down, apply one coat of Anti Corrosion Primer and allow drying.

3. Spread a 2mm layer of mastic over the affected area and extending 20mm beyond.

8. ACCIDENTAL DAMAGE

Should the glass coated steel tank be exposed to unintended influences such as collision, fire or similar act that might affect the structural integrity of the construction, Kirk should be contacted within 48 hours of the occurrence. A survey of the damage will be undertaken.

9. MECHANICAL EQUIPMENT, PENITRATIONS AND ROOFS

The installation of any mixers, pumps or the drilling into the steel panels and the installation of any roofs should not be undertaken without the prior approval of Kirk Environmental.

10. REPLACING AND REMOVING THE TANK SHEET

NOTE:

Ensure the tank is well ventilated and it is safe to enter!

1. Set up scaffold to a working height on the outside and inside of the tank adjacent to where the sheet is to be removed.

   To remove the sheet, carefully take out all the sheet fixing bolts from the sheet overlaps. Using wooden wedges, gently prise the sheet joints apart. Using suitable lifting equipment, remove the tank sheet. Thoroughly clean mastic from the sheet overlap joints.

2. To fit the replacement sheet, mastic must be applied to all the overlap faces. When the replacement sheet is lowered into position with suitable lifting equipment, ensure mastic is applied to the replacement bolts before fitting. When all the bolts are fitted, tighten to correct torque and apply mastic fillets over the sheet edges to blend in with the existing fillets.

NOTE: It is recommended that an authorised bolted tank specialist is engaged if removal of a tank sheet is necessary.

11. MASTIC TYPES AND INSTRUCTIONS ON USE OF TOUCH-UP KIT

NOTE:

Types of mastic and primer vary due to the design criteria of the structure. Always follow manufacturers guidelines for application and curing times.

Mastic Type	Where used
Sika TS plus	Used on all sheet joints (vertical and horizontal) and metal faces in direct contact with glass coated sheets. Minor repairs to internal and external glass coating. Perimeter seal and edge protection.
Sika Primer No 3 or 5	Used for cleaning glass surfaces. Vertical side of perimeter seal concrete form. Apply to all metallic surfaces that are in contact with glass at sealing areas.
Sika Primer No 35	Apply to stainless steel parts and allow to dry before seal.
Corroless EPF	For minor repairs to glass coating on the inside and outside of the structure. Internal repairs must be overlaid with Sika TS plus.

Instruction for use of Touch-Up Kit

1. Two-part epoxy resin based protective coating.

2. Surface preparation:

   Steel should be clean and free from any loose glass coating, oil, grease or rust. Abrade the surface and surrounding area of sound glass with medium emery cloth.

3. Mixing and Application:

   Using the wooden spatula, mix the Component A well and transfer it **ALL** into the plastic bucket. Then pour **ALL** of the Component B into the bucket and mix well with the spatula. Apply without delay to the prepared surface with a clean paint brush in a thick layer, overlapping onto the abraded glass as well.

4. Properties:

Pot Life (mixed)	½hr at 20^0C
	1 hr at 10^0C
Application	minimum 5^0C
Temperature	maximum 30^0C
Full Cure	12 days
Initial Cure	3 days

(Water contact)

5. Handling Precautions:

Resins and hardeners are generally harmless provided that certain precautions normally taken when handling chemicals are observed. The materials must not, for instance, be allowed to come into contact with foodstuffs of food utensils, and measures should also be taken to prevent the incurred materials from coming in contact with the skin, since people with particularly sensitive skin may be affected. The use of protective clothing, goggles, barrier creams and rubber gloves are required. The skin should be thoroughly cleansed at the end of each working period either by washing with soap and warm water or by using a resin removing cream – the use of powerful solvents is to be avoided. Disposable paper towels – not cloth towels – should be used to dry the skin. Adequate ventilation of the working area is recommended. In case of accidental eye or mouth contact flush with water – consult a doctor immediately. A leaflet on the handling of epoxy compound is available and we strongly advise anyone to read this before using the resin products.

Data Sheets

Information and data sheets for all mastics, primers and cleaners used to build structures are available on request from:

KIRK Environmental Ltd
Valley Forge Business Park
Reedyford Road
Nelson
Lancashire
BB9 8TU
Telephone: 01282-677966
Fax: 01282-696731

12. DRILLING AND CUTTING HOLES IN GLASS SHEETS

- Do not use disc grinders or flame cutting equipment to cut holes into glass-coated sheets. Always use electric drills or jigsaws.
- Always use eye protection when cutting or drilling sheets.
- Always obtain approval from KIRK prior to any work being undertaken.

1. Drilling Holes

   Mark the position of the hole to be drilled and dot punch the centre. Using the dot punch, lightly tap the centre and remove the glass to the diameter of the hole to be drilled. This will prevent the drill being blunted. Start with a small pilot drill and gradually increase the drill size to the required hole diameter.

2. Cutting Openings

   Apply mastic tape over the area of the opening to be cut. Mark out the opening and dot punch on the inside edge. Drill out to 10mm and using a jigsaw cut around the marked opening.

3. After cutting, or drilling, remove all traces of swarf and burred edges.

4. Ensure that all edges have been covered with mastic on completion of work.

13. MAINTENANCE OF ROOF

IMPORTANT: ***BEWARE OF THE POSSIBILITY OF TOXIC GASES AND RESIDUAL SLUDGES. THE INSIDE OF ANY TANK MAY BE AN EXTREMELY HOSTILE ENVIRONMENT.***

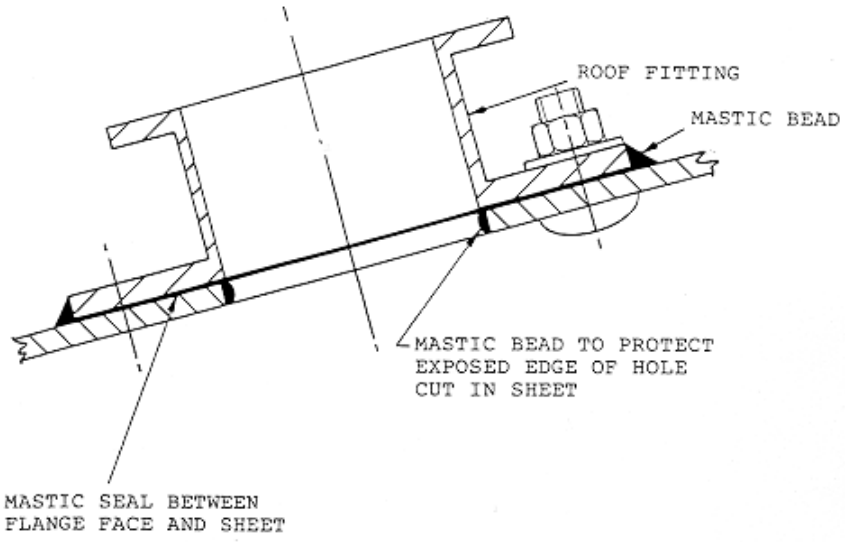
Access to the underside of the cover and a means of lifting the panel will be required. Adequate safety procedures must be in place to ensure the safety of all operatives required to work inside the confined space of any tank, especially one that has been in service.

The panel must be supported from the underside while the joints are released. All bolted joints are sealed during installation and will require prying to split the adhesive seal.

Before reinstallation, all joint faces should be cleaned of any existing sealants. Fresh sealant should be re-applied. After the panel has been re-fitted and all bolted joints re-assembled, the outside faces of all joints should be filleted off with a bead of sealant. Sealant works should not be attempted in wet weather.

FITTING VENTS AND ROOF ACCESS HATCHES

1. Assemble roof fitting, i.e. hatch, vent, etc., and apply mastic to roof contact faces, fit tighten fixing bolts.



2. Site Cut Openings:

   For openings that are cut into the glass coated sheet on site, refer to Section before.

Note:

Use Sika Primer on joint faces of metallic outlets and backing flanges fixed to tank with mastic. Follow manufactures instructions on application and cure times.

14. DECOMMISSIONING

Introduction

This method statement covers the decommissioning of a structure and forms the basis of a **site specific Method Statement** to be used and developed by a **competent contractor**. It is recommended that only approved tank erectors be employed to undertake the task.

References

All decommissioning work shall comply with the following :-

BS5228 – Noise control on construction and open sites.

BS6187 – Code of Practice for Demolition

GS29 – Health & Safety in Demolition Work (Produced by HSE)

CDM – The Construction (Design & Management) Regulations.

Documentation

The contractor shall prepare the following documentation :-

Detailed (Site Specific) Method Statements.

Drawings of temporary works (for example, protective measures).

Survey of any existing services.

Preliminary Procedures

Survey

A detailed examination (or survey) should be carried out of the affected area. Sketches and photographs retained as necessary.

Services

Ensure all services affected by the operation are removed, diverted and rendered completely safe at the outset.

Precautionary Measures

Safety

Prior to commencement, ensure all documentation is copied / submitted to all appropriate persons. (Note requirements under the CDM Regulations). Tanks with roofs may involve working in confined spaces and appropriate extra precautions must be taken in line with current guidelines.

Care of existing works

Take measures to protect existing works from the decommissioning process.

Materials from works

Materials arising from the operation shall be recovered and recycled where possible, otherwise, shall be removed from site and disposed of under an appropriate Waste Management Licence. The contractor shall comply with legislation governing the state and the location of proposed tipping areas if carting away is to be sub-let.

Methodology

The tank is to be empty and excavated before commencing work.

Basically, the tank should be dismantled in a manner that is the reverse of the installation method. Refer to section 10.0 regarding the removal of tank sheets.

If roofs are involved these should be removed before commencing the dismantling of the tank, the respective dismantling processes again generally being the reversal of the installation method. Likewise, any launders, weir plates etc. should be dismantled before taking down the glass coated sheets.

15. CLEANING

The glass coated steel panels can be cleaned relatively easily using water at medium pressure. However, reputable contractors only should undertake the cleaning.

Particular care should be taken around areas where sealant is exposed and if in any doubt advice from KIRK should be sought.

All sheet edge fillets should be inspected after cleaning. Repairs should be undertaken if there are any signs of lifting or if any sheet edges are visible. Only use approved sealants suitable for contact with the tank contents.

WARNING!

The most frequent damage occurring to an enamelled tank installation is caused by steel

GRINDING AND CUTTING OPERATIONS.

The sparks and steel particles generated by cutting and grinding operations are of sufficient temperature that they will fuse into the enamel coating upon contact.

The consequences of the damage depend upon the severity of the blast:-

In an extreme case, where the tank plate receives a heavy and direct blast from a grinding operation, the particles will melt the enamel through to the parent metal and the factory applied coating is severely compromised. The raw steel particles will very quickly begin to rust in the open air and the corrosion will quickly spread to the steel plate and under the enamel. In cases of a severe blast it is normally required that the tank plate is replaced. The costs related to plate replacement can quickly start to mount up, especially if the damaged plate is in the bottom ring of the tank where it is set into the concrete rebate.

ALL GRINDING DAMAGE IS AVOIDABLE.

Diligent Site Management and the proper education of other site trades can prevent grinding damage from occurring. The most frequent cause of this sort of damage arises from Civils workers preparing reinforcement for concrete slabs and structures around a completed tank installation. Pipe-fitters and Electricians may also have the need to cut or grind steel parts during the course of their operations.

All cutting and grinding operations should be prohibited from the vicinity of a tank installation.

Always consider wind direction when determining a safe working area for cutting and grinding operations – airborne particles carried by the wind may still damage the enamel.

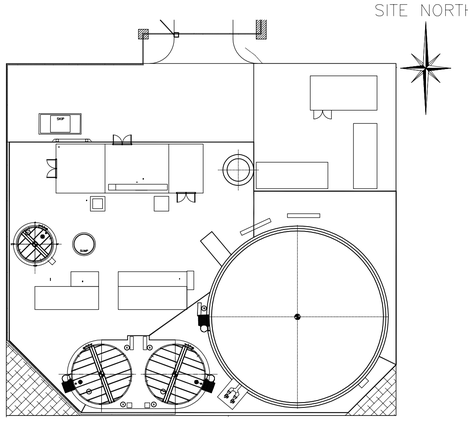
Always provide protection between the tank and the cutting or grinding operation if circumstances prevent it from being conducted in a safe area.

ALL DIMENSIONS IN MM

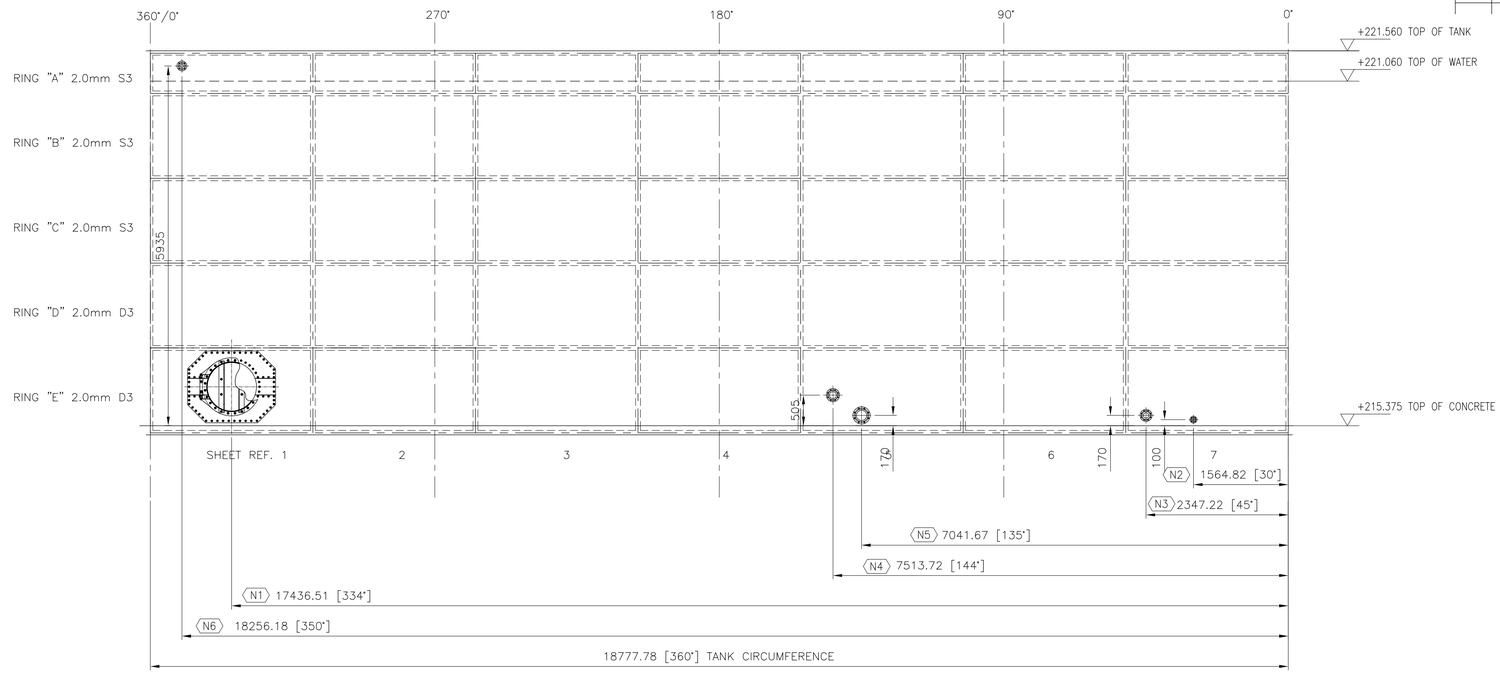
DEBURR ALL SHARP EDGES AND CORNERS

ITEM	MATERIAL	QTY PER

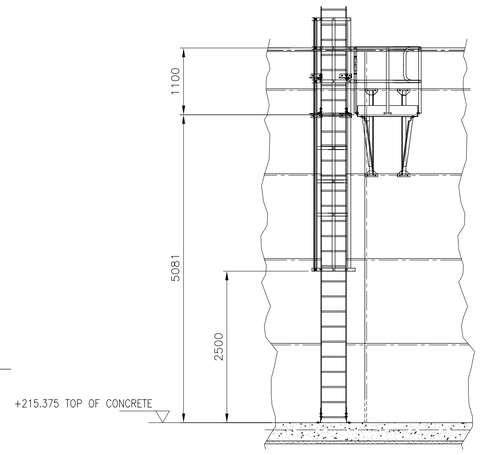
SITE NORTH



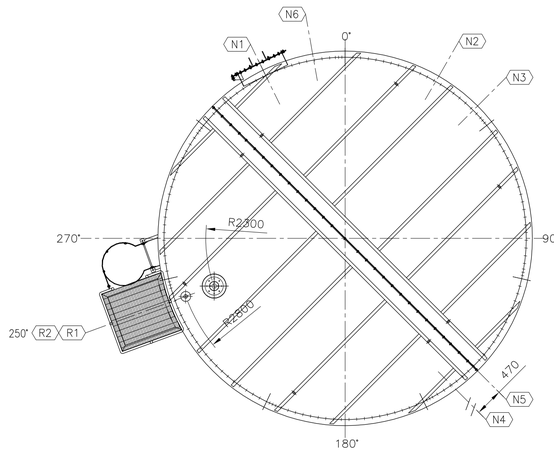
SITE PLAN
NTS

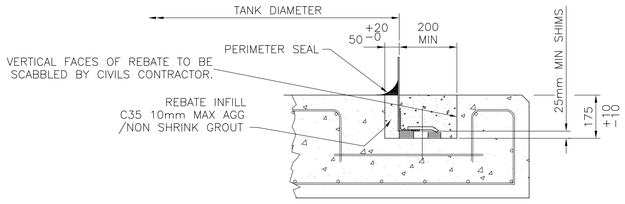


TANK WALL DEVELOPMENT DIAGRAM
VIEWED FROM OUTSIDE STRUCTURE



DETAIL 'D'





DETAIL 'A' (N.T.S)
SCRAP SECTION THROUGH BASE/WALL CONNECTION
'DEEP REBATE' BASE DESIGN

STEELWORK:

NOTES:

1) ALL MATERIAL S275 MILD STEEL, HOT DIP GALVANISED TO BS EN 1461 AFTER FABRICATION U.N.O.
2) HANDRAIL BALUSTERS – Ø42.4 X 3.2 C.H.S., Ø75 BALLS C/W GRUB SCREW FIXINGS. HORIZONTAL SIDE PALM C/W WITH 2–OFF M16 Gr. 8.8 BOLTS PER STANDARD.
3) HANDRAIL TUBE – Ø42.4 X 3.2 PRE–GALVED C.H.S., INTERNAL EXPANSION CONNECTERS FOR JOINTS, 150 MAX. DISTANCE FROM BALUSTERS.
4) FLOORING – 25 X 5 41/100 FLOWFORGE.
5) TOE BOARD – 150 X 6 FLAT BAR.
6) ALL FIXINGS Gr. 8.8 H.D.G. C/W NUT & WASHER.
7) ALL ANCHOR BOLTS H.D.G. CHEMICAL RESIN TYPE STUDS.
8) FLOORING FASTENERS – MECHANICAL FLOOR CLIPS.

SPECIFICATIONS:

1: TANK MODEL REF.	2022.5
2: ENAMEL COATING	TRIFUSION
3: COLOUR	BS4800 12–B–29
4: COVER	GRP 'D' TYPE COVER (BS4800 12–B–29)
5: INSULATION	WALLS: 75mm ROCKWOOL RWA45
	ROOF: UNCLAD

NOZZLE SCHEDULE:

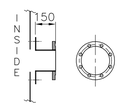
REF	DUTY	SIZE	RATING	TYPE	OFFSTAND EXT./INT.	MATERIAL	FITTINGS
N1	ACCESS HATCH	Ø 800	--	--	--	GMS	--
N2	TANK LEVEL SENSOR	25NB	PN 16	SINGLE	150	GMS	--
N3	PUMP TAKE–OFF	80NB	PN 16	SINGLE	150	GMS	--
N4	DISCHARGE FROM MIXER	100NB	PN 16	DOUBLE/PARALLEL	150/150	GMS	--
N5	FEED TO MIXER	150NB	PN 16	DOUBLE	150/150	GMS	--
N6	OVERFLOW PIPE	50NB	PN 16	SINGLE	150	GMS	--

NOZZLES TERMINATED PN16. TANK SHELL CONNECTION IS NOT RATED PN16.
TANK WALL NOZZLES SUPPLIED WITH TESTING FLANGE, GASKET AND BOLTS

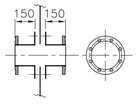
ROOF NOZZLE SCHEDULE:

R1	AIR VENT	150NB	--	SINGLE – ROOF	--	GRP	--
R2	LEVEL PROBE	50NB	--	SINGLE – ROOF	150	GRP	--

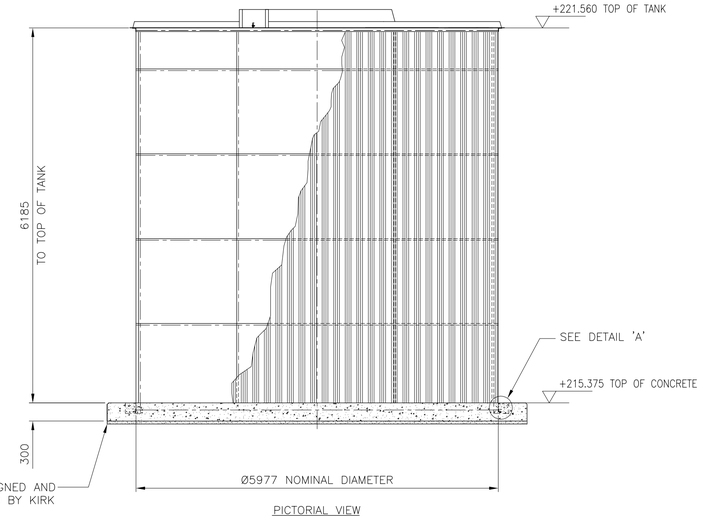
GRP ROOF NOZZLES SUPPLIED UNDRILLED.



DETAIL 'B' (NTS)
SINGLE NOZZLE CONNECTION
150mm STANDARD OFFSTAND



DETAIL 'C' (NTS)
DOUBLE NOZZLE CONNECTION



PICTORIAL VIEW

REV.	DATE	DETAILS	DRAWN
D	15/10/10	AS BUILT	MP
C	11/01/10	PLATFORM SUPPORT EXTENDED	CMR
B	11/12/09	FOR CONSTRUCTION	CMR
A	03/12/09	SEE CHANGE NOTE CN–001	CMR
P1	20/11/09	FIRST ISSUE	CMR

STATUS: AS BUILT

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APPROVED	CHECKED	DRAWN	DATE	SCALE
--	XXX	CMR	20/11/09	1:50(A1)

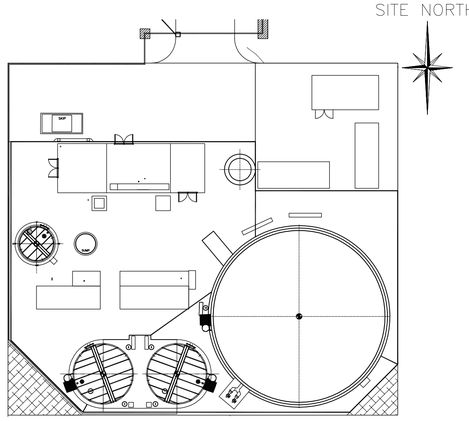
BV DARIES PERMEATE WWT
GENERAL ARRANGEMENT

DRAWING No.	ISSUE	SHEET
K31703–100–2022.5	D	1/1

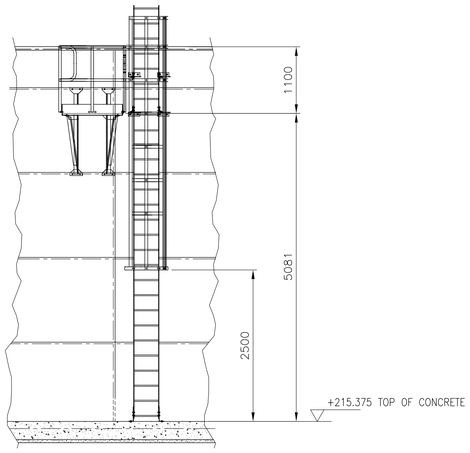
ALL DIMENSIONS IN MM

DEBURR ALL SHARP EDGES AND CORNERS

ITEM	MATERIAL	QTY PER



SITE PLAN
NTS



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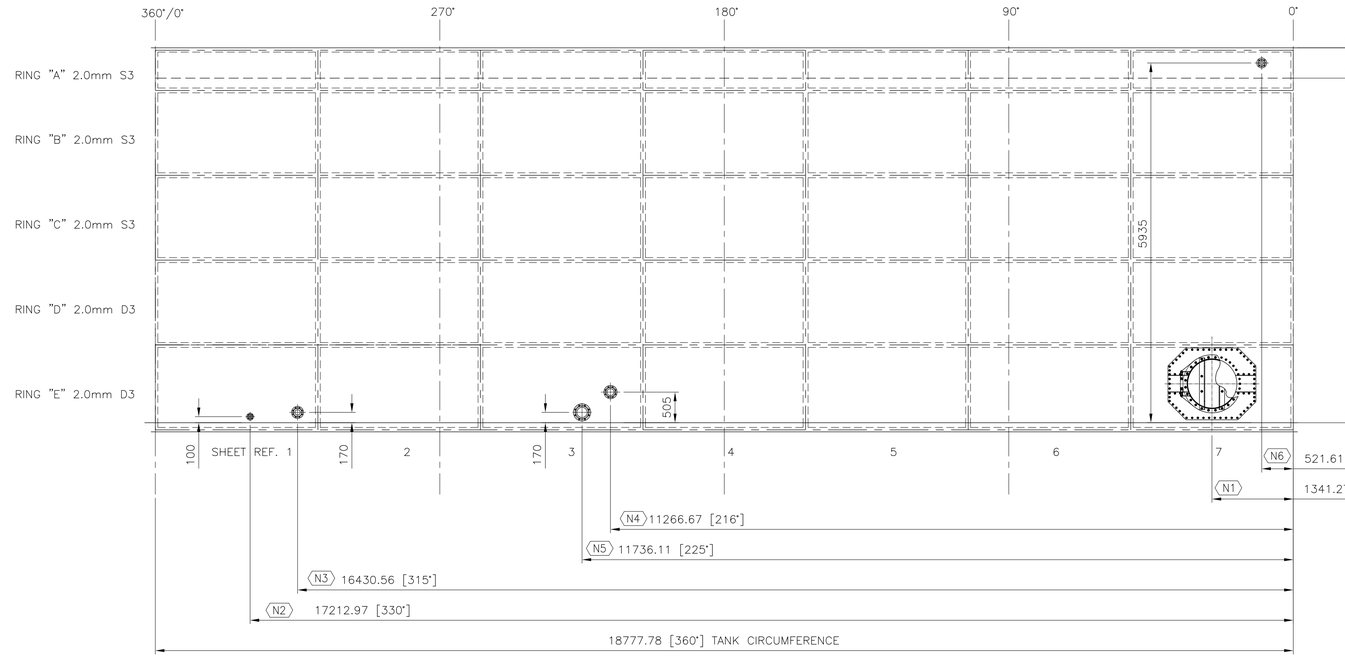
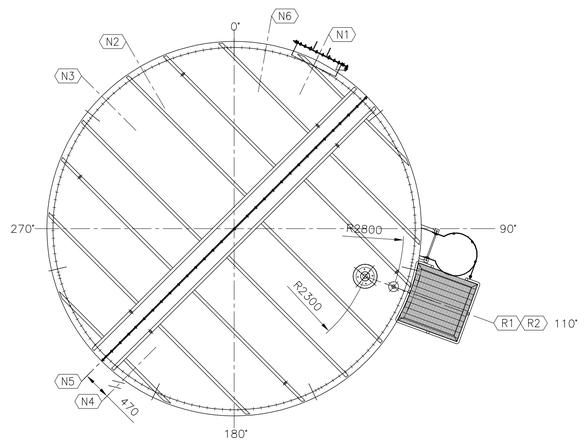
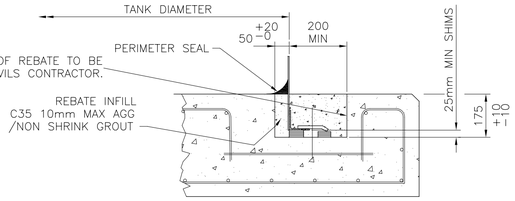


TANK WALL DEVELOPMENT DIAGRAM
VIEWED FROM OUTSIDE STRUCTURE





DETAIL 'A' (N.T.S)
SCRAP SECTION THROUGH BASE/WALL CONNECTION
'DEEP REBATE' BASE DESIGN

STEELWORK:

NOTES:

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2) HANDRAIL BALUSTERS – Ø42.4 X 3.2 C.H.S., Ø75 BALLS C/W GRUB SCREW FIXINGS. HORIZONTAL SIDE PALM C/W WITH 2-OFF M16 Gr. 8.8 BOLTS PER STANDARD.
3) HANDRAIL TUBE – Ø42.4 X 3.2 PRE-GALVED C.H.S., INTERNAL EXPANSION CONNECTERS FOR JOINTS, 150 MAX. DISTANCE FROM BALUSTERS.
4) FLOORING – 25 X 5 41/100 FLOWFORGE.
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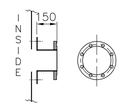
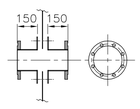
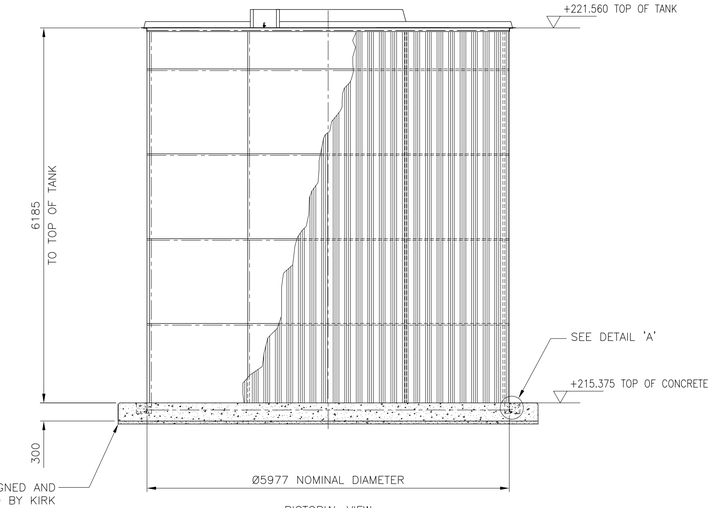
6) ALL FIXINGS Gr. 8.8 H.D.G. C/W NUT & WASHER.
7) ALL ANCHOR BOLTS H.D.G. CHEMICAL RESIN TYPE STUDS.
8) FLOORING FASTENERS – MECHANICAL FLOOR CLIPS.



DETAIL 'B' (NTS)
SINGLE NOZZLE CONNECTION
150mm STANDARD OFFSTAND



DETAIL 'C' (NTS)
DOUBLE NOZZLE CONNECTION



PICTORIAL VIEW

SPECIFICATIONS:

1: TANK MODEL REF.	2022.5
2: ENAMEL COATING	TRIFUSION
3: COLOUR	BS4800 12-B-29
4: COVER	GRP 'D' TYPE COVER (BS4800 12-B-29)
5: INSULATION	WALLS: 75mm ROCKWOOL RWA45
	ROOF: UNCLAD

NOZZLE SCHEDULE:

REF	DUTY	SIZE	RATING	TYPE	OFFSTAND EXT./INT.	MATERIAL	FITTINGS
N1	ACCESS HATCH	Ø 800	--	--	--	GMS	--
N2	TANK LEVEL SENSOR	25NB	PN 16	SINGLE	150	GMS	--
N3	PUMP TAKE-OFF	80NB	PN 16	SINGLE	150	GMS	--
N4	DISCHARGE FROM MIXER	100NB	PN 16	DOUBLE/PARALLEL	150/150	GMS	--
N5	FEED TO MIXER	150NB	PN 16	DOUBLE	150/150	GMS	--
N6	OVERFLOW PIPE	50NB	PN 16	SINGLE	150	GMS	--

NOZZLES TERMINATED PN16. TANK SHELL CONNECTION IS NOT RATED PN16.
TANK WALL NOZZLES SUPPLIED WITH TESTING FLANGE, GASKET AND BOLTS

ROOF NOZZLE SCHEDULE:

R1	AIR VENT	150NB	--	SINGLE - ROOF	--	GRP	--
R2	LEVEL PROBE	50NB	--	SINGLE - ROOF	150	GRP	--

GRP ROOF NOZZLES SUPPLIED UNDRILLED.

STATUS:
AS BUILT

REV.	DATE	DETAILS	DRAWN
D	15/10/10	AS BUILT	MP
C	11/01/10	PLATFORM SUPPORT EXTENDED	CMR
B	11/12/09	FOR CONSTRUCTION	CMR
A	03/11/09	SEE CHANGE NOTE CN-001	CMR
P1	20/11/09	FIRST ISSUE	CMR

APPROVED	CHECKED	DRAWN	DATE	SCALE
--	--	CMR	20/11/09	1:50(A1)

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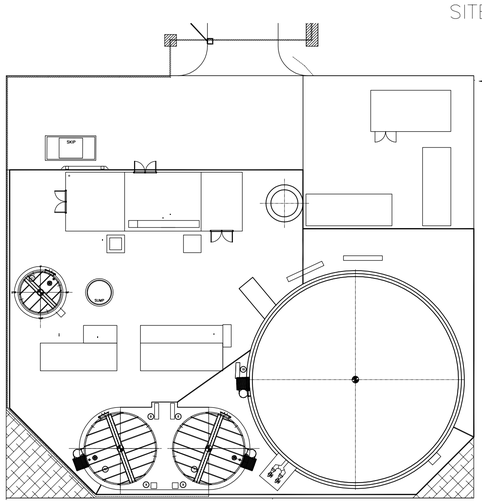
BV DARIES TRADE WASTE WWT
GENERAL ARRANGEMENT

DRAWING No.	ISSUE	SHEET
K31703-101-2022.5	D	1/1

ALL DIMENSIONS IN MM

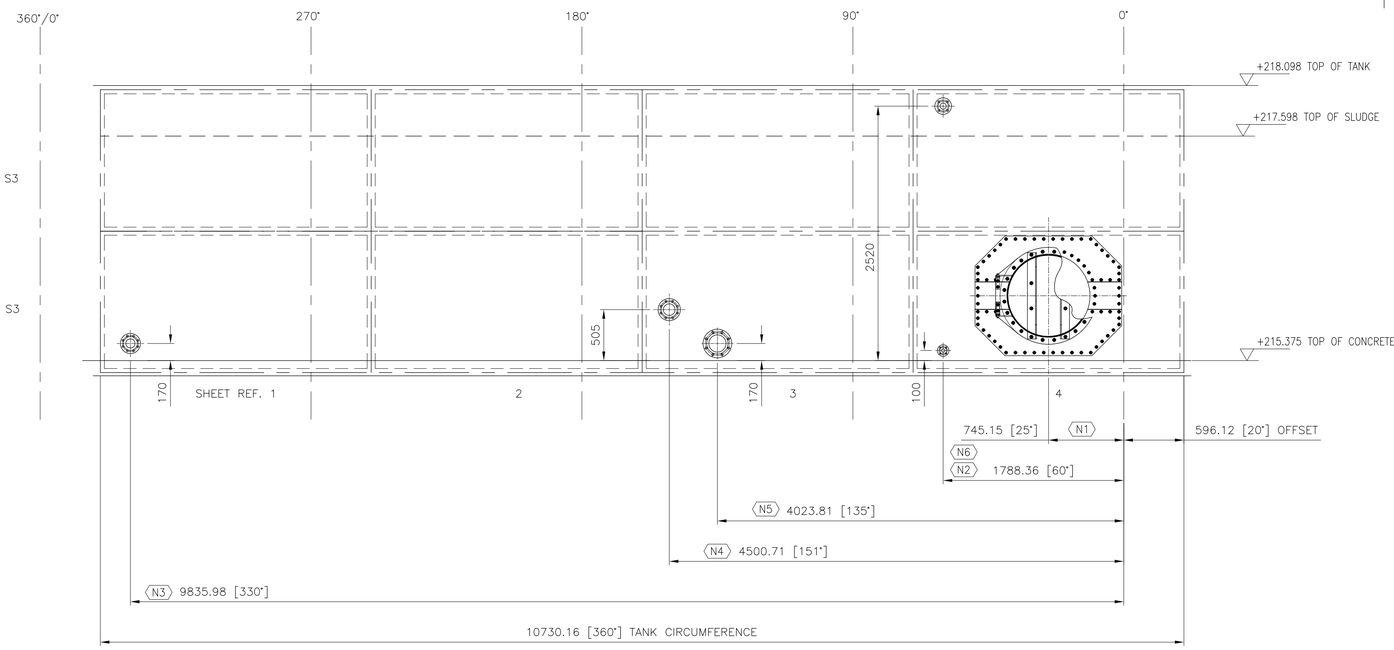
DEBURR ALL SHARP EDGES AND CORNERS

ITEM	MATERIAL	QTY PER

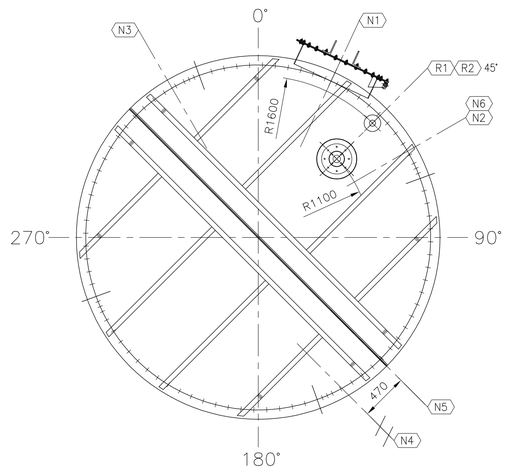


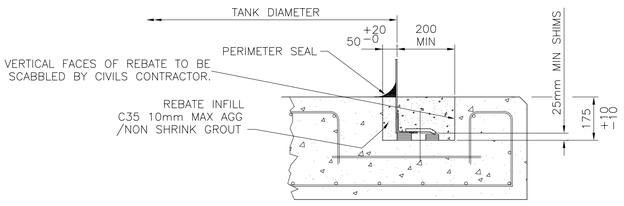
SITE NORTH

SITE PLAN
NTS



TANK WALL DEVELOPMENT DIAGRAM
VIEWED FROM OUTSIDE STRUCTURE





DETAIL 'A' (N.T.S)
SCRAP SECTION THROUGH BASE/WALL CONNECTION
'DEEP REBATE' BASE DESIGN

SPECIFICATIONS:

1: TANK MODEL REF.	1110
2: ENAMEL COATING	TRIFUSION
3: COLOUR	BS4800 12-B-29
4: COVER	GRP 'D' TYPE COVER (BS4800 12-B-29)
5: NSULATION	WALLS: UNCLAD
	ROOF: UNCLAD

NOZZLE SCHEDULE:

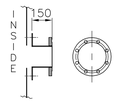
REF	DUTY	SIZE	RATING	TYPE	OFFSTAND EXT./INT.	MATERIAL	FITTINGS
N1	ACCESS HATCH	Ø 800	--	--	--	GMS	--
N2	TANK LEVEL SENSOR	25NB	PN 16	SINGLE	150	GMS	--
N3	PUMP TAKE-OFF	80NB	PN 16	SINGLE	150	GMS	--
N4	DISCHARGE FROM MIXER	100NB	PN 16	DOUBLE/PARALLEL	150/150	GMS	--
N5	FEED TO MIXER	150NB	PN 16	DOUBLE	150/150	GMS	--
N6	OVERFLOW PIPE	50NB	PN 16	SINGLE	150	GMS	--

NOZZLES TERMINATED PN16. TANK SHELL CONNECTION IS NOT RATED PN16.
TANK WALL NOZZLES SUPPLIED WITH TESTING FLANGE, GASKET AND BOLTS

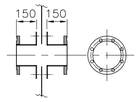
ROOF NOZZLE SCHEDULE:

R1	AIR VENT	150NB	--	SINGLE - ROOF	--	GRP	--
R2	LEVEL PROBE	50NB	--	SINGLE - ROOF	150	GRP	--

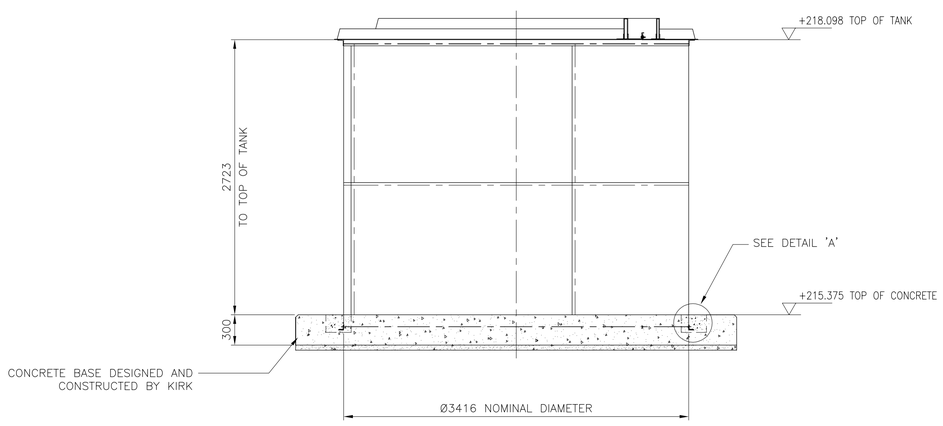
GRP ROOF NOZZLES SUPPLIED UNDRILLED.



DETAIL 'B' (NTS)
SINGLE NOZZLE CONNECTION
150mm STANDARD OFFSTAND



DETAIL 'C' (NTS)
DOUBLE NOZZLE CONNECTION



PICTORIAL VIEW

STATUS:
AS BUILT

REV.	DATE	DETAILS	DRAWN
C	15/10/10	AS BUILT	MP
B	11/12/09	FOR CONSTRUCTION	CMR
A	03/11/09	SEE CHANGE NOTE CN-001	CMR
P1	20/11/09	FIRST ISSUE	CMR

APPROVED	CHECKED	DRAWN	DATE	SCALE
--	--	CMR	20/11/09	1:30(A1)

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BV DARIES SLUDGE STORAGE TANK
GENERAL ARRANGEMENT

DRAWING No.	ISSUE	SHEET
K31703-102-1110	C	1/1