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Application to Vary Environmental Permit EPR/NP3638NN – Taw Valley Creamery

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Non-Technical Summary

Arla Foods Ltd Taw Valley Installation are seeking to vary their Environmental Permit EPR/NP3638NN to account for an expansion of the site primarily as a result of the introduction of mozzarella production. The proposed changes to the site follow an extended period of consultation with the Environment Agency that sought to also address a number of related issues, primarily regarding the age and uncertain condition of the existing effluent facility and aeration lagoons. This variation represents a significant step change investment at the site by introducing new waste effluent treatment technologies and upgrade of key associated assets in line with Best Available Techniques (BAT) for the sector that fundamentally address the perceived risks associated with possible liner failure and potential for loss of containment.

This variation therefore deals with changes at the site that include the following activities and assets:

- Mozzarella production
- All Purpose Whey
- Cheddar CIP
- Milk Intake and CIP
- Increased pasteurisation capacity
- Refrigeration and heat recovery
- Replacement of existing effluent treatment plant
- Water recovery
- Utility provision including additional and replacement of air compressors, refrigeration equipment and steam boiler (culinary), water treatment.
- An update to description of the milk, cheese, whey powder and protein concentrate production processes, removal of butter and overarching operating techniques

The introduction of mozzarella will result in an increase overall production capacity of the installation. The new Mozzarella plant is projected to produce 88 tonnes/day, with an associated Whey Protein Concentrate (WPC) output of approximately 17 tonnes/day. Changes to the product mix, including the increase in WPC concentration (62% to 82%) and the removal of butter production, will partially offset the increase in production capacity.

The above proposed changes require the operator to handle and fully treat increased influent volumes from the production plant associated with the expansion of the site into the production of mozzarella cheese alongside production of cheddar, whey powder and whey protein concentrate. The operations will be able to comply with the anticipated EA revised consent conditions in accordance with the Waste Treatment BREF note as discussed with EA during pre-application consultation. Whilst the initial enhanced pre-application consultation sought to uplift discharge volumes to 3250m^3 this variation seeks authorisation to increase the treatment capacity of the ETP to support sustained maximum production capacity of the overall integrated site. The total volumetric discharge limit from the plant to the River Taw is required to be increased to a maximum total daily volume of discharge of 4500m^3 per day.

In order to assess the impact from the proposed volumetric uplift at W1 to the River Taw, a risk assessment has been completed in accordance the Environment Agency Guidance and additional environmental data collected following instruction from EA Central Permitting teams. The surface water risk assessment (Appendix 3) demonstrates that, with the proposed limits detailed below in Section 4 Table 4, all emissions of pollutants within the uplifted volume of effluent will have an acceptable impact and/or meet the EA ‘no deterioration’ criteria regarding emissions to water.

To support the changes, the appropriateness of the containment design philosophy and changes to the infrastructure have been assessed against the CIRIA Containment guidance. The site CIRIA Risk Assessment previously submitted in response to response to IC23 of EPR 3638NN/V005 for the site has been reviewed and re-issued (Appendix 4). This variation addresses all the recommendations from the original report. This updates CIRIA risk assessment concludes that site primary, secondary and tertiary containment infrastructure, and relevant pollution prevention processes, are appropriate to demonstrate alignment with CIRIA C736.

In summary this variation application has addressed potential impact to the environment from the proposed changes. Through an iterative approach to the assessment of risk it has been demonstrated that there are no significant negative effects on human beings or on the environment and no anticipated discernible increase in the odour (Appendix 6) or noise (Appendix 8) effects as a result of this variation. There are increases in the flow to the receiving environment of fully treated effluent for which the EA has been engaged with through the advanced preapplication process to obtain indicative acceptable limits. Additionally, minimal increases to ambient pollution concentrations (in the form of combustion gases) have been assessed (Appendix 5) as acceptable through detailed dispersion modelling. There are no additional releases which may lead to pollution of groundwater or additional loading to controlled waters.

These changes to the installation are considered to be substantial as they introduce a new process subject to regulation under the Medium Combustion Plant Directive (MCPD); a significant increase in the volume of production and consequently an increase in the effluent treatment capacity required to treat all indigenous effluent through a new plant in addition to a small extension to the existing boundary of the installation.

Arla will remain the operator of the overall installation and are the legal entity responsible for the continued commitment to the proactive management of compliance with the EPR permit. The site will continue to operate in accordance with an ISO14001:2015 certified Environmental Management System. Within this variation (Section 8) is a environmental risk assessment. It is concluded that the proposed works to the installation will be managed sufficiently so as to present an acceptable ongoing risk to the environment.

1 What activities are you applying to vary?

Table 1a Types of Activities

Schedule 1 listed activities						
Installation Name	**Schedule 1 References**	**Description of the activity**	**Activity daily capacity**	**Annex IIA or IIB (disposal and recovery) codes**	**Hazardous waste treatment capacity**	**Non-hazardous waste treatment capacity**
Taw Valley Creamery	Section 6.8 Part A1 (e)	Treating and processing milk with the quantity of milk received being more than 200 tonnes per day (average value on annual basis)	Intake capacity of 2,000,000 litres per day	N/A	N/A	N/A
	Section 5.4 Part A(1)(a)(I)	Biological treatment of non hazardous wastewater	Exceeding 50 tonnes per day	N/A	N/A	N/A

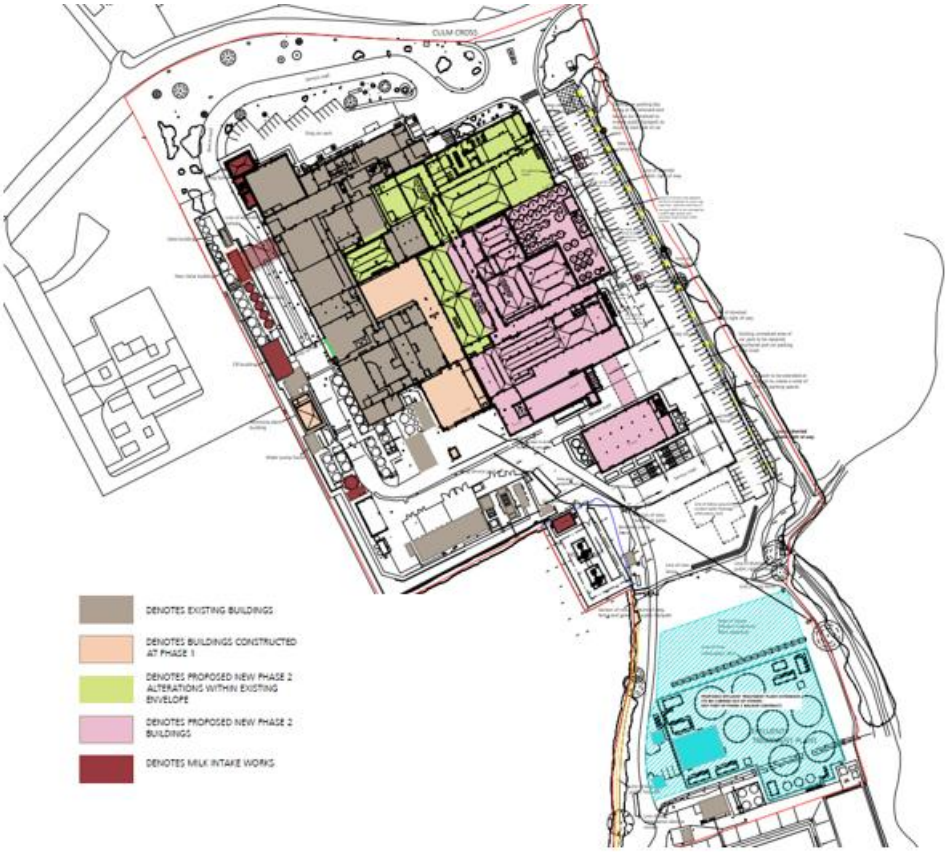
Directly associated activities (See note 4)	
Name of DAA	**Description of the DAA**
AR3	Medium Combustion plants: Boiler 1: 10.9MWth Boiler 2: 11.3MWth Boiler 3: 2.7 MWth (new) CHP: 6.1 MWth Standby 566KW(e) emergency diesel generator
AR4	Raw material storage and handling
AR5	Use of refrigerants
AR6	Storage and use of chemicals and oils
AR7	Waste handling and storage
AR8	Process cooling waters
AR9	Surface water drainage

1b About the Proposed Changes

The Taw Valley creamery installation is undergoing major redevelopment as part of the 'Baldur' Project, involving a phased programme of civil, mechanical, electrical, and process improvements designed to modernise infrastructure and strengthen environmental performance and resilience. The works are being delivered in close consultation with the local Environment Agency (EA) inspector and national permitting (via enhanced pre-application service), with agreed commitments on meeting revised emission limits, pollution control, decommissioning, and risk management.

The main expansion project at Taw Valley site is as a result of the introduction of mozzarella production. Changes to the production facilities are being undertaken in phases including extensive enabling and civils works that commenced in 2024 and will be ongoing through 2026 ahead of commissioning in 2027. These works have been planned and are being undertaken under notification to the local EA officer. This is to allow the site to first reorientate the existing process to provide segregation and additional footprint for the new mozzarella production process. Works include some improvements that serve both cheddar and mozzarella production using synergies with facilities, utilities, staff, general ways of working etc. This includes relocation, removal and installation of new milk silos, relocated cheddar despatch, reallocation of warehouses, construction of a packaging store, new CIP facilities and an enclosed recycling compound. The addition of the mozzarella facility will involve a significant extension to the south of site including a frozen warehouse, utility room, despatch facility and installation of silos serving the process. Upon commencement, mozzarella production will result in the overall production capacity of the site increasing with consequential uplift in utility use and generation of wastewater requiring on-site treatment as detailed within this variation.

Figure 1 Phasing of Works (milk intake and production)



The new Mozzarella plant is projected to produce 88 tonnes/day, with an associated WPC (82%) output of approximately 17 tonnes/day. Changes to the product mix, including the increase in WPC concentration (62% – 82%), will partially offset the increase in production capacity that is anticipated will breakdown as:

- Whey Protein Concentrate (@82%) – 17 tonnes day
- Powder – 55 tonnes day
- Cheddar Cheese 135 tonnes a day
- Mozzarella 88 tonnes per day

The current permit capacity relates to milk intake rather than finished product capacity. Variation No. 5 of the EPR permit allows for a maximum daily intake of 1,950,000 litres (approximately 1,890 tonnes) of raw milk. Typically, with an opening stock of around 800,000 litres (779 tonnes), the site receives approximately 1,160 tonnes (1,150,000 litres) per day under normal operations. With the planned expansion for Mozzarella production, the daily milk intake capacity will increase marginally to 2,000,000 litres, supported by new milk silos and upgraded reception infrastructure.

A core objective of the redevelopment of the site is the controlled and staged elimination of pollution risks associated with the existing lagoon-based effluent treatment system as identified within the site's recent CIRIA containment review. Therefore, a new fully-bunded Effluent Treatment Plant (ETP) will be constructed adjacent to the existing lagoon-based system to provide enhanced treatment capacity and improved compliance for the overall site. Once the new plant is fully commissioned the old lagoon and all associated legacy infrastructure will be decommissioned, dismantled, and infilled under notification and agreement from the local inspector. The land occupied by the former plant will be retained within the permit and not surrendered.

Leading up to the commissioning of the new ETP the operator has put in place enhanced controls in agreement with the local EA officer. These will continue up to the successful commissioning of the new plant and commencement of the decommissioning programme. They include but are not limited to:

- Inspection and maintenance of all infrastructure, existing pollution control systems and associated instrumentation will remain fully operational.
- Routine sampling/testing of effluent, surface water and groundwater to confirm compliance and identify early indicators of risk.
- Quarterly internal audits to verify pollution controls and site compliance.
- Quarterly updates presented to the local EA officer ensuring transparent communication on pollution risk controls.

The proposed changes to the effluent plant are required to handle the increase in received influent from the combined production facility when at full capacity. Whilst the initial enhanced pre-application consultation obtained indicative limits for an uplift of discharge volumes to 3250m^3 this variation seeks authorisation to increase the treatment capacity of the ETP to support the maximum design production capacity of the overall integrated site. The total volumetric discharge limit from the plant to the River Taw would be required to be increased to a maximum total daily volume of discharge of 4500m^3 per day. The submission, response and information request covered by the Pre-Application request is included at Appendix 10 of this variation application. The consultation process confirmed that upon receipt of this variation application the modelling undertaken by the EA water quality team will be re-run and revalidated with the additional environmental data requested following the preapplication and as a result in any changes in the flow required by the operator.

The selection of the treatment technology will improve the efficacy of the ETP. As well as improving the removal rates of pollutants within the process, the proposed works will also increase the treatment and containment capacity at the ETP in the event of an other than normal occurrence. All new effluent plant infrastructure will reside within a bund within the existing site boundary.

With the exception of the new ETP all works are programmed to be completed by the end of 2026 with the commissioning of the new mozzarella plant in Q2 2027. The commissioning of the new effluent plant will be in alignment with the uplifting of production capacity and the need to process additional effluent volume.

A detailed ETP decommissioning plan is in development. The approach will be fully aligned with EA guidance, including formal consultation on decommissioning scope, validation requirements, and expected post-closure condition for consultation with the local EA officer covering:

- Safe draining, desludging, and cleaning of the lagoon;
- Removal of all redundant pipework, equipment, and chemical residues;
- Verification sampling of soils and groundwater to confirm removal of legacy contamination; and
- Reinstatement of the lagoon area to achieve stable ground conditions suitable for future use

2 Site Layout

Appendix 1 Drawing 1 provides the future site layout and installation boundary plan post project completion. The variation is seeking to extend the installation boundary to include a small area of previously undeveloped agricultural land to allow the siting of high voltage equipment and associated assets to support the investment at the site. Therefore, the application includes an update to the Site Condition report in alignment with the EA's revised guidance on site condition reporting (Environmental Permitting: H5 site condition report proposed revision (Appendix 9).

3 Process Description

The introductory text to the current EPR Permit (NP3638NN/V005) provides a description of the permitted installation based on documents submitted as part of the original application, and the last

variation determined in 2023. This current variation application provides a consolidated update to the detailed description of the activities undertaken at the installation to account for changes covered by this variation, changes in operations previously agreed with EA but not accounted for in the current issue of the permit and any discrepancies contained therein. Specific attention is drawn to the inclusion of butter production in the current permit that has since been removed from the installation. The updated description of the process below accounts for these changes and the alterations to the site that are within the scope of this variation.

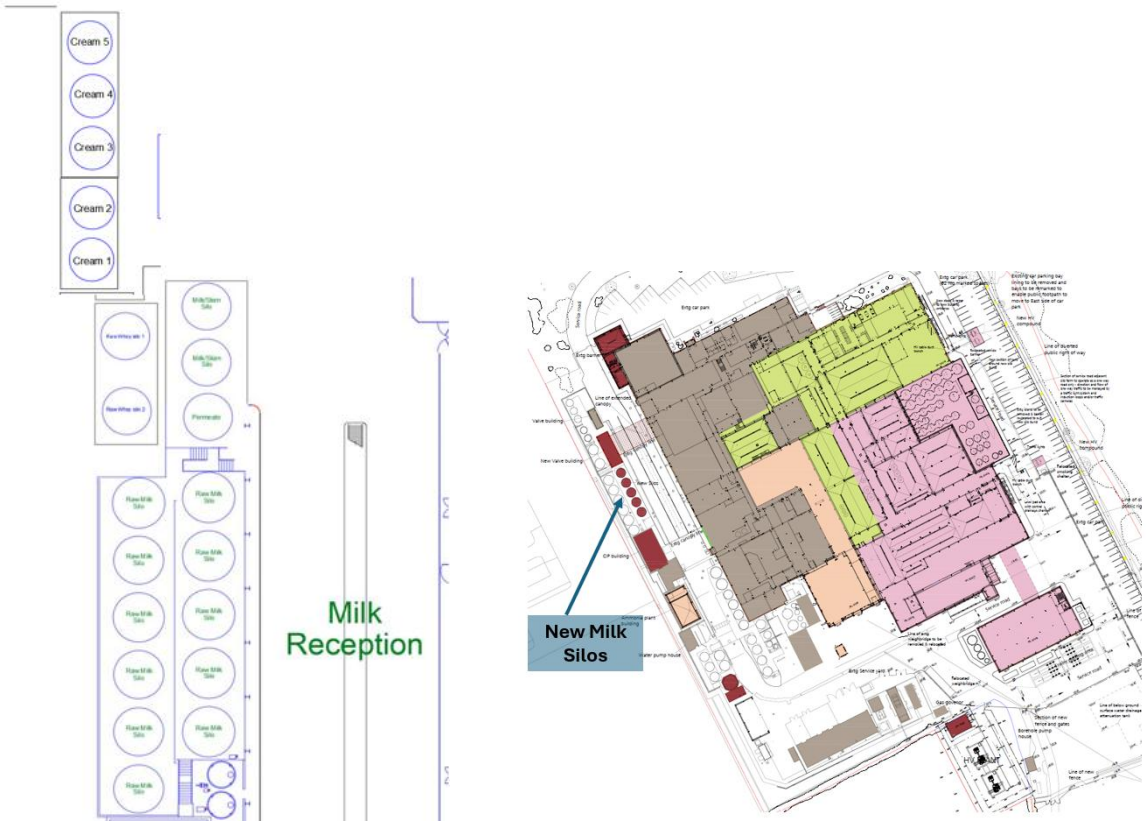
3.1 Milk Reception and Handling

Raw milk is delivered to the site daily in insulated bulk tankers from local farms. Upon arrival, each tanker is weighed using calibrated scales, and collection tickets are cross-checked against the supplier records. Quality control is performed on every tanker by taking a representative milk sample, which is tested for temperature, bacterial counts, antibiotic residues (CCP 1), fat and protein content, and other regulatory parameters. Only milk meeting quality criteria is accepted for processing.

Milk is directed to one of six intake bays and pumped into one of eleven stainless steel silos. Silo allocation is determined by available capacity, product grade, and first-in-first-out rotation to maintain freshness. Each silo is fitted with high-level and high-high level safety probes, automatic valves, and real-time temperature monitoring. CIP (Clean-In-Place) systems ensure the internal surfaces are hygienically cleaned without manual intervention. Milk is recirculated through internal piping during CIP, guaranteeing all contact surfaces meet strict hygiene standards. Silo sequencing and automation ensure consistent milk flow to downstream processes while reducing the risk of contamination or equipment overloading.

Additionally, the milk handling infrastructure is integrated with SCADA (Supervisory Control and Data Acquisition) systems, allowing remote monitoring of tank levels, flow rates, temperatures, and alarms. Milk transfers are synchronized with production schedules to optimise usage for cheddar and mozzarella lines.

The daily milk requirements at the site to allow for mozzarella production will increase. Seven of the existing silos have been replaced with six larger-capacity silos in the same location for improved storage and rotational efficiency.



Milk Storage Silos and Recepetion

3.2 Cheese Production

Cheddar cheese production follows a tightly controlled multi-stage process summarised below:

3.2.1 Raw Materials Intake

In addition to milk, starter cultures, rennet, colourings, salt, and packaging materials are inspected for microbiological quality, weight accuracy, and compliance with storage requirements. Perishable ingredients are stored in chilled conditions (typically 2–4°C), while long-term items are frozen to prevent degradation. All material handling is documented to meet food safety and traceability standards.

3.2.2 Milk Preparation and Ripening

Some of the raw milk is separated to produce skim milk and the resultant cream is further pasteurised before storage. This cream can be added back into the cheese, depending on the recipe, or exported off site for further processing. Milk is pasteurised and then transferred to stainless steel processing vats equipped with temperature control jackets and mechanical agitators. Starter cultures and rennet are added to initiate coagulation. The milk is gently stirred to ensure uniform distribution of enzymes and bacterial cultures. During ripening, temperature is continuously monitored to achieve consistent acid development and flavour profile.

3.2.3 Coagulation and Curd Formation

After ripening, rennet coagulates milk into curds. The curds are cut using automated knives to a uniform size to promote whey drainage while maintaining desired moisture content. The curds are then gently heated and scalded to firm the structure, with continuous monitoring of temperature and pH. Controlled stirring ensures even curd consistency across the vat.

3.2.4 Whey Separation and Cheddaring

Curds are drained of whey and moved to the cheddaring tower where excess whey is drained and the cheddaring process starts. In the tower the curd is compressed to press out any remaining whey before being dropped into the chip mill. Salt is automatically added and stirred into the chips to achieve precises moisture content and flavour, while also supporting preservation.

3.2.5 Pressing and Block Formation

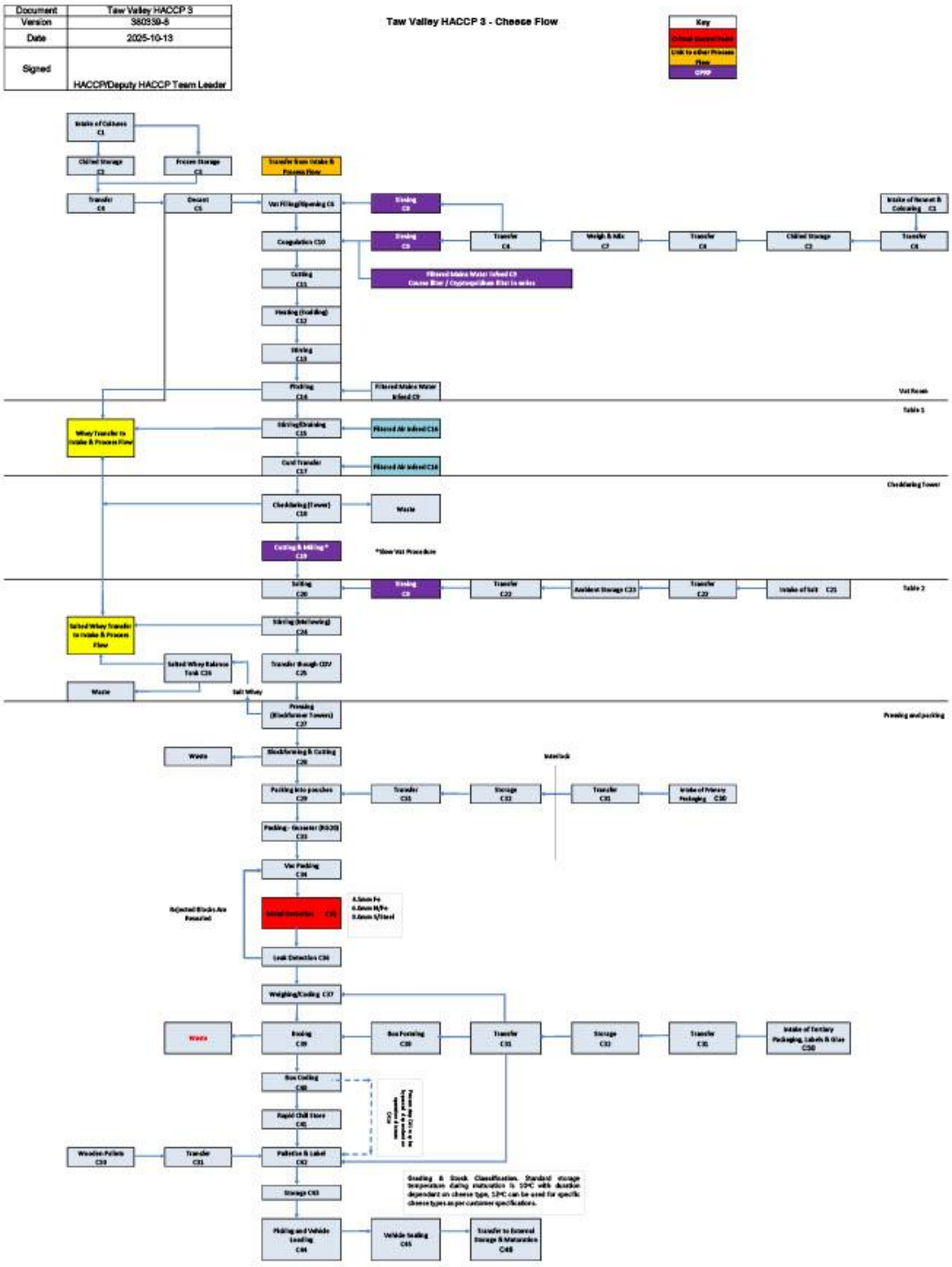
Curds are transferred from a curd distribution vessel to 5 block forming towers where the cheddaring process continues. In the blockformer towers the curd is compressed under its own weight to form a column. The column of curd is dropped to a desired height before being cut to form a block, pressed and then pushed out into a bag.

3.2.6 Packaging, Boxing, and Distribution

Blocks are vacuum sealed, and passed through a metal detector and leak detector. Packages are weighed and coded with batch information. Boxes are rapidly chilled to preserve quality, then palletized and stored under controlled conditions. Finished products are dispatched in refrigerated vehicles, ensuring cold chain integrity until deliver.

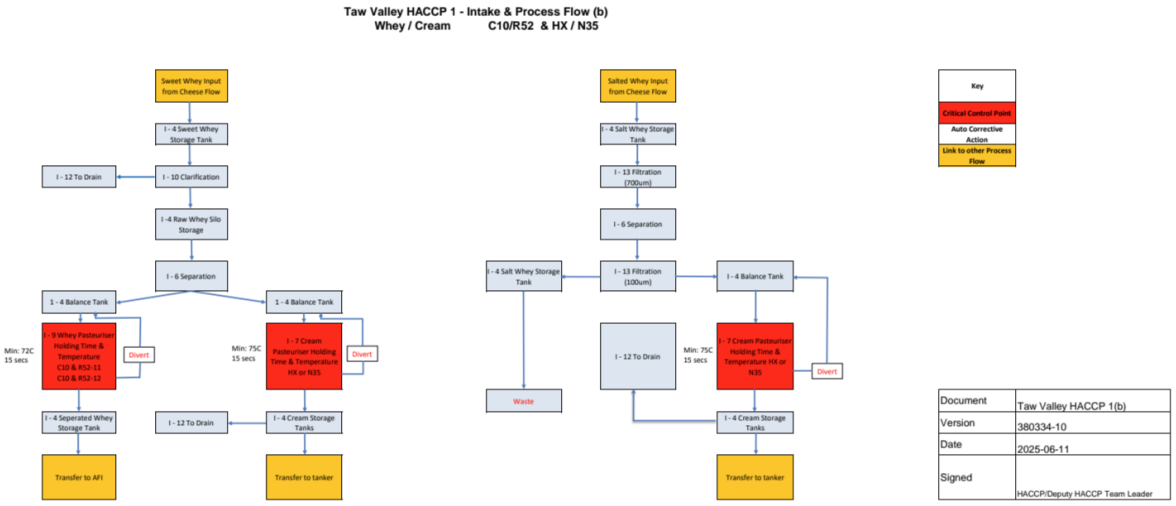
Cheddar production flow with pH and temperature monitoring points (overleaf)

Document	Taw Valley HACCP 3
Version	380330-8
Date	2025-10-13
Signed	HACCP/Deputy HACCP Team Leader



3.3 Whey and Cream Processing

After Cheddar production, whey streams (sweet and salt) are collected in dedicated stainless steel tanks. Sweet whey undergoes clarification to remove residual curd particles and minimize solids content before cream extraction. Salt whey is clarified similarly, and cream is recovered and blended with sweet whey cream for export off site. Pasteurization follows strict temperature-time control (74°C for 15 seconds, divert set at 72.5°C) to ensure microbial safety. CIP cleaning occurs every 8 hours.



3.3.1 WPC and Permeate Production

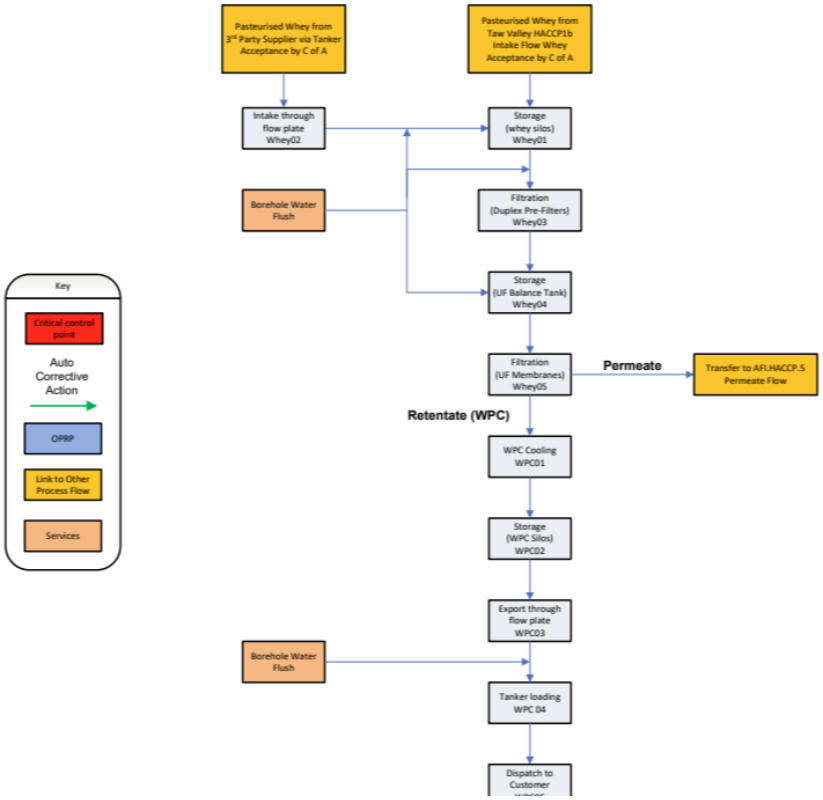
Pasteurised whey is sent to ultrafiltration (UF) membranes to produce Whey Protein Concentrate. Retentate is concentrated, re-pasteurized, and dried to produce high-protein powders. The driers are served by the bag house filter to control emissions associated with whey powder production. All abatement equipment is continuously monitored and subject to annual extractive testing and site PPMs including inspection and calibration in line with the suppliers O&M and existing permit requirements and MCERTS See Table 3.

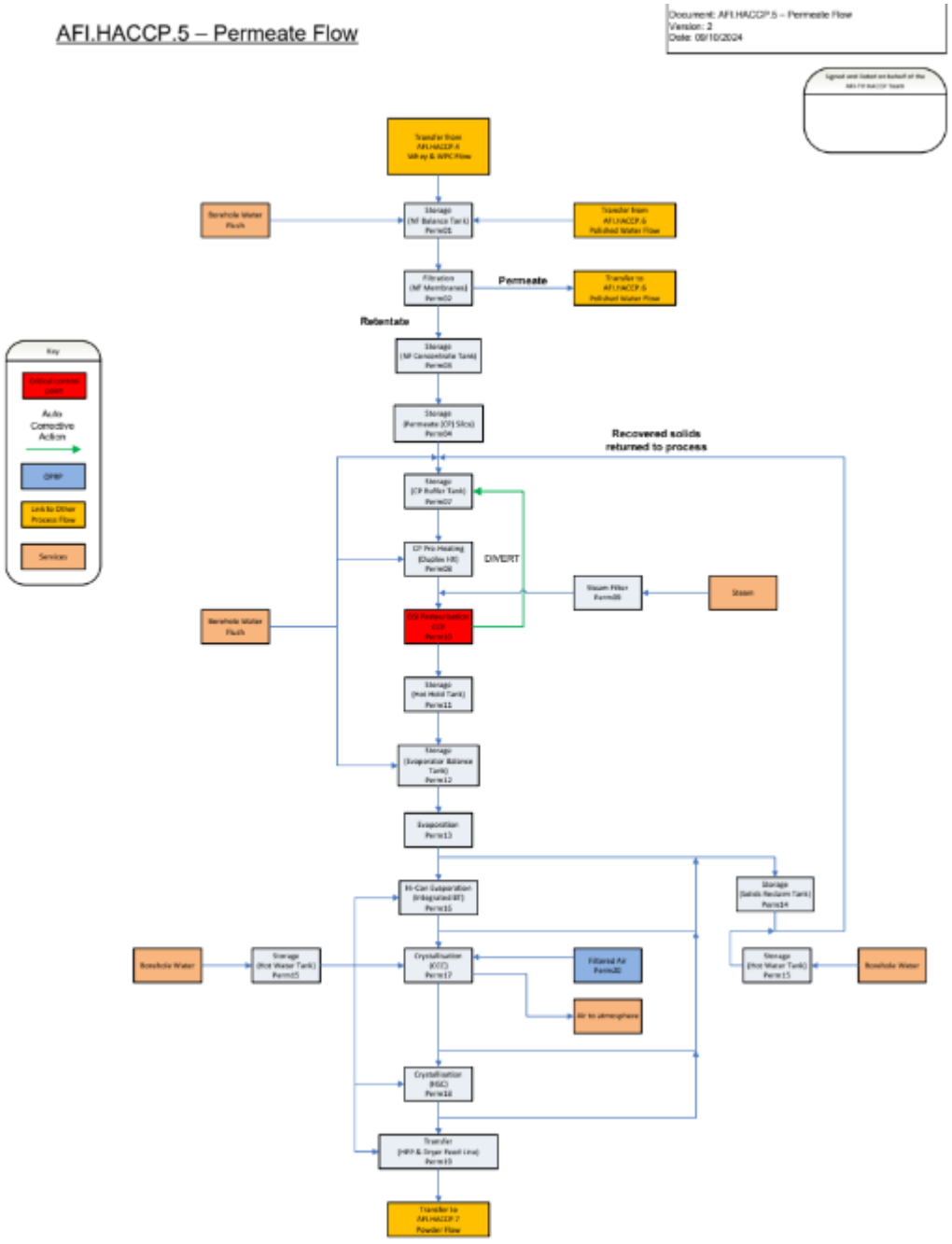
Permeate, containing lactose and minerals, is concentrated and partially demineralized to produce whey permeate powder. All steps are closely monitored for solids content, temperature, flow rates, and microbial safety.

AFI.HACCP.4 - Whey & WPC Flow

Document: AFI.HACCP.4 – Whey & WPC Flow
Version: 2
Date: 09/10/2024

Signed and Dated on behalf of the AFI-TV HACCP Team





3.3.2 Cream Handling and Storage

Recovered cream is stored in insulated Cream Storage Tanks (CSTs), with automated level and temperature controls. Cream can be redirected for cheddar, mozzarella, or offsite use. Batch traceability ensures each stream is documented for quality and regulatory compliance.

3.3.3 Process Control and Utilities

SCADA systems monitor flow rates, pressures, membrane integrity, and CIP cycles. All pumps, valves, and separators operate under automated control with alarms for deviations. Utilities such as chilled water, steam, and cleaning chemicals are precisely regulated to support continuous operation. Temperature sensors, flow meters, and conductivity probes ensure product integrity, compliance, and efficiency.

3.4 Mozzarella Production

3.4.1 Overview

The new Mozzarella facility is designed for high throughput, with automated material handling, strict quality control, and integration with existing site utilities to ensure sustainability and efficiency. As described above, the mozzarella facility is being delivered at the site through a two-phase expansion:

- Phase 1: Reorientation of existing infrastructure to create space for mozzarella production, including new milk silos, relocated cheddar dispatch, warehouse reallocation, a packaging store, two new CIP facilities, and an enclosed recycling compound.
- Phase 2: Construction of a dedicated mozzarella plant south of the site, including frozen warehouse, utility room, dispatch facility, and additional silos.

3.4.2 Raw Milk Handling and Pre-Treatment

Milk is cooled via glycol from a new ammonia refrigeration plant with heat recovery, supplying ice water and low-temperature hot water (LTHW) to reduce steam demand.

Milk pre-treatment includes clarification, standardization, and filtration to remove debris and ensure uniform fat/protein content.

SCADA-monitored flow meters and temperature probes ensure consistent milk quality before it enters the production line.

3.4.3 Pasteurization and Membrane Filtration

Milk is separated into skim and cream using high-capacity centrifugal separators. Skim milk is concentrated through ultrafiltration (UF) and microfiltration (MF) membranes, producing retentate for Mozzarella cheese. Permeate streams are further processed into WPC or whey powder for offsite use, ensuring no waste and maximising resource efficiency.

Pasteurisation is undertaken at precisely controlled temperature and flow conditions.

3.4.4 Mozzarella Cheese Processing

Milk for mozzarella is heat treated using steam. Curds and whey are separated in a decanter, whey is further processed, and the curd goes to the batch cookers. The curd is heated in the batch cookers where cream, salt, lactic acid and other ingredients are added to produce mozzarella. Inside the batch cooker the curd is stretched and folded. The mozzarella is transferred to an extruder where it is then formed into a continuous flat sheet. The flat sheet is then cooled using iced water and then cut into the final format (cubes or sticks). The cubes or sticks are rapidly frozen in a cooling tunnel to –20 °C before being fed to a form – fill – seal machine to produce packets of product. The packs are automatically check weighed and metal detected before being placed in carboard boxes. Labelled and batch coded for traceability Finished products are stored in dedicated cold storage, with temperature, humidity, and airflow control to maintain quality. Inventory is managed via automated warehouse systems for efficient dispatch.

3.4.5 Quality Control and Traceability

Inline pH, temperature, and conductivity sensors monitor critical process parameters. Each batch is traceable from milk intake to finished IQF product, meeting strict food safety standards. Samples from each production batch are tested for microbiological quality, moisture, fat content, and melt characteristics to confirm product compliance.

3.4.6 Cleaning and CIP Integration

Two new CIP facilities support the Mozzarella plant and reconfigured production lines. The CIP cycles are automated and monitored via SCADA for detergent dosing, temperature, and flow rate.

Cleaning solutions are recycled and neutralized where possible to reduce water and chemical consumption in line with the Food and Drink Sector BAT 8: Harmful substances – cleaning & disinfection.

3.4.7 Dispatch and Logistics

Finished IQF Mozzarella is palletized and stored in cold storage prior to dispatch. Automated warehouse systems optimize stock rotation and order fulfilment. Products are shipped directly from site in temperature-controlled vehicles, maintaining the cold chain from production to customer delivery.

3.4.8 Utility Integration

As part of the expansion to milk capacity, an additional cooling load of approximately 1000 kw is required. This will be accomplished by installing a new ammonia cooling system with associated tanks and pumps linked with a heat pump to generate low temperature hot water (LTHW). The new cooling plant being installed will be more energy efficient and the quantity of ammonia within the system reduced. The LTHW will be utilised for process heating which will reduce the site dependency on steam.

The process heating requirements of the new facility will require the addition of a 2.7 MWth steam boiler (A28). Whilst further the de-steaming projects will be implemented over time, there is an ambition to remove the need for the operation of this unit as part of Arla's ambition to reduce carbon emissions by 63% by 2030 and become carbon neutral by 2050.

The overall facility energy infrastructure will therefore comprise:

- 10.9 MWth natural gas-fired boiler (Emission Point A2)
- 11.3 MWth natural gas-fired boiler (Emission Point A3)
- 4.6 MWth natural gas-fired Combined Heat and Power (CHP) unit (Emission Point A7)
- A new 2.7 MWth natural gas-fired boiler is proposed to complement the existing plant, with emissions released via a new dedicated 21.6 m stack (A28).
- A new 0.57MWe emergency standby generator serving the new effluent plant

Emission Points Explanation:

- A2 and A3 (Boilers): These release combustion gases from natural gas-fired steam generation. The emissions primarily include CO_2, water vapor, and trace NOx. These boilers support pasteurisation, process heating, and general site utility requirements.
- A7 (CHP Unit): Combusts natural gas to generate both electricity and heat, improving overall energy efficiency. The flue emissions include CO_2, water vapor, and minor NOx. The CHP unit offsets electricity demand from the grid and contributes to site steam and hot water supply.
- A28 New 2.7 MWth Boiler: This additional boiler supplements existing capacity for process heating, particularly during peak Mozzarella production. Its dedicated stack ensures controlled dispersion of emissions without interaction with existing flue points.
- A29 New 0.57 KW(e)1.4MWth input standby generator (limited hours Medium Combustion Plant) operated for the purposes of maintaining power supply to the effluent plant and for testing only (less than 500 hours per year).

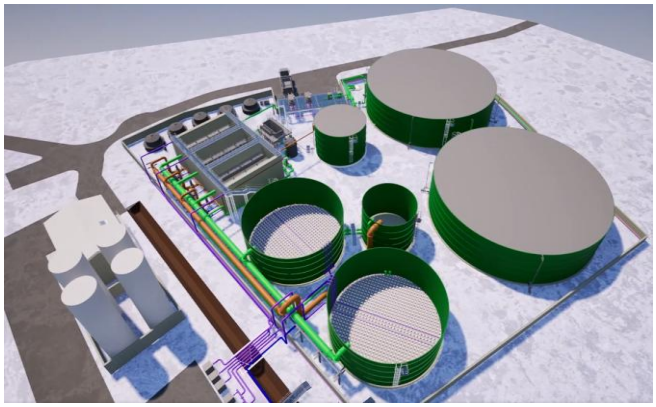
The energy strategy incorporates heat recovery and LTHW from refrigeration plants to reduce dependency on steam and improve overall efficiency. Solar panels installed on the new roof area further contribute to renewable energy supply and carbon reduction targets.

3.5 Effluent Treatment

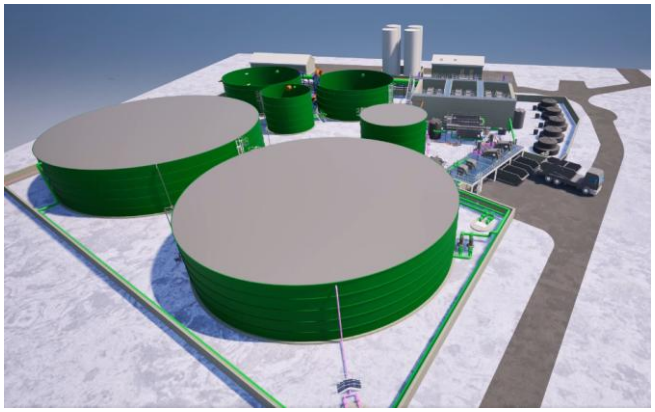
All site process effluent will be treated in a dedicated, purpose-built aerobic wastewater treatment plant which will be built alongside and will replace the existing plant. The facility is designed to treat up to a maximum of 5,000 m^3/day. The plant is designed with full automation and resilience, ensuring consistent performance while minimising environmental risks. Integrated within the new facility is the ability to recover up to 1,000 cubic meters of water per day, meeting Arla's grade 'A' quality standards using reverse osmosis technology. Once the water is recovered, it will be reintroduced into the borehole water supply line that feeds the wider site.

Location of New Effluent Plant Indicative Layout

Location of New Effluent Plant and Existing Treatment Lagoons



Render View Towards North



Render View Towards South

In conjunction with specialist suppliers, the operator has identified a treatment approach that includes primary screening and flow balancing of influence volumes, followed by Dissolved Air Flotation (DAF) to reduce contaminant loading, followed by further treatment within a membrane bioreactor (MBR) that is in alignment with the Waste Treatment Sector and Food, Drink and Milk Sector BREFs. The final effluent concentrations aligned as a minimum with the BAT discharge values as established by the UK for the Dairy Industry and indicative limits anticipated to be imposed by the EA as a result of further modelling of the discharge loading to the River Taw. In conjunction with specialist suppliers, the operator has selected a treatment approach that includes primary screening and flow balancing of influent volumes, followed by Dissolved Air Flotation (DAF) to reduce contaminant loading, followed by further treatment within a membrane bioreactor (MBR) that in combination will have the effect of:

- Reducing the Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Total Phosphorus (P) and Organic Nitrogen (N) loading to subsequent biological treatment processes.
- Reducing the Fats, Oils and Greases (FOG) loading to downstream processes.
- Reducing the TSS and FOG load.
- Improving the energy efficiency of the plant by reducing the demands currently required by the existing blowers
- Optimised controls on coagulant and chemical dosing.
- Critically, reducing the loading of (and therefore noncompliance risk associated with) the discharge of TSS, BOD, COD, Total P, Total N, Iron and Chloride to the River Taw.

A summary process flow and supporting information including anticipated equipment specification for key treatment assets is detailed below with detailed description provided within the subsections of Appendix 2.

3.5.1 FOG Separator and Transfer Pumps

Incoming effluent first passes through a FOG (fat, oil, and grease) separator, which removes floating oils and grease from the wastewater stream. The separated FOG is collected and transferred using duty and standby pumps to a designated collection area for proper disposal or treatment.

3.5.2 Screening and Collection

A screening system removes large solids and debris from the wastewater before it enters the main treatment process. The screen may be rotary or static, equipped with an automatic wash system to maintain continuous operation. Screenings are directed via chutes into collection bins at ground level, and hose points are provided for cleaning any spillages, ensuring a hygienic process.

3.5.3 Incoming Effluent Sampler

After screening, a 24-hour composite sampler automatically collects samples of the incoming wastewater. This enables continuous monitoring of effluent characteristics, including pH, COD, and other critical parameters. Sampling ensures compliance with regulatory standards and supports process optimisation.

3.5.4 Balance Tank with Aerator Mixers

The balance tank receives screened effluent and provides a consistent flow to downstream treatment. Three aerator mixers are installed at low level to maintain homogeneity, prevent solids settling, and promote oxygenation if needed. The tank includes radar-level transmitters to monitor volumes and facilitate automated flow control.

3.5.5 Divert Tank / Standby Balance Tank

A divert tank of equivalent capacity to the balance tank is provided to isolate effluent that is out of specification, such as wastewater with high or low pH or excessive COD. Out-of-specification effluent can be slowly returned to the balance tank for treatment or, in extreme cases, tankered off-site. The tank is also equipped with aerators, sampling points, and level monitoring for safe and controlled operation.

3.5.6 Dissolved Air Flotation (DAF)

The DAF units remove suspended solids and reduce COD levels. Effluent is pre-treated in a hydraulic flocculator, where chemicals including hydrochloric acid, sodium hydroxide, and coagulants are dosed using duty/standby variable stroke pumps. The DAF floats sludge for removal, with sludge pumps transferring collected material to the sludge storage tank.

3.5.7 Anoxic Tank and Aeration Tank

The anoxic tank facilitates denitrification by creating low-oxygen conditions, allowing bacteria to convert nitrates to nitrogen gas. Effluent from the DAF and returned sludge are mixed under controlled conditions. Following this, the aeration tank provides oxygen-rich conditions to support biological treatment via activated sludge. Aeration is provided by fine bubble grids powered by variable-speed blowers controlled through DO sensors to maintain optimal dissolved oxygen levels.

3.5.8 Membrane Bioreactor (MBR)

The MBR system combines biological treatment with ultrafiltration membranes. It produces high-quality treated effluent suitable for reuse or discharge. Sludge from the MBR is collected in dedicated tanks, and duty/standby pumps manage sludge transfer and recirculation.

3.5.9 Reverse Osmosis (RO)

The RO system separates water from dissolved solids, enabling recovery of up to 1,000 m^3/day for reuse in cleaning and process water. Semi-permeable membranes ensure high-quality output water, reducing borehole water demand and supporting the site's sustainability goals.

3.5.10 Final Effluent Sampling

Before discharge, effluent is continuously monitored for quality parameters such as total phosphorus, total nitrogen, and other relevant indicators. Automated samplers ensure compliance with permit limits and facilitate real-time process control.

3.5.11 Chemical Storage and Dosing

Bunded bulk chemical tanks store HCl, ferric chloride, caustic, coagulants, and polymers with double containment. Duty/standby dosing pumps deliver chemicals to the process as required, with automatic control via the SCADA system. This ensures precise dosing, environmental compliance, and safety in handling hazardous substances.

3.5.12 Compressed Air and Wash Water

Compressed air, generated via on-site compressors, powers pneumatic control systems and instrumentation around the plant. Wash water points throughout the ETP bund provide cleaning and spill management, maintaining operational hygiene and safety.

3.5.13 Sludge Dewatering

A screw press dewaters sludge, substantially reducing waste volume before off-site disposal. Dewatering improves sludge handling efficiency and lowers the environmental footprint of waste management.

3.5.14 Commissioning and Maintenance

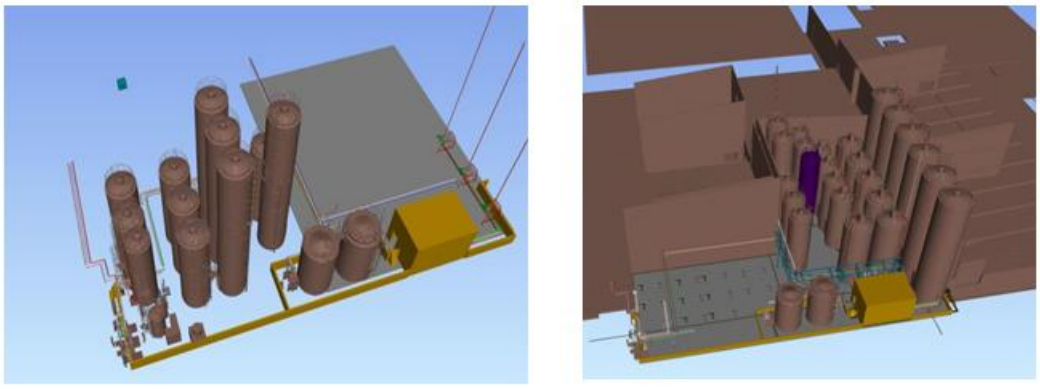
Following installation, the plant will undergo commissioning to confirm performance against design specifications. Site staff will be trained in operations and maintenance, with SOPs and a maintenance programme ensuring long-term reliability and regulatory compliance.

3.6 Raw Materials

Across the whole site the nature, types and environmental hazards posed by raw materials usage and delivery will not fundamentally change as a result of this variation. There will be no significant new chemicals or materials introduced to site that are not currently already residing within the installation boundary. However, the maximum quantities of milk, hygiene chemicals and effluent will be increasing due to the increased capacity of the facility.

In addition to the changes described above to the milk reception and processing tanks required for the mozzarella production areas as a result of the overall changes there is a requirement for additional bulk chemical storage which will be located within a new bunded silo farm adjacent to mozzarella production.

The new silo farm that serves mozzarella production is located as indicated below:



Render Views of the Mozzarella Tank Farm Pump Room

The following specific bulk materials are raw ingredients and auxiliary consumables integral to the functioning of the processes (Table 2). All are industry standard materials and most are already used by at the installation in similar quantities with the same fates and do not therefore present additional risk to human health and the environment. The containment design for the new and modified areas have been assessed alongside the review of the changes to the site as part of the updated CIRIA Containment Risk Assessment (Appendix 4) and the assessment of impact of use of all materials consumed at the installation and their fate in the environment has been assessed the presented within Appendix 3 – Surface Water Risk Assessment.

Relevant hazardous substances are those substances or mixtures defined within Article 3 of Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP Regulation) which, as a result of their hazardousness, mobility, persistence and biodegradability (as well as other characteristics), are capable of contaminating soil or groundwater and are used, produced and/or released by the installation. The changes to the site that are subject to this variation are associated with the use and storage of relevant hazardous substances that are already employed at the site. These substances were screened using the three-stage assessment outlined in the EC guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions as part of the previous permit variation. The assessment concluded that, based on site management and infrastructure, an ‘actual pollution risk’ is not posed by the storage of Relevant Hazardous substances on site. The modifications to the installation introduced by this variation will further improve the physical containment measures (Appendix 4). The ongoing checks and audits at the site indicate that it’s unlikely that the site poses an actual or significant risk to users and the baseline condition of the underlying ground.

Table 2 Bulk Storage Tank Inventory

i) Milk Reception

Location	Status Existing/New	Material	Volume (Ltrs)	Storage	Hazard Rating & Justification
Raw Milk Silo 1 (TK0113)	New	Raw Milk	250,000	Stainless Steel Tank	Food raw ingredient. Negligible pollution potential. No risk hazard classification under CLP. Overfill protection fitted to tank. Local drainage to the remote ETP.
Raw Milk Silo 2 (TK0112)	New	Raw Milk	250,000	Stainless Steel Tank	
Raw Milk Silo 3 (TK0111)	New	Raw Milk	250,000	Stainless Steel Tank	
Raw Milk Silo 4 (TK0110)	New	Raw Milk	250,000	Stainless Steel Tank	
Raw Milk Silo 5 (TK0109)	New	Raw Milk	250,000	Stainless Steel Tank	
Raw Milk Silo 8 (TK0103)	Existing	Raw Milk	140,000	Stainless Steel Tank	
Raw Milk Silo 9 (TK0104)	Existing	Raw Milk	140,000	Stainless Steel Tank	
Raw Milk Silo 10 (TK0105)	Existing	Raw Milk	140,000	Stainless Steel Tank	
Raw Milk Silo 11 (TK0106)	Existing	Raw Milk	220,000	Stainless Steel Tank	
Raw Milk Silo 12 (TK0107)	Existing	Raw Milk	220,000	Stainless Steel Tank	
Raw Milk Silo 13 (TK0108)	Existing	Raw Milk	220,000	Stainless Steel Tank	
Raw Milk Silo (TK0102)	New	Raw Milk	250,000	Stainless Steel Tank	
Raw Whey Silo 2	Existing	Raw Whey	90,000	Stainless Steel Tank	
Processed Whey silo 1	Existing	Whey	200,000	Stainless Steel Tank	
Processed Whey silo 2	Existing	whey	200,000	Stainless Steel Tank	
Processed Whey silo 3	Existing	Whey or Waste product	200,000	Stainless Steel Tank	
AFI CIP rinse tank	Existing	Water	10,000	Stainless Steel Tank	
AFI caustic	Existing	Chemical and water	10,000	Stainless Steel Tank	
AFI acid	Existing	Chemical and water	10,000	Stainless Steel Tank	

WPC Silo 6	Existing	Whey Protein Concentrate	60,000	Stainless Steel Tank	
WPC Silo 7	Existing	Whey Protein Concentrate	60,000	Stainless Steel Tank	
Whey Silo 2	New	Whey	127,000	Stainless Steel Tank	
CP Silo 1	Existing	Calcium Permeate	140,000	Stainless Steel Tank	
CP Silo 2	Existing	Calcium Permeate	140,000	Stainless Steel Tank	
Cream Storage tank 1	Existing	Sweet cream	60,000	Stainless Steel Tank	
Cream Storage tank 2	Existing	Sweet cream	60,000	Stainless Steel Tank	
Cream Storage tank 3	Existing	Sweet cream	60,000	Stainless Steel Tank	
Cream Storage tank 4	Existing	Sweet cream	60,000	Stainless Steel Tank	
Cream Storage tank 5	Existing	Sweet cream	60,000	Stainless Steel Tank	
2x 8000 ltr detergent tanks (1 for tankers and 1 for silos) detergent is TK9201 and T for tanker cip prefix CK0002, line and silos CK0001	New	Caustic or Nitric Acid and water	2 x 8000	Stainless Steel Tank	Medium - This product is not classified as environmentally hazardous. However, large or frequent spills can have a harmful or damaging effect on the environment. Area drains to the effluent plant. Areas of local hardstanding in good condition.
2x New water recovery tank 13,500 ltr	New	Water and dilute chemical	2 x 13,500	Stainless Steel Tank	
new fresh water tank 16,500 ltrs TNK9001	New	Water	16,500	Stainless Steel Tank	Low - Food raw ingredient. Negligible pollution potential. No risk hazard classification under CLP. Overfill protection fitted to tank. Local drainage to the remote ETP.
Horolith	Existing	Horolith	1,000	IBC	High - LD50 (75ppm) and mass calculation signals high toxicity. Large or frequent spills can have a harmful or damaging effect on the environment. Area drains to the effluent plant. Areas of local hardstanding in good condition. IBC stored on drip tray bund.
Ultrachlor 10	Existing	Ultrachlor 10	1,000	IBC	Medium - This product is not classified as environmentally hazardous. However, large or frequent spills can have a harmful or damaging effect on the environment. Area drains to the effluent plant. Areas of local hardstanding in good condition. IBC stored on drip tray bund.
Auxillary silo 8	Existing	Waste product and/or dilute chemicals	127,000	Stainless Steel Tank	Low - Food raw ingredient. Negligible pollution potential. No risk hazard classification under CLP. Overfill protection fitted to

Auxillary silo 9	Existing	Waste product and/or dilute chemicals	127,000	Stainless Steel Tank	tank. Local drainage to the remote ETP.
pre-rinse tank	Existing	Water and small amount of chemical	10,000	Stainless Steel Tank	
Glycol buffer tank (Hot)	New	DTX Coolmax gylcol	12,500	Stainless Steel Tank	Medium - This product is not classified as environmentally hazardous. However, large or frequent spills can have a harmful or damaging effect on the environment. Area drains to the effluent plant. Areas of local hardstanding in good condition. IBC stored on drip tray bund.
Glycol buffer tank (Cold)	New	DTX Coolmax gylcol	12,500	Stainless Steel Tank	
Low Temperature Buffer Tank (Ammonia)	New	Water	20,000	Stainless Steel Tank	Low - Food raw ingredient. Negligible pollution potential. No risk hazard classification under CLP. Overfill protection fitted to tank. Local drainage to the remote ETP.
Low Temperature Buffer Tank (CHP)	New	Water and inhibitor	50,000	Mild Steel Tank	Medium - This product is not classified as environmentally hazardous. However, large or frequent spills can have a harmful or damaging effect on the environment. Area drains to the effluent plant. Areas of local hardstanding in good condition.
Bulk Nitric Acid	Existing	Nitric Acid	21,000	Stainless Steel Tank	High - Large or frequent spills can have a harmful or damaging effect on the environment. Area drains to the effluent plant. Secondary containment provided by shared concrete bund with over 25% volume capacity of all tanks.
Mip SC	Existing	Sodium Hydroxide	23,000	Stainless Steel Tank	High - Large or frequent spills can have a harmful or damaging effect on the environment. Area drains to the effluent plant. Secondary containment provided by shared concrete bund with over 25% volume capacity of all tanks.

ii) New Silo Farm – Tank Inventory (Mozzarella Production)

Location	Status Existing/New	Material	Volume (Ltrs)	Storage	Hazard Rating & Justification
Pasteurised Whey	New	Whey	100,000	Stainless Steel Tank	Low - Food raw ingredient. Negligible pollution potential. No risk hazard classification under CLP. Overfill protection fitted to tank. Stored within bunded Tank Fram.
Pasteurised Whey	New	Whey	100,000	Stainless Steel Tank	
Milk Permeate	New	Permeate	60,000	Stainless Steel Tank	
Milk Permeate	New	Permeate	60,000	Stainless Steel Tank	
Milk Permeate	New	Permeate	60,000	Stainless Steel Tank	
Concentrated Milk	New	Milk	60,000	Stainless Steel Tank	

Concentrated Milk	New	Milk	60,000	Stainless Steel Tank	
Process Milk	New	Milk	60,000	Stainless Steel Tank	
Process Milk	New	Milk	60,000	Stainless Steel Tank	
Process Milk	New	Milk	60,000	Stainless Steel Tank	
Process Milk	New	Milk	60,000	Stainless Steel Tank	
Skimmed Milk	New	Milk	100,000	Stainless Steel Tank	
Skimmed Milk	New	Milk	100,000	Stainless Steel Tank	
Skimmed Milk	New	Milk	100,000	Stainless Steel Tank	
Skimmed Milk	New	Milk	100,000	Stainless Steel Tank	
Skimmed Milk	New	Milk	100,000	Stainless Steel Tank	
RO Water	New	Water	250,000	Stainless Steel Tank	
RO Water	New	Water	250,000	Stainless Steel Tank	
RO Water	New	Water	250,000	Stainless Steel Tank	
Skimmed Milk	New	Milk	100,000	Stainless Steel Tank	
Sodium Hydroxide Bulk 36.5%	New	Caustic	60,000	Stainless Steel Tank	Medium - Products are not classified as environmentally hazardous. However, large or frequent spills can have a harmful or damaging effect on the environment. Stored within new high integrity hardstanding within Tank Farm/ Internal valve room.
M&P CIP Set Caustic Tank (dilute)	New	Caustic (dilute)	50,000	Stainless Steel Tank	
Whey CIP Set Caustic Tank (dilute)	New	Caustic (dilute)	30,000	Stainless Steel Tank	
Cheese CIP Set Caustic Tank	New	Caustic	50,000	Stainless Steel Tank	
Cheese CIP Set Weak Caustic Tank	New	Caustic (dilute)	50,000	Stainless Steel Tank	
Nitric Acid Bulk 40%	New	Acid	60,000	Stainless Steel Tank	
M&P CIP Set Acid Tank	New	Acid (dilute)	50,000	Stainless Steel Tank	
Whey CIP Set Acid Tank	New	Acid (dilute)	30,000	Stainless Steel Tank	

Cheese CIP Set Acid Tank	New	Acid (dilute)	50,000	Stainless Steel Tank	
Citric Acid Bulk 40%	New	Acid	40,000	Stainless Steel Tank	
Hydrochloric Acid Bulk 30%	New	Acid	1,000	Stainless Steel Tank	
Hydrochloric Acid Dilute 5%	New	Acid (dilute)	5,000	Stainless Steel Tank	
Citric Acid Dilute 20%	New	Acid (dilute)	1,000	Stainless Steel Tank	

iii) New Effluent Plant[1] – Main bulk tanks only (see Appendix 13 for full materials inventory)

Location	Status Existing/New	Material	Volume (Ltrs)	Storage	Hazard Rating & Justification
Polymer Tank	New	Polymer	6,000	Self Bunded Polypropylene Tank	Medium - These products are not classified as environmentally hazardous. However, large or frequent spills can have a harmful or damaging effect on the environment. Stored within new high integrity hardstanding within the effluent compound
Dewatering Polymer	New	Polymer	2,771	Self Bunded Polypropylene Tank	
Sulphuric Acid Tank	New	Acid	30,000	Self Bunded Polypropylene Tank	
Ferric Sulphate Tank	New	Coagulant	30,000	Self Bunded Polypropylene Tank	
Citric Acid Tank	New	Acid	1,000	IBC	
Sodium Hypochlorite	New	Caustic	2,000	IBCs	
Sodium Hydroxide Tank	New	Caustic	30,000	Self Bunded Polypropylene Tank	
Antiscalant	New	Antiscalant	1,000	IBC	
Sodium Hypochlorite Tank	New	Sodium Hypochlorite	3,000	Self Bunded Polypropylene Tank	High - This product is classified as environmentally hazardous. Stored within new high integrity hardstanding within the effluent compound
Post DAF PS	New	Process effluent	20,000	PE	High – While effluent is not highly ecotoxic, there is a very large volume within the ETP. A major effluent spill can significantly impact river ecology. High - This product is classified as environmentally hazardous. Stored
Balance Tank	New	Process effluent	2,863,000	Glass lined steel tank	
Divert Tank	New	Empty routinely / Process effluent	2,863,000	Glass lined steel tank	
Post DAF PS	New	Process effluent	20,000	PE	

[1] Subject to review at ETP detailed design stage

Anoxic Tank	New	Process effluent	769,422	Glass lined steel tank	within new high integrity hardstanding within the effluent compound
Aeration Tank 1	New	Process effluent	1,679,183	Glass lined steel tank	
Aeration Tank 2	New	Process effluent	1,679,183	Glass lined steel tank	
Membrane Tank 1	New	Process effluent	334,000	Concrete tank	
Membrane Tank 2	New	Process effluent	334,000	Concrete tank	
Membrane Tank 3	New	Process effluent	334,000	Concrete tank	
MBR CIP Tank	New	Dilute CIP Chemical	20,000	PE	
MBR CIP Header Tank	New	Dilute CIP Chemical	5,000	PE	
MBR Permeate Tank	New	Permeate	10,000	PE	
Sludge Tank	New	Effluent sludge	670,461	Glass lined steel tank	
Reverse Osmosis Feed Tank	New	Sodium Hypochlorite	3,000	Self Bunded Polypropylene Tank	
Reverse Osmosis Feed Tank	New	Processes Effluent	10,000	PE	Fully processed effluent, in compliance with permitted standards, poses limited environmental risk.
Reverse Osmosis Permeate Tank	New	Processes Effluent	10,000	PE	
Standby Generator Diesel Storage	New	Diesel	20,000	PE	Diesel fuel is hazardous to the environment. The tank is new, self bunded and compliant with the Oil Storage Regulations.

4 Emissions to Air, Water and Land

4.1 Point Source Emissions to Air

The process heating requirements of the new facility will require the addition of a 2.7 MWth steam boiler and associated emission point (A28). The two new CIP systems to support mozzarella production will be vented from the tanks during routine filling and emptying. Table 3 and Appendix 1 Drawing 2.

Table 3 Emission Points to Atmosphere

Permit Ref	Source	Parameter	*Limit*	Location	Notes
A2	Boiler 2 10.9 MWth Natural Gas Fired	Oxides of Nitrogen	*100 mg/m3*	Boiler House	Existing - only one main process boiler is operated at a time
		Carbon Monoxide	*No Limit Set*		
A3	Boiler 1 11.3 MWth Natural Gas Fired	Oxides of Nitrogen	*100 mg/m3*	Boiler House	
		Carbon Monoxide	*No Limit Set*		
A4	Baghouse fan outlet	Particulates	*20 mg/m3*	Baghouse	Existing
A5	Receiving baghouse vent	Particulates	*20 mg/m3*	Baghouse	Existing
A6	Cooling, crystallisation, concentrator (CCC) Exhaust	Water Vapour	*No Limit Set*	Baghouse	Existing
A7	CHP 6.1MWth	Oxides of Nitrogen	*95 mg/m3*	CHP Plant Room	Existing
		Carbon Monoxide			
A8	Steam Safety Valve	No Parameters Set	*No Limit Set*	Various	Existing
A9-21	CIP Tank Vents	No Parameters Set	*No Limit Set*	Various	Existing
A22-27	Condensate Valves	No Parameters Set	*No Limit Set*	Various	Existing
A28	2.7MWth Steam Boiler	Oxides of Nitrogen	*100 mg/m3*	Mozzarella Plant	New
		Carbon Monoxide	*No Limit Set*	"	"
A29	1.4 MWth Emergency Generator	Oxides of Nitrogen	*No Limit Set*	Effluent Plant	New
		Carbon Monoxide	*No Limit Set*		

The minimal increases to ambient pollution concentrations (in the form of combustion gases from equipment routinely operated that serve the process) have been assessed (Appendix 5) as acceptable through detailed dispersion modelling.

4.2 Point Source Emissions to Water

There are no changes to the number and location of point source emissions to water as a result of this variation.

Table 4a Point Source Emissions to Water (other than Sewers)

Permit Ref	Source	Parameter	*Limit*	*Reference Period*	*Monitoring Frequency*	Notes
W1	Effluent Treatment Plant	Total Daily Volume of Discharge dry weather flow	*2500 mg/l*	24 hr Total	Continuous	See Table 4a
"	"	Chemical Oxygen Demand (COD)	125 *mg/l*	24 Hour Flow Proportional Sample	Daily	See Table 4a
"	"	Total Suspended Solids	14 *mg/l*	24 Hour Flow Proportional Sample	Daily	See Table 4a
"	"	Total Nitrogen (TN)	20 *mg/l*	24 Hour Flow Proportional Sample	Daily	See Table 4a
"	"	Total Phosphorus (P)	2 *mg/l*	24 Hour Flow Proportional Sample	Daily	See Table 4a
"	"	Chloride (CL)	-	24 Hour Flow Proportional Sample	Monthly	No Change
"	"	Biological Oxygen Demand (BOD)	*9 mg/l*	24 Hour Flow Proportional Sample	Monthly	See Table 4a
"	"	Ammoniacal nitrogen as N	*5 mg/l*	24 Hour Flow Proportional Sample	Monthly	See Table 4a
"	"	pH	*6-9*	-	Continuous	No Change
"	"	Temperature	*30 ^{O}C*	-		No Change
W2	Uncontaminated Surface Water	No Parameters Set	-	-	-	No Change

4.2.1 Surface Water Discharge and Containment Philosophy

Under normal operations only clean rainwater routinely enters the surface water drainage system. All sources of materials that may give rise to pollution potential are located in areas that drain to effluent. The processing and new ETP area will be constructed of robust high integrity hardstanding to prevent migration of losses to ground (Appendix 11.1). There will be no change to the existing arrangement for non-contaminated surface water discharge from site (W2). The existing infrastructural and operational controls are sufficient to prevent discharge of pollution at W2 that serves all areas of hard standing surrounding the production areas and carparking. The new effluent plant infrastructure will be located in newly constructed areas where all local drainage leads back to the head of the treatment works and will therefore be treated by the ETP before discharge via W1. See Appendix 1 Drawing 3 for the updated drainage plan.

In the instance of a loss of containment or spill the operators follow established robust spill procedures that are already embedded at site to prevent spills reaching the drainage system. Should pollutants reach a surface water drain, the pollutants would first enter a belowground pit whereby a probe continuously monitors pH, conductivity and temperature. Should pollutants be identified, site operatives would be notified and activate a pumped divert to the ETP.

There is an existing penstock valve located in the surface water drainage system (W2). In the event of a pollution spill reaching a surface water drain, the valve will be closed shut retaining polluting materials within the site boundary and drainage infrastructure. The penstock is serviced and tested annually by a third-party specialist. In the event of a major pollution event, the installation is therefore reliant on the tertiary containment of the effluent plant to contain liquid within the installation infrastructure and specifically the ETP. The new ETP has therefore been designed with appropriate divert tank capacity to contain and separately treat or dispose of losses directed to the ETP from the operational facility.

In the event of catastrophic failure of any of the ETP assets a reinforced concrete bund wall runs across the boundary of the ETP. The containment volume is sufficient to retain losses within the ETP area in the event of catastrophic failure of any of the proposed ETP tanks. In order to assess the appropriateness of the containment philosophy and infrastructure in light of the proposed change. The containment assessment is provided as Appendix 4.

4.2.2 Uplift to Discharge Volume

The above-described investments in the ETP are for the purpose of both improvements in ETP performance and efficiency, and to handle a proposed increase in the dairy effluent volumes received from the creamery. As a result of the increased influent reception, the installation is seeking to uplift the maximum allowable discharge at W1 to 4500m^3/day.

4.2.3 Surface Water Pollution Risk Assessment

In order to assess the impact from the proposed 80% volumetric uplift at W1 to the River Taw, a risk assessment has been completed in accordance the Environment Agency Guidance: Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk). This assessment is presented within Appendix 3 – Surface Water Risk Assessment.

In terms of the point source emissions limits at the outfall, the site anticipates an update to the indicative limits that were determined by the EA's enhanced pre application process in 2024 (Appendix 10). The below Table 4b proposed limits have been determined through reducing the concentrations of modelled parameters proportionally to the increase in volume from 3250m^3/day to 4500m^3/day. In summary, the mass of pollution discharged is unchanged for the modelled parameters.

The remaining parameter limits (pH, COD, Temperature and Total N) were stated by an EA Water Quality representative, through an assessment of BAT. This is reflected in the pre application advice. Therefore, it is understood that no change to these indicative limits is required.

Table 4b – Proposed W1 Emissions Limits

Determinant	Current Permit 2500m3	Uplift to 3250m3*	Uplift to 4500m3
pH	6 - 9	6 - 9	6 - 9
Temperature	30	30	30
COD (mg/l)	125	125	125
BOD (mg/l)	9	7	5
Suspended Solids (mg/l)	14	11	8
Ammoniacal nitrogen (mg/l)	5	3	2.2
Total P (mg/l)	2	0.5	0.36
Iron (ug/l)	No limit	2600	1878
Total N (mg/l)	20	20	20
Total K (mg/l)	No limit	145 (95%ile 371 maximum	105 (95%ile 268 maximum

* Indicative limits received from EA following initial enhanced pre-application consultation (30% uplift in effluent flow).

** Extrapolated limits for 80% uplift required at full production capacity based on mass loading of the determinant on a daily basis. Where no change is applied this is because the original EA modelling which screened the uplift against BAT limits rather than against parameters in the model.

Regarding the hazardous substances that may be present within the effluent discharge, a chemical inventory of liquid products was collated. A number of substances and their potential emissions were determined from a worst-case mass balance calculation. Emissions of dissolved iron and EDTA were assessed using the EA's H1 Tool. The H1 screening stages concluded that the emissions of EDTA can be screened out as an insignificant impact on the receiving water. Dissolved iron could not be fully screened out at H1 stage, it is understood that further EA modelling will be undertaken to assess the emissions of iron.

In summary, the EA's determined limits have been, and will further be, modelled to demonstrate acceptability of impact to the river. The remaining hazardous substances have been assessed through the EA's H1 methodology and determined to be insignificant.

4.3 Waste Management

There will be no new waste types generated on site. Other than new sludge storage and dewatering as described above there will be no change to the existing waste management processes on site. However, the total volume sludge removal from effluent will increase which will be undertaken using the existing licenced waste contractors engaged by the site.

4.4 Fugitive Emissions to Air

No change as a result of this variation.

4.5 Odour Emissions to Air

The proposed changes have the potential to alter the odour emission profile of the facility and result in impacts at sensitive locations in the vicinity of the site. An Odour Assessment (Appendix 6) was therefore undertaken to evaluate effects and identify the requirement for any additional mitigation to control impacts to an acceptable level.

An initial Screening Assessment was undertaken to identify potentially significant odour sources at the site. This indicated the risk of impacts as a result of releases from a number of emission points was not

significant. Any releases that could not be screened from the assessment were considered further through dispersion modelling.

Potential odour releases from the relevant sources were defined based on the size and nature of the operations. Impacts at sensitive receptors were quantified using dispersion modelling and the results compared with the relevant odour benchmark level.

The results indicated that predicted odour concentrations were below the relevant benchmark level at all sensitive locations in the vicinity of the site for all modelling years. As such, potential odour emissions from the facility are not considered to be significant.

The operator will operate in accordance with a TGN H4 guidance aligned odour management plan (Appendix 7). This OMP considers the sources, releases and impacts of potentially odorous emissions from the ETP site and associated equipment, in accordance with the Environmental Permitting Regulations. The changes to the site will not materially change the existing monitoring, reporting and mitigation controls that are required and undertaken at the installation.

4.6 Noise and Vibration

Specialist noise consultants, Philip Dunbavin Acoustics (PDA) Limited, were commissioned in November 2025 to undertake a noise assessment across the site. This assessment was undertaken in accordance with the requirements of BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'. The assessment did not identify any actions associated with the infrastructure. The installation will not materially change the noise profile of the site.

All kit will be operated in accordance with operations and maintenance manuals and be subject to routine inspection. Noise is a consideration of all new procurements. The site is limiting trailer pickups to daytime hours only. Further detail is provided in Appendix 9 –Noise Assessment.

4.7 Superseded Documents

Operating Techniques in the current permit refers to responses provided in the original application document and subsequent variations. With the exception of the information presented above, the these are not superseded by this application.

An assessment against the relevant BAT conclusions from the BAT Reference Document for Waste Treatment has been completed and is available as Appendix 11 – BAT Assessment. The responses previously provided in relation to the applicable Food and Drink Sector BREF as part of the R61 variation will not change as a result of this variation.

4.8 Management Systems

There will be no changes in the management techniques as a result of this variation. The management and operation of the processes new to the site will be incorporated into the existing management structure of the site including the existing Environmental Management System (certified to ISO14001). In line with Group global standards the site operates its EMS that aligns with the Food & Drink Bref BAT Conclusions 1 (i-xx) incorporating the following:

- Documented Environmental Policy setting out the businesses vision and values in relation to environmental management;
- A documented Aspects Register identifying all activities on site with an assessment of environmental impact;
- Documented structure and responsibilities for environmental management within the system manual and individual procedures;
- Identification of all applicable environmental legal requirements and the compliance status of the business. The site is subject to audit as part of the Arla Group;
- Documented operating procedures for environmental operations that may have an adverse impact on the environment;
- A planned preventative maintenance regime and routine inspections of key plant and equipment;

- Routine documented monitoring of key parameters including effluent discharge, energy and water use, waste arisings and raw materials use;
- Training programmes to ensure all staff and contractors are suitably inducted and trained in relevant environmental procedures;
- Procedures for the investigation of any potential complaints;
- Contingency plans to be used in the event of breakdowns of key plant and equipment or unplanned events such as extreme weather;
- An accident plan is present on site which includes any emergency procedures for environmental matters;
- Regular review of Environmental performance by the management team against set improvement targets;
- Procedures are in place for all key operations including receipt and processing of raw materials;
- Audits of compliance against relevant procedures and all legal requirements are carried out periodically;
- Non-conformances are documented and appropriate corrective and preventive actions are taken;
- Records are kept to demonstrate compliance with applicable legislation, as well as other relevant records including training, monitoring and maintenance; and
- Documented procedures for change management including assessment of potential environmental impacts of any planned changes to the site.

The majority of equipment and the processes covered by this variation are new to the site and/or significantly modified throughout the phased installation plan and therefore training pre-commissioning and during commissioning is key and will be provided by equipment suppliers. All personnel operating the equipment will be instructed in the correct operation, responsibilities under the EPR permit and actions to be taken in the event of abnormal conditions, incidents or emergencies.

In addition to the automated process controls outlined in the process description above, as with the current operations monitoring and inspections will be undertaken by competent operatives and/or contractors. All reactive and preventative maintenance activities identified within the operations and maintenance (O&M) manuals will be incorporated into existing systems (or equivalent dedicated Planned Preventative Maintenance (PPM) systems specific to the plant) and suitable 3rd party support (including breakdown) will be in place from outside specialists. In addition, suitable level of spares will be held on site (based on suppliers/manufacturers recommendations) and appropriate competent resources available to respond to planned and reactive maintenance.

The changes to the site have considered the BAT conclusions of the relevant BREF notes as indicated below:

Technical Standards (Best Available Techniques)

Description of the Schedule 1 Activity or DAA	Relevant Technical Guidance Note	Document Reference
Section 6.8 Part A1 (e) Treating and processing milk with the quantity of milk received being more than 200 tonnes per day (average value on annual basis	Food, Drink and Milk Industries BREF, 2019	Process Description above and BAT Assessment Appendix 11(i)
5.4: Part A Disposal, recovery or a mix of disposal or recovery of non-hazardous waste	As above (integral to food and drink processing activity Waste Treatment Industries BREF, 2018	Process Description above and BAT Assessment Appendix 11(ii)
AR3 Medium Combustion Plant	None published	Process Description

5 Monitoring

4a Describe the measures you use for monitoring emissions

All existing monitoring frequencies and monitoring standards set in EPR/NP3638NN Table S3.2 are aligned to BAT. No change is proposed as a result of this variation.

4b Point source emissions to air only

All existing monitoring frequencies and monitoring standards set in EPR/NP3638NN Table S3.1 are aligned to BAT and will be extended to include the monitoring and reporting obligations for the new MCP introduced by this variation.

6 Environmental Impact Assessment

5a Have your proposals been the subject of an EIA under Council Directive 85/337/EEC?

No

7 Resource Efficiency and Climate Change

6a Describe the basic measures for improving how energy efficient your activities are?

No change to the basic measures, as set out in the existing permit and BAT Assessment, are planned as a result of proposed changes. Energy efficiency is a key consideration of procurement. The new assets are aligned to industry best practice in energy efficiency. All equipment is operated and maintained appropriately to ensure efficient operation.

6b Provide a breakdown of any changes to the energy your activities use and create

An increase in electricity usage will occur as a result of these operations. The new assets are anticipated to improve the efficiency of downstream kit. All installed equipment will be modern, processes will be optimised, and the site is committed to continuous improvements in energy efficiency.

6c Have you entered into, or will you enter into, a climate change levy agreement?

Taw Valley participated in phase 2 of the CCA Scheme as part of a group CCA DIAL/T00030 with other Arla sites.

Taw Valley has completed all required documentation to continue into phase 3. A copy of the new underlying agreement for the site is included at Appendix 12.

6d Tell us about, and justify your reasons for, the raw and other materials, other substances and water you will use

See Section 3 above.

6e Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste

There will be no changes to the site wide waste streams

8 Installations that include a combustion plant (excluding waste incinerators)

The new boiler plant will comply with the relevant ELV's in the Medium Combustion Plant Directive. Annex II Part 2, Table 1 of the MCPD sets out ELV's for new combustion plant other than engines and turbines; see below:

Table 3 MCPD ELV's

Pollutant	Type of MCPD	Gas Oil	Liquid Fuels other than Gas Oil	Natural Gas	Gaseous fuels other than natural gas
NOx	New medium combustion plant other than engines and turbines.	-	-	100	-

The new boiler will comply with the emissions limit of 100 mg/m^3 for NO_X for medium combustion plant other than engines or turbines. The new emergency generator will be used for emergency back up power to the effluent plant only and operated for less than 50 hours per year for testing purposes therefore Emission Limit Values do not apply. The generator is considered low risk MCP and emissions have been discounted from the air quality assessment and have not been considered further.

Medium Combustion Plant Checklist

	A28	A29
MCP Site Specific Identifier	Not yet purchased	Not yet purchased
Grid Reference	Easting: 265423.8, , Northing: 101317.5	Easting: 265461 Northing: 101172
Rated Thermal Input (MW) of MCP	2.7MWth	1.4MWth
Type of MCP	Steam Boiler	Emergency Standby Generator
Types of Fuel Used	Natural gas	Diesel
Date new MCP first in operation	Commissioning from 1st January 2027	Commissioning from 1st January 2027
Sector of activity of the MCP or the facility in which it is applied (NACE code**)	C.10.51	C.10.51
Expected number of annual operating hours of the MCP	8,760	<500hrs/year (and <50 hrs for testing)
Average Load in Use (%)	100%	100%
Where the option of exemption under Article 6(8) is used, a declaration signed here by the operator (as identified on Form A) that the MCP will not be operated more than the number of hours referred to in this paragraph	N/A	N/A
Stack Height (m)	21.6 metres	3.5 metres
Distance to nearest human receptor (m)	Operators on-site; Culm Cross, 21 m N; Birchy House, 66m NW	Operators on-site; Culm Cross, 425 m N;
Distance to nearest ecological receptor (m)	Western Copse Ancient Woodland, 1.8km N	Western Copse Ancient Woodland, 1.8km N

9 Environmental Risk Assessment

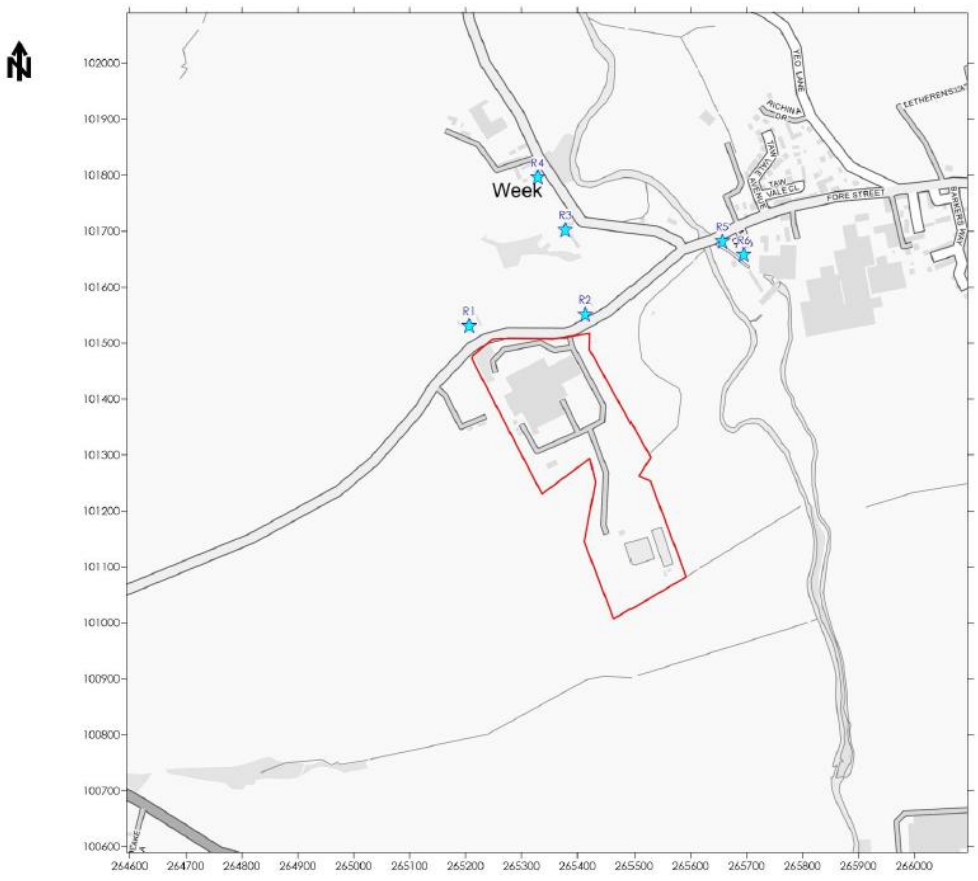
All environmental risks of the proposed changes have been screened as acceptable. The uplifted volume of effluent has been assessed to demonstrate no deterioration of the River Taw (Appendix 3); the new plant will be installed in line with BAT (Appendix 11); odour will continue to be managed using existing controls (Appendices 6 and 7); a noise assessment has not identified significant noise risk on site (Appendix 8); the storage of additional raw materials does not pose an actual pollution risk to ground (Appendices 4 and 9); and, the operator will continue to follow an ISO14001:2015 certified EMS in line with BAT 1 (i-xx).

The following section addresses the potential impact of the proposed changes on the surrounding area.

9.1 Sensitive Receptors

A desk-top study was undertaken in order to identify any sensitive human receptor locations in the vicinity of the site that required specific consideration during the assessment. These are summarised below.

Receptor		NGR (m)	
		X	Y
R1	Residential - Culm Cross	265207.0	101530.3
R2	Residential - Culm Cross	265413.2	101550.6
R3	Residential - Week	265378.4	101702.1
R4	Residential - Week	265328.9	101795.5
R5	Residential - Fore Street	265656.5	101681.0
R6	Residential - Mill Lane	265695.2	101657.1



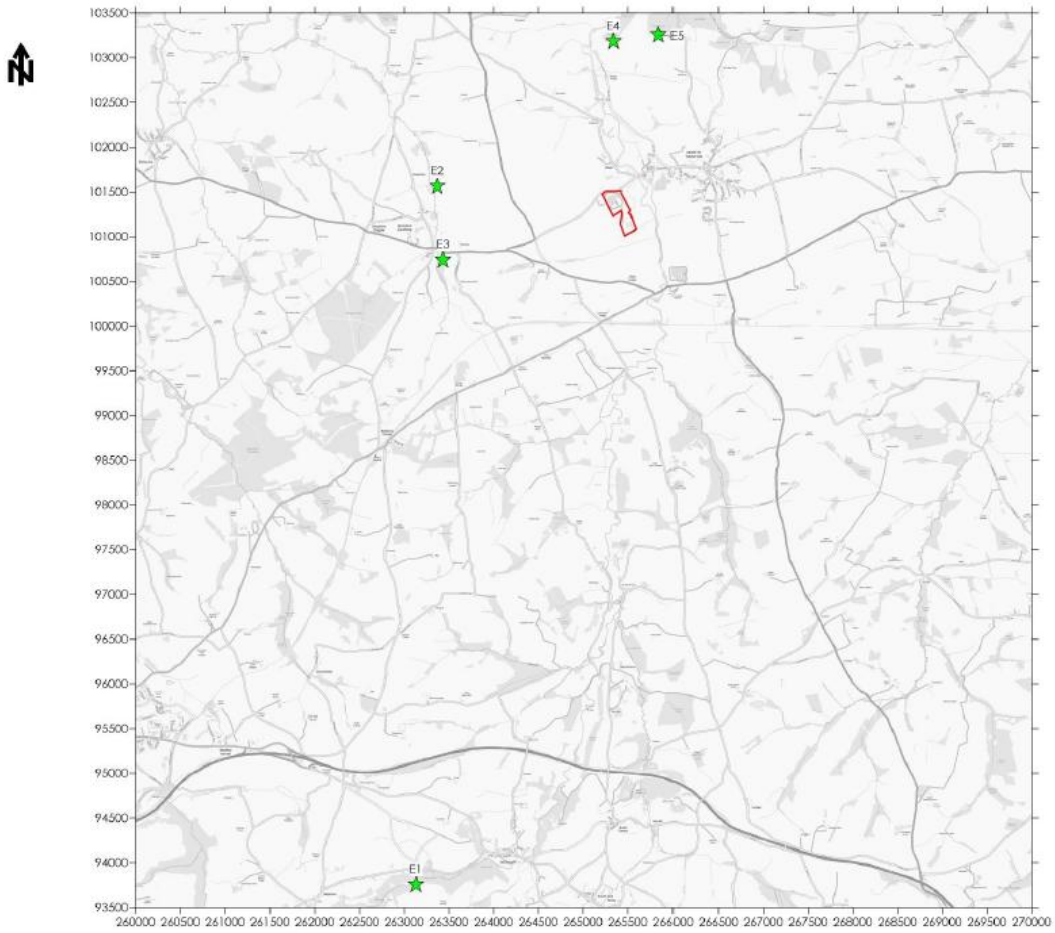
A review undertaken identified the following sites of ecological or nature conservation importance:

- Special Areas of Conservation (SAC), Special Protection Areas or Ramsar sites within 10km of the facility; and,

- Sites of Special Scientific Interest, National Nature Reserves, Local Nature Reserves, Local Wildlife Sites (LWSs) and Ancient Woodland (AW) within 2km of the facility.

The study was completed using the Devon County Council Environment Viewer map and the Multi-Agency Geographic Information for the Countryside (MAGIC) web-based interactive mapping service, which draws together information on key environmental schemes and designations. Sites of ecological or nature conservation importance have been identified and summarised below:

Receptor		NGR (m)	
		X	Y
E1	Dartmoor SAC	263131.5	93752.34
E2	Oxenpark Marsh LWS	263370.9	101561.4
E3	Trecott Marsh LWS	263436.4	100740.5
E4	Cottles Wood AW	265337.1	103180.5
E5	Rook Wood / Western Copse AW	265836.2	103255.5



It should be noted that for the purpose of the modelling assessment discrete receptors were placed at the closest points of each designation to the facility to ensure the maximum potential impact was predicted.

The superficial River Terrace Deposits mapped across the majority of the site are classified by the EA as a Secondary A Aquifer which are defined as 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers'. The Glaciofluvial Deposits mapped to possibly extend on to the northernmost part of the Site and the Alluvium mapped at the site's discharge point into the River Taw are also classified as

Secondary A Aquifers. The Till is classified as a Secondary Undifferentiated aquifer, defined as 'where it is not possible to apply either a Secondary A or Secondary B definition because of the variable characteristics of the rock type. These have only a minor value '. The bedrock is also classified by the EA as a Secondary A Aquifer. The site is therefore moderately sensitive from a groundwater perspective.

The closest surface water to site is the Beck Runa located approximately 130m east and flowing into the River Taw to the southeast. The River Taw is located approximately 350m south at its closest point, and drainage pipework from the site (W1 and W2) discharges directly into the River Taw. The Permit boundary is therefore adjacent to the River Taw.

The EA Flood Map for Planning feature indicates the majority of the site lies within Flood Zone 1, with Zones 2 and 3 recorded for the southern end of the pipeline discharging into the River Taw. Zone 1 is defined as a low probability of flooding, Zone 2 is defined as medium (0.1%) risk of flooding, and Zone 3 is defined as a high (1%) risk of flooding from rivers.

Risk Assessment Summary

The impact of the extension to the installation has been summarised in Table 8. The following categories have been used to assess the unmitigated likelihood of each scenario and the severity of the consequence.

Severity Categories

Classification	Impact classification			
	Impact Severity	Scale e.g. amount of resource use/waste generated	Reputation	Business Impacts
Category 1 Insignificant	No damage	Negligible	Short term dissatisfaction; occasional community complaints	<100k impact on profit; line out of use p to 3 days
Category 2 Minor	Negligible Damage; no remedial activities or regulatory involvement	Minor	Local news coverage; local complaints/regular complaints by individuals	Up to £1mill impact on profit; line out of use for 1 week
Category 3 Moderate	Short term environmental damage which can be remedied; some remedial activity and regulatory involvement	Moderate	Regional level media coverage; brand damage; low community pressure	Up to £2 mill impact on profit; line out of use up to 2 weeks
Category 4 Major	Serious long term damage; regulatory restrictions/possible prosecutions.	Significant	National media coverage; high profile community pressure; brand damage	Up to £5 mill impact on profit; Site out of use up to 2 weeks
Category 5 Devastating	Permanent damage; high profile prosecution	Excessive	High profile, international coverage	>£5 mill impact on profit; site out of use over 2 weeks

Likelihood Categories

Classification	Liklihood	%Assessment	Explanatory Notes
Almost Certain	Daily occurrence	>95% Chance	Regularly happens or is likely to occur
Likely	Monthly occurrence	61-95% Chance	Has happened before recently or will probably occur
Possible	Yearly occurrence	21-60% Chance	History of it happening here or elsewhere occasionally
Unlikely	10 year occurrence	5-20% Chance	History of it happening elsewhere occasionally. Do not expect it will happen
Rare	Occurs once every 100 years	<5% Chance	No known history, but conceivable. Do not believe it will ever happen

Table 8 – Environmental Risk Assessment

Hazard	Receptor	Pathway	Probability of Exposure	Consequence Unmitigated (Severity)	Risk Management Technique	Overall Residual Risk
Spill or catastrophic loss from bulk storage.	Adjacent receptors and overland runoff leading to downstream receptors.	Overland breach of tertiary containment.	2 - Unlikely	4 – Potential impact on neighbours or downstream environments	Tanks are subject to routine inspection and maintenance and used within design life. Tanks are fitted with high level alarms and automated controls. Operator training in operating procedures, routine inspections and audits. Hardstanding condition across the site is high integrity creating effective barrier to ground. Whole site containment using penstock and tertiary containment walls. The variation addresses the improvements identified by the original containment assessment. All new processing areas and effluent infrastructure have been designed to be in full alignment with CIRIA. Containment is sufficient for the proposed new tanks. See Appendix 4.	Medium
	Underlying ground and groundwater.	Vertical Migration	2 - Unlikely	3 – Moderately sensitive underlying aquifer.	Tanks are subject to routine inspection and maintenance and used within design life. Tanks are fitted with high level alarms and automated controls. Operator training in operating procedures, routine inspections and audits.	Low
	River Taw	Discharge from W1 and W2.	2 - Unlikely	4 – Ecological damage to main river.	Hardstanding condition across the site is high integrity creating effective barrier to ground. Belowground infrastructure including the penstock and drainage are subject to appropriate inspection and maintenance.	Low
Emissions of compliant trade effluent to river	River Taw	Discharge from W1	5 - Certain	1 - Insignificant	See Appendix 3, all emissions of pollutants within the uplifted volume of effluent have been demonstrated to show an insignificant impact and/or meet the EA 'no deterioration' criteria regarding emissions to water. Further detailed modelling will be undertaken by the EA to determine appropriate emission limits.	Low

Emissions of out of specification trade effluent to river	River Taw	Discharge from W1	2 - Unlikely	Between 2 & 4 – Minor non-compliance with permit to significant breach and river damage.	This application seeks to completely replace and install new equipment to improve the wastewater treatment process on site. All equipment will be installed, maintained and operated in accordance with BAT. Ongoing plant management in line with ISO14001:2015 accredited EMS.	Medium
Emissions of Products of Combustion	Neighbouring human and ecological receptors	Airborne	3 - Possible	3 – Impact on local air quality	The minimal increases to ambient pollution concentrations (in the form of combustion gases) have been assessed (Appendix 5) as acceptable through detailed dispersion modelling.	Low
Odour – new processing and ETP assets	Neighbouring human receptors	Airborne	3 - Possible	3 - Complaints of odour	New installation does not produce malodours that would require additional management (Appendix 6). Continued alignment of operations with existing odour management plan (Appendix 7).	Low
Fugitive Emissions to Air – dust, litter etc.	Section 8	Airborne	1 - Rare	3 - Complaints of nuisance	Site inspections, waste management practices and housekeeping standards. No additional litter or dust emissions associated with this application	Low
Fire water and smoke	Section 8	Airborne and water runoff.	1 - Rare	5 – Potential for major damage.	No additional fire risk is posed by this variation. Ongoing management in line with existing fire and emergency processes. Design allows for whole site containment of firewater in the event of incident	Low
Noise	Neighbouring human receptors	Airborne	2 - Unlikely	3 - Complaints of noise	All kit will be operated in accordance with operations and maintenance manuals and be subject to routine inspection. Noise is a consideration of all new procurements. The site is limiting trailer pickups to daytime hours only. A boundary noise assessment (Appendix 8) did not identify any actions associated with the infrastructure.	Low

It is concluded that the design and operation of the proposed works to the installation will be managed sufficiently so as to present a low ongoing risk to the environment.

Appendix 1 - Site Drawings

1. Updated Installation Boundary and Site Layout
2. Point Source Emissions
3. Drainage Plan

Appendix 2 – Effluent Plant Technical Information

2.1 Process Description

Technical Data Sheets:

2.2 DAF Unit

2.3 MBR and Aeration Blowers

2.4 Drum Screen

2.5 Diffusers

2.6 MBR Membranes

2.7 Screw Press

2.8 Chemical Storage Tanks

2.9 Glass Lined Steel Tanks

2.10 RO Unit

2.12 Emergency Generator

2.13 Fuel Tank

Appendix 3 - Surface Water Risk Assessment

Appendix 4 – CIRIA Containment Risk Assessment

Appendix 4i – ABDA Containment Risk Assessment Arla Taw Valley

Appendix 5 – Air Quality Assessment.

Appendix 6 – Odour Assessment.

Appendix 7 – Odour Management Plan

Appendix 8 – Noise Assessment

Appendix 9 – Site Condition Report

Appendix 10 – Enhanced Preapplication Consultation

i) Enhanced Pre-application Request - Pre-application Submission Acknowledgement

ii) Response to Pre-application (indicative Limits)

iii) River Sampling PRE APP. Results Spreadsheet

iv) Taw Valley Final Effluent Results_2025

Appendix 11 – BAT Assessment

i) Food, Drink and Milk Industries BREF, 2019

ii) Waste Treatment Industries BREF, 2018

Appendix 12 – CCA Underlying Agreement

Appendix 13 – Inventory of Potential Hazardous Substances Within Effluent