MOTT MACDONALD

Queenborough Sludge Treatment Centre Environmental Permit Application

Main Supporting Document
790101_MSD_Main_QUE

September 2024

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	06/07/2021	Alex Symeonidis	Shannon Stone	Anita Manns	First draft
B	20/08/2021	Natalia Cunningham	Shannon Stone	Anita Manns	Second draft
C	23/09/2021	Natalia Cunningham	Shannon Stone	Anita Manns	Final
D	19/01/23	Isobel Moss Shannon Stone	Anita Manns	Anita Manns	Revision for client review
E	31/01/2024	Isobel Moss	Shannon Stone	Anita Manns	Resubmission
F	28/8/2024	Mohar Das	Shannon Stone	Anita Manns	Updated based on Not Duly Made Request for information August 2024
G	11/09/2024	Shannon Stone	Anita Manns	Anita Manns	Updated based on Not Duly Made Request for information September 2024

Document reference: 790101_MSD_Main_QUE September 2024

Information class: Standard

Contents

Tables

1 Non-technical summary

1.1 Overview of the site and activities

Queenborough is a Sludge Treatment Centre (STC) (also known as the “Site”) and associated Wastewater Treatment Works (WTW). The address for the site is Argent Road, Queenborough, Kent, ME11 5DZ (National Grid Reference: TQ 90914 70575).

The WTW operation is covered by the Urban Wastewater Treatment (England and Wales) Regulations 1994 and has a standalone Water Discharge Activity Environmental Permit, which will remain an independent permitted activity. The STC operation is a non-hazardous waste activity which is currently carried out under a registered T21 exemption.

The waste activities at the Site comprises imports, physio-chemical and anaerobic digestion treatment and the storage of waste, all for recovery purposes. The STC handles waste derived from the wastewater treatment process, either indigenously produced on-site or imported from other Southern Water owned assets.

The site is also separately permitted under permit number EPR/CP3798HU, for the non-hazardous imported waste activity for the disposal of waste to the head of the works. Activities under this permit have been suspended since 2017, and it is requested that the import waste activity to the head of works on this permit is removed/surrendered and retain the permit reference for the variation described below.

Southern Water wishes to vary permit EPR/CP3798HU into an installation permit for the Site to consolidate the:

- Anaerobic digestion of sludge
- Temporary storage of imported cake (raw or digested)
- Acceptance of liquid sludge waste (digestate) at post digestion, for dewatering

into a single consolidated Installation permit

Anaerobic digestion of sludge

As advised by the Environment Agency through consultation at the WaterUK Waste & Recycling Network and a letter sent to all Water and Sewage Companies at director level in July 2019, Southern Water is applying to vary the existing bespoke waste activity permit into a Bespoke Installation Permit for the STC waste activity, as a joint Environment Agency and DEFRA decision has been made that Anaerobic Digestion (AD) treatment facilities at WTW STCs are covered by the Industrial Emissions Directive and can no longer operate under standard environmental permits or exemptions.

The primary permitted installation activity will be the AD treatment facility. The AD facility will treat indigenously produced and imported sludges. Permitted Directly Associated Activities will be the import of waste from other WTW assets to undergo digestion; the physio-chemical treatment of imported and indigenously produced sludges; the storage of indigenously produced sludges, imported sludges and the sludge cake from the AD facility; the storage of biogas derived from the AD treatment of waste and the combustion of biogas in an on-site Combined Heat and Power plant (CHP). In the event the CHP cannot run in an emergency or due to operational issues, biogas will be combusted via an on-site flare stack and/or back-up boiler system.

Temporary storage of sludge cake (raw or digested)

Southern Water wishes to include in the permit the capability to accept raw and digested cake from other Southern Water sites to be stored temporarily at Queenborough STC as a contingency, whereby there is limited capacity at other sites.

Raw cake can be stored whilst awaiting available capacity at other sites for on-going treatment (anaerobic digestion or direct dewatering).

Digested cake can be stored to allow for extended maturation where capacity is not available elsewhere.

In both scenarios, the cake will not enter the waste reception for treatment via anaerobic digestion at Queenborough. The activity is for temporary storage only, and therefore the activity is to be permitted as a separate waste activity.

Acceptance of liquid sludge waste (digestate) at post digestion, for dewatering

Southern Water wishes to include in the permit the capability to accept post digested liquid sludge (digestate) from other Southern Water, to enter into the post digestion tanks, for dewatering at the centrifuges. The activity is a contingency measure, whereby there is limited capacity at other sites to dewater digestate, for example process shutdown.

1.2 Overview of the STC process

Currently the Site accepts indigenous sludge and imported liquid sludge. Cake is imported on rare occasions, but is not treated, only stored in the cake bays.

Imported sludge makes up around 2/3 of the total dry solids treated and is received in 1 No. sludge reception tank (270m^3). Indigenous primary sludge and imported sludge are screened by 3 No. strain presses and stored in 3 No. post screened sludge storage tank (225m^3 each) before being thickened by 2 No. duty / standby gravity belt thickeners and stored in 1 No. thickened sludge storage tank (518m^3). Thickened sludge is fed to 2 No. conventional mesophilic anaerobic digesters (3,696m^3 total volume) operating at around 35°C. Digested sludge is stored in 2 No. post-digestion sludge storage tank (271m^3 each) before being dewatered by 2 No. duty, standby centrifuges. Dewatered digested cake is stored on-site before being transported off-site for storage prior to being recycled to farmland.

Biogas produced from the two digesters will be transported to the one gas holder. The biogas produced gas will then be burnt in the existing CHP engines to produce electricity. The current waste biogas burner (or flare) will be retained and available to burn excess gas. The specifications of the combustion plant are presented in Table 1.1.

Centrate and decant liquor from the sludge thickeners gravitates to the site liquor pumping station and are returned to the end of the inlet channel.

Table 1.1: Combustion plant details

	CHP	Boiler 1	Boiler 2
Make/Model Number	Caterpillar G3412c	Viessman VITROND 200 VD 2	Beeston Broxley 50501B
Date that MCP became operational/was commissioned	2004	2009	1998
Thermal Input (MWth)	1.1	0.88	0.82
Stack height (m)	8	10	10

	CHP	Boiler 1	Boiler 2
Fuel used (biogas, diesel etc)	Biogas	Biogas or gas oil	Biogas or gas oil
Estimated total hours of operation per year	8760	Operates when the CHP plant is not operating	Operates when the CHP plant is not operating
MCPD and SG Regs status	Existing MCP	Existing MCP	Existing MCP

The IED permit will include:

- Sludge reception tank 1 No. (270m^3)
- Strain presses 2 No.
- Post screened sludge storage tank 3 No. (225m^3 each)
- Gravity belt thickeners (duty/standby) 2 No.
- Thickened sludge storage tank 1 No. (518m^3)
- Digesters 2 No. (3,696m^3 total volume)
- Post digestion storage tank 2 No. (271m^3 each)
- Centrifuges (duty/standby) 2 No.
- Gas bag holder 1 No. (570m^3)
- Auxiliary boilers 2 No. powered by biogas/gas oil
  - Boiler 1 (dual fuel): 0.88 MWth thermal rated input
  - Boiler 2 (dual fuel): 0.82 MWth thermal rated input
- CHP engine 1 No. (1.1MWth thermal rated input)
- Biogas burner (flare stack) 1 No.
- Cake storage bays 7 No. (total volume 3920m^3), wall height is approximately 6ft (including one back-up bay).
- Odour control units (OCU) 2 No.
- Odorous air is extracted by 2 No. duty, standby fans

The following are outputs from the process:

- Cake (dewatered post digestion sludge) - stored in cake bays before being transported off-site for agricultural use;
- Bio-gas - stored in an existing gas holder, then either:
  - Burnt in the CHP or back-up boilers to generate electricity;
  - Flared in the waste biogas burner.
- Grit and screenings (small amount) – deposited in skips before being taken off-site.

1.3 Summary of key technical standards

Table 1.2 lists the technical guidance notes (TGNs) used to inform the techniques and measures proposed to prevent and reduce waste arising and emissions of substances, including during periods of start-up and shut down, momentary stoppage and malfunction, and leaks.

Table 1.2: Part C3, Question 3a, Table 3a: Technical standards

Installation name	**Queenborough STC**	
C3 – Installation		
Description of the schedule 1 activity or directly associated activity	**Best available technique (BATC, BREF or TGN reference)**	**Document reference**
Section 5.4 non-hazardous waste installation - anaerobic digestion installation regulated under the Industrial Emissions Directive, utilisation biogas for energy	• Biological waste treatment: appropriate measures for permitted facilities • Non-hazardous and inert waste: appropriate measures for permitted facilities	• https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities/1-when-appropriate-measures-apply • https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities
B4 – Waste activities		
Description of the waste operation	**Appropriate measure (TGN reference)**	**Document reference**
Temporary storage of imported cake (raw or digested) Acceptance of liquid sludge (digestate) at post digestion, for dewatering	• Non-hazardous and inert waste: appropriate measures for permitted facilities • Biological waste treatment: appropriate measures for permitted facilities	• https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities • https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities/1-when-appropriate-measures-apply
General		
All activities	**Guidance**	**Document reference**
	• Monitoring stack emissions: technical guidance for selecting a monitoring approach • M1 sampling requirements for stack emission monitoring • Environment Agency environmental permitting guidance, including: • Risk assessments for your environmental permit • Energy efficiency (Energy efficiency for combustion and energy from waste power plants) • Noise assessment and control • H4 Odour management • H5 Site condition report • Control and monitor emissions for your environmental permit	• https://www.gov.uk/guidance/monitoring-stack-emissions-technical-guidance-for-selecting-a-monitoring-approach • https://www.gov.uk/government/publications/m1-sampling-requirements-for-stack-emission-monitoring • https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit • https://www.gov.uk/guidance/energy-efficiency-standards-for-industrial-plants-to-get-environmental-permits • https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits • https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management • https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report • https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit

Source: Mott MacDonald

1.4 Revisions since 2021 application submission

The application was first submitted in 2021. This Main Supporting Document includes details that have been updated following feedback received over the past three years in relation to IED permit applications for the anaerobic digestion of sewage sludge. Table 1.3 provides a summary of the stand-alone documents included as part of this application, and the amendments where applicable. Where a document has not been amended due to it remaining applicable, the original reference number remains unchanged. Where a document has been updated this document will supersede any previous versions.

Table 1.3: Summary of revisions

Document name	Latest document reference	Summary of amendments
Main supporting document	790101_MSD_Main_QUE September 2024	Resubmitted – updated to include wider feedback from the Environment Agency and response to Request for Information August and September 2024.
Environmental Risk Assessment	790101_ERA_QUE September 2024	Resubmitted – updated to include complaints recorded since 2020 and completion of air quality risk assessment.
Environmental Constraints Maps	790101_ERA_Maps_QUE January 2024	Resubmitted. Human receptor map screening distance increased to 2km
Bio-aerosol Risk Assessment	790101_ERA_BioaRA_QUE January 2024	Resubmitted – updated to include bio-aerosol monitoring proposals and new windrose.
Odour Management Plan	790101_ERA_OdourMP_QUE September 2024	Resubmitted – updated to include new windrose, updated complaints recorded since 2020 and feedback from the Environment Agency and response to Request for Information August and September 2024.
Climate Change Risk Assessment	790101_ERA_CCRA_QUE	No change. To be included as part of the management system for the site.
Site Condition Report	790101_MSD_SCR_QUE September 2024	Resubmitted – in response to Request for Information August and September 2024.
BAT analysis	790101_MSD_BAT_QUE January 2024	Resubmitted – updated to include changes by Southern Water and wider feedback from the Environment Agency.
Site Layout and Location Plan	790101_MSD_SiteLayoutPlan_QUE September 2024	Resubmitted – updated to reflect proposed secondary containment, liquor transfer point, liquor sampling point and changes to point source emissions.
Drainage Plan	790101_MSD_Drainageplan_QUE 121021	No change
Schematics	7790101_MSD_Schematics_QUE September 2024	Resubmitted – updated to include separation of AD and waste activities in response to Request for Information August and September 2024.
Environmental Management System Certificate	790101_MSD_EMS December 2023	Resubmitted. Certificate has been renewed.
Relevant Offences	790101_MSD_RelevantOffences_QUE December 2023	Resubmitted – Updated since original 2021 submission
Details of Directors	790101_MSD_Directors_QUE December 2023	Resubmitted – Updated since original 2021 submission
Competency assessment certificates	790101_MSD_CompetencyAssessmentCertificates_QUE December 2023	Retracted, and replaced with Competency Management System.
Competency Management System	790101_MSD_CMS December 2023	Substitutes CoTC assessment certificates
Material Safety Data Sheets	790101_MSD_MSDS_QUE January 2024	Resubmitted - Updated since original 2021 submission
Leak Detection and Repair Plan	790101_MSD_LDAR_QUE September 2024	Additional document – updated as part of response to Request for Information August and September 2024.

Table 1.3: Summary of revisions

Document name	Latest document reference	Summary of amendments
Duty of Care	790101_MSD_DutyofCare_QUE	Additional document but superseded by the Waste Acceptance document listed below.
Waste acceptance	790101_WasteAcceptance_QUE August 2024	Additional document - updated as part of response to Request for Information August and September 2024.
CIRIA assessment	790101-MMD-IED-QUE-CA-C-001-IED ADBA tool Queenborough P03	Additional document. updated as part of response to Request for Information August and September 2024. Superseded: • 790101-MMD-IED-QUE-CA-C-001 – IED Risk Register-Queenborough • 790101-MMD-IED-QUE-SIM-M-101 DoNothing(Rainfall Included) • 790101-MMD-IED-QUE-SIM-M-102 DoNothing(Tank Failure Only) • 790101-MMD-IED-QUE-SIM-M-103 Option1(Rainfall Included) • 790101-MMD-IED-QUE-SIM-M-104 Option1(Tank Failure Only) • 790101-MMD-IED-QUE-SIM-M-105 Option1A(Rainfall Included) • 790101-MMD-IED-QUE-SIM-M-106 Option1A(Tank Failure Only) • 790101-MMD-IED-QUE-SIM-M-107 Option2(Rainfall Included) • 790101-MMD-IED-QUE-SIM-M-108 Option2(Tank Failure Only) • 790101-MMD-IED-QUE-SIM-M-109 Option3(Rainfall Included) • 790101-MMD-IED-QUE-SIM-M-110 Option3(Tank Failure Only)
Residue Management Plan	790101_MSD_ResidueMP_QUE September 2024	Additional document - updated as part of response to Request for Information August and September 2024.
H1 assessment	790101_H1 Tool v8_QUE January 2024	Resubmitted – reviewed with updated information
Air Quality Risk Assessment	790101_AQRA_QUE August 2024	Additional document, amended in response to Request for Information August 2024. The AQRA is accompanied by the models included in the folder, Queenborough Models.
Accident Management Plan	790101_MSD_AMP_QUE September 2024	Additional document, - amended in response to Request for Information August and September 2024.
Form Part A	790101_App_PartA_QUE	No change
Form Part C2	790101_App_PartC2_QUE	No change
Form Part C2.5	790101_App_PartC2.5_QUE	Additional document (not previously required)
Form Part C3	790101_App_PartC3_QUE	No change

Table 1.3: Summary of revisions

Document name	Latest document reference	Summary of amendments
Form Part B4	790101_App_PartB4_QUE August 2024	Additional document, in response to Request for Information August and September 2024.
Form Part B6	790101_App_PartB6_QUE	Additional document (not previously required)
Form Part E2	790101_App_Part_E2_QUE September 2024	Additional document - in response to Request for Information August and September 2024.
Form Part F1	790101_App_PartF1_QUE	No change
Envirocheck Report	790101_MSD_SCR_QUE_AppB_Envirocheck	Additional document, updated as part of response to Request for Information August and September 2024.
Annual throughput summary	790101_AnnualThroughput_QUE August 2024	Additional document updated as part of response to Request for Information August and September 2024.
Waste transfer notes	790101_WasteTransferNotes_QUE August 2024	Additional document, updated as part of response to Request for Information August and September 2024.
Sampling proposal	790101_Sampling proposal_QUE August 2024	Additional document, updated as part of response to Request for Information August and September 2024.
Appropriate Measures Assessment	790101_Appropriate Measures_QUE September 2024	New, additional document in response to RFI August and September 2024.

2 Introduction

2.1 Overview

This document has been prepared to support the application to vary the existing bespoke waste activity permit into a bespoke installation Environmental Permit (hereafter referred to as 'the Permit'), reference EPR/CP3798HU, for the Queenborough Sludge Treatment Centre (STC) ('the Site') on behalf of Southern Water Services Limited ('Southern Water' or 'the Operator').

Following the joint Environment Agency and Department for Environment, Food and Rural Affairs (DEFRA) decision that AD treatment facilities at WTWs and STCs are covered by the Industrial Emissions Directive (IED) the intent of the application is to ensure the Site is permitted in line with the IED and the EPR 2016, as amended.

This document contains a description of the Site, the proposed permitted activities and Directly Associated Activities (DAAs), an assessment of the possible effects of these activities and responses to questions in Parts A, C2, C2.5, C3, C4, B4, B6, E2 and F1 of the application documentation (plus supporting information where required). Completed forms Part A, C2, C2.5, C3, C4, B4, B6, E2 and F1 are included as separate documents.

2.2 Document content and structure

The following application forms have been completed to support the application and have been submitted as separate documents:

- Part A: About You (Document reference 790101_App_PartA_QUE)
- Part C2: Varying a bespoke permit (Document reference 790101_App_PartC2_QUE)
- Part C2.5: Application for an environmental permit Part C2.5 – Variation to a bespoke permit to add or vary a MCP/SG permitted activity at an installation or to vary an existing MCP/SG standalone permit (Document reference 790101_App_PartC2.5_QUE August 2024)
- Part C3: Variation to a bespoke installation permit (Document reference 790101_App_PartC3_QUE)
- Part C4: Varying a bespoke waste operation permit (Document reference 790101_App_PartC4_ QUE)
- Part B4: New bespoke waste operation (Document reference 790101_App_PartB4_QUE August 2024
- Part B6: New bespoke water discharge activity or groundwater activity (point source discharge) or point source emission to water from an installation (Document reference 790101_App_Part_B6_QUE January 2024)
- Part E2: Surrender application (installations, waste operations, mining waste operations, medium combustion plant/specified generator and mobile plant only) (Document reference 790101_App_Part_E2_QUE September 2024)
- Part F1: Charges and declarations (Document reference 790101_App_PartF1_QUE)

The main body of the Permit application document ('the Main Supporting Document') includes all the supplementary information required in response to relevant questions within the Part A, Part C2, Part C2.5, Part C3, Part C4, Part B3, Part B6, Part E2 and Part F1 application forms for which there was insufficient space on the forms to answer the questions in full.

The Environmental Permit variation application document ('the Main Supporting Document') consists of two main parts:

- Chapter 5 provides the general information required to inform Part C2 relating to the variation of a bespoke permit; and
- Chapter 6 provides the more detailed information required to inform Part C2.5, Part C3, Part C4, Part B4 and Part E2 relating to the variation of a bespoke installation permit.
- Chapter 7 provides the more detailed information required to inform Part B6

Part F1 covers the required financial information required for payment of the application fee.

Additional information included as part of this submission and not as stand-alone documents, are found in the following appendix:

- Appendix A – European Waste Catalogue (EWC) Codes

3 Process Description

Anaerobic digestion of sludge

Queenborough catchment covers the towns of Sheerness, Queenborough, Halfway and Minster. The sewerage system comprises combined gravity sewers and rising mains with some 20 No. wastewater pumping stations (WPS).

All flows are received at an elevated inlet works and pass through 3 No. 6mm 2D screens, operating as duty, assist units. Screened sewage then passes through a detritor for grit removal. Following grit removal, flows in excess of the permitted flow to full treatment (FFT), 252 l/s, overflow to 2 No. storm tanks. Storm tank contents are returned to treatment or discharged to the outfall as settled storm sewage.

Flows up to the permitted FFT pass through 4 No. circular primary settlement tanks (PSTs). Only 2 or 3 PSTs are operated at any given time with the rest serving as standby. The PSTs are auto-desludged by pumps. Ferric dosing of crude sewage occurs upstream of the primary tanks to aid primary settlement. Ferric dosing is also used for hydrogen sulphide suppression.

Settled sewage is treated in a conventional activated sludge process consisting of 3 No. aeration lanes with fine bubble aeration. Mixed liquor is settled in 3 No. radial final settlement tanks. Return activated sludge (RAS) is continuously removed from the final settlement tanks (FSTs) and returned to the aeration lanes. Surplus activated sludge (SAS) is returned to the PSTs for co-settlement.

Secondary treated sewage effluent and settled storm sewage is discharged to the Swale Estuary.

The site has liquid sludge reception facilities. Imported sludge makes up around 2/3 of the total dry solids treated. Cake is imported on rare occasions, and is not treated, only stored in the cake bays.

Indigenous primary sludge and imported sludge are screened and stored in 3 No. post screened sludge storage tank (225m^3 each) before being thickened by 2 No. duty / standby gravity belt thickeners and stored in 1 No. thickened sludge storage tank (518m^3). Thickened sludge is fed to 2 No. conventional mesophilic anaerobic digesters operating at round 35°C. Digested sludge is stored in 2 No. post-digestion sludge storage tanks before being dewatered by 2 No. duty, standby centrifuges. Dewatered digested cake is stored on-site before being transported off-site for agricultural use. Biogas produced by the digesters is used by CHP to generate electricity. Centrate and decant liquor from the sludge thickeners gravitates to the site liquor pumping station and are returned to the end of the inlet channel.

The main sludge treatment processes are covered or enclosed. Odorous air is extracted by 2 No. duty, standby fans and dispersed via the stack. The site is situated in a remote and windy location away from residential areas.

The CHP unit on-site has been in operation in 2004. It is powered by biogas and has a thermal rated input of 1.1MWth. Therefore, the Site falls within the scope of the Medium Combustion Plant Directive (MCPD) since the thermal rated input is greater than 1MWth. The existing CHP unit will not be required to meet MCPD requirements until 2030 because it is an existing medium combustion plant (MCP). The CHP unit is due to be upgraded and, in that event, an appropriate permit variation would be sought to comply with regulations.

Temporary storage of imported cake (raw or digested)

Raw cake can be stored whilst awaiting available capacity at other sites for on-going treatment (anaerobic digestion or direct dewatering).

Digested cake can be stored to allow for extended maturation where capacity is not available elsewhere.

Acceptance of liquid sludge waste (digestate) at post digestion, for dewatering

Post digested liquid sludge (digestate) from other Southern Water sites enters at the post digestion tanks, for dewatering at the centrifuges. The process aligns with the above description of the anaerobic digestion from the post digestion tanks onwards.

4 Part A – About you

4.1 Question 5c: details of directors

Details of directors are provided in stand-alone document reference 790101_MSD_Directors_QUE.

4.2 Question 7: Contact details

Whereby the contact disclosed in 7a (Anita Manns, Mott MacDonald) is not available the Environment Agency should contact the secondary contacts:

Name: Shannon Stone

Address: Mott MacDonald, Mountbatten House, Grosvenor Square, Southampton, SO15 2JU

Phone number: 023 8062 8538

Email: shannon.stone@mottmac.com

5 Part C2 – General – varying a bespoke permit

5.1 Question 2 – Table 1: Changes to existing activities

The variation application is to:

- Remove the existing physical treatment activity (A16) as authorised under the permit reference EPR/CP3798HU.
- Add the scheduled activity for Anaerobic Digestion.
- Add the waste operation activity for temporary storage of imported cake (raw or digested).
- Add the waste operation activity for acceptance of liquid sludge waste (digestate) at post digestion, for dewatering.

5.2 Question 3a: Relevant offences

Details of the relevant convictions are provided in the document reference 790101_MSD_RelevantOffences December 2023 (produced by Southern Water).

5.3 Question 3b: Technical ability

Operational management is provided by qualified individuals and considered to be technically competent. All staff on-site are trained to manage and operate activities without causing pollution.

The current CoTC holder for Queenborough STC is [redacted] Environmental permit number and site address for all other waste activities that [redacted] provides technical competence for:

- Site Address: Motney Hill WTW, Motney Hill Road, Lower Rainham, Gillingham, Kent; Post Code: ME8 7UA
- Permit No: EPR/NP4698HN; Site Address: Canterbury WTW, Sturry Road, Canterbury, Kent; Post Code: CT2 0AA

Competency in terms of the requirements of the environmental permit will be ensured through the appropriate training of all staff, covering:

- Awareness of the regulatory implications of the Permit for the permitted activity and their own work activities;
- Awareness of all potential environmental effects from operation under normal and abnormal circumstances;
- Awareness of the need to report any deviation from the Permit; and
- Prevention of accidental emissions, and action to be taken when accidental emissions occur.

All staff are aware of the implications of activities undertaken including the operation of the Site. Skills and competencies necessary to work on-site are documented and records of training needs and training received for these posts are maintained.

Southern Water is currently working on an accredited Competency Management System under the Competent Operator Scheme, based on the Anglian Water Services-developed technical

competency course to demonstrate that personnel have the appropriate technical skills and knowledge to manage the activities undertaken. This will be independently certificated and audited, through a third-party certification body (yet to be determined) to ensure it meets the requirements of the Competence Management System Standard, developed by Energy & Utility Skills[1]. The Competence Management System (CMS) enables Operators to demonstrate technically competent management on the basis of corporate competence and employees' individual competence. Individual competence remains a key component with each employee having the relevant technical competences required to carry out their role.

An e-learning course is being developed and certification is due to be undertaken by LRQA see document 790101_MSD_CMS December 2023). The CMS is to be certified within the first 12 months from issue of a permit for the STC.

5.4 Question 3c: Finances

No relevant persons within Southern Water have current or past bankruptcy or insolvency proceedings against them.

5.5 Question 3d: Management System

The Site operates under the company-wide Environmental Management System (EMS 684981), which is certified to ISO 14001:2015 and is applicable to water supply and wastewater treatment assets at operational sites (wastewater treatment works, water supply works and water booster stations). The EMS is effective for three years from 28 July 2020 and is accredited by the British Standards Institution (BSI).

Demonstrable procedures are outlined in the Site Process Activity Manual (SPAM) and Operating Plan. Where suitable and available, any monitoring of emissions to air, land and water is undertaken according to Monitoring Certification Scheme (MCERTS) Standards where the permit requires it.

As a part of the EMS the Operator has an internal audit programme that takes places every 12 months. During this annual programme operational sites are selected as a subsample and audited. Suppliers and business areas area also audited. An annual report is produced as part of the management review, and this is signed off by Senior Management. In addition, the EMS is subject to audit by the inspection and certification company BSI (for accreditation purposes) each year, and a full certification audit is conducted every three years.

The EMS addresses the following to ensure staff understand their roles and responsibilities to comply with environmental legislation and protect the environment and human health:

- Resources, roles, responsibility and authority
- Legal and other requirements in protecting the environment and human health
- Competence, training and awareness requirements
- Explanation of the Non-Conformance, Corrective and Preventative Action procedures
- Details of the significance of Environmental Aspects and Impacts
- EMS Review and auditing procedure and requirements
- Monitoring and measurement requirements
- Record keeping procedures

[1] Energy and Utility Skills (2021) Competence Management System. Available online at: https://www.euskills.co.uk/about/our-industries/waste-management/competence-management-system/

To accompany the Permit the Site will have its own Management System in line with the Environment Agency guidance. This identifies all the applicable procedures under the accredited EMS but includes additional site-specific information and procedures.

One of the key tasks for Southern Water during the permit determination process is the development of the management system arrangements to cover additional requirements in relation to the permitted operations. This may include the Climate Change Risk Assessment (CCRA) document reference 790101_ERA_CCRA_QUE to address measures to adapt to predicted additional pressure from changes in external operational conditions (such as weather and flooding), if required. Climate change and climate resilience will be included in the ongoing future updates to the EMS.

In addition to the environmental elements of the management system, Southern Water also has a health and safety management system which includes relevant procedures to follow with regards to accidents and the reporting of incidents and near misses. The health and safety manual is designed to comply with the Health and Safety Executive's (HSE) Managing for health and safety guide (HSG65)[2].

The EMS certification can be found in Document reference 790101_EMS Certificate December 2023.

5.6 Question 5a: Site layout plan and process diagram

Plans provided, to satisfy question 5a, can be found in the following stand-alone documents:

- Site Layout and Location Plan - Document reference 790101_MSD_SiteLayoutPlan_QUE September 2024
- Drainage Plan - Document reference 790101_MSD_DrainagePlan_QUE
- Schematics - Document reference 790101_MSD_Schematics_QUE September 2024

5.7 Question 5b: Site condition report

In accordance with Environment Agency requirements, a Site Condition Report (SCR) has been produced to demonstrate the condition of the land and groundwater at the Site on issue of the proposed permit. The SCR includes the following details (section 1 to 4 of the Environment Agency template[3]):

- Site details;
- Condition of the land at permit issue;
- Permitted activities; and
- Changes to the activity.

A copy of the SCR can be found as document reference 790101_MSD_SCR_QUE September 2024.

5.8 Question 6: Environmental risk assessment

As part of the application for an environmental permit, operators must assess the risk to the environment and human health from the activities that they propose to undertake, using the

[2] Health and Safety Executive (2013), Managing for health and safety (HSG65). Available online at: https://www.hse.gov.uk/pubns/books/hsg65.htm.

[3] Environment Agency (2013). Environmental permitting: H5 Site condition report. Available online at: https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report

methodology outlined in the Environment Agency's 'Risk assessments for your environmental permit'[4].

The Environmental Risk Assessment (ERA) sets the requirements for the management of the permitted area, emission control measures etc. It assesses the risks to the environment, amenity and human health. All control measures within the rules must be adhered to in order to obtain the permit.

The ERA assesses the impacts from the following environmental concerns:

- Point source and fugitive emissions to air;
- Point source and fugitive emissions to water and land;
- Noise and vibration;
- Odour;
- Litter, mud and debris;
- Vermin and insects (pests);
- Human health and environment safety (i.e. visual impacts, site security, flood risk); and
- Natural habitats and ecology.

Where emissions result in insignificant effects these have been screened out and where further detailed assessments of potential environmental impacts are required this is noted.

A copy of the ERA can be found as document reference 790101_ERA_QUE September 2024. Constraints maps have been updated to demonstrate human receptors to a radius of 2km, as shown in document reference 790101_ERA_Maps_QUE January 2024.

[4] Environment Agency (2023) Risk assessments for your environmental permit. Available online at: https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

6 Part C3 – Variation to a bespoke installation permit

6.1 Question 1: Table 1a: Activities applied for

Table 6.1: C3 Table 1a: Activities applied for (Scheduled activity)

Installation name	Schedule 1 or other references	Description of the Activity	Activity capacity	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity	Non - hazardous waste treatment capacity
Queenborough STC	S5.4, Part A (1), (b) and (i)	Anaerobic digestion	Annual: 218,812 wet tonnes Daily: 247 wet tonnes	Recovery or a mix of recovery and disposal of non-hazardous waste with a biological treatment capacity exceeding 100 tonnes per day if the only waste treatment activity is anaerobic digestion. R3 - Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) R13 - Storage of waste pending any of the operations numbered R 1 to R 12.	0	Annual: 218,812 wet tonnes Daily: 247 wet tonnes
Directly associated activities						
	Physical treatment of waste	Recycling/ reclamation of organic substances which are not used as solvents.		R3		
	Waste reception area	Import of sludge from satellite sites and commercial waste (future)		R3 D9		
	Gas combustion to produce heat and power.	Use principally as a fuel or other means to generate energy		R1		

Installation name	Schedule 1 or other references	Description of the Activity	Activity capacity	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity	Non - hazardous waste treatment capacity
	Use of biogas	Use principally as a fuel or other means to generate energy.		R1		
	Use of auxiliary standby flare	Incineration on land		D10		
	Standby boilers	Used for emergency only		D10		
	Use of pressure release values	Release of pressure from digesters				
	Storage	Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced).		R13		
	Raw material storage	Storage of raw materials including chemicals, lubrication oil, antifreeze, diesel, activated carbon.		R05		
	Discharge of condensate	Condensate from the CHP exhaust, flare gas pipelines, gas storage bag From collection to the point of discharge at the adjacent WTW.				
For installations that take waste	Total storage capacity	5,701m^3 Sludge storage capacity = 5,701m^3 Cake storage capacity = 3,920m^3				
	Annual throughput	Total site capacity: 218,812 wet tonnes 28,322 wet tonnes for indigenous sludge 61,876 wet tonnes for imported liquid sludge (Total into the site: 90,198 wet tonnes)				

Table 6.2: B4 Table 1a: Activities applied for (waste operation activity)

Name of waste operation	Description of the waste operation	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity	Non - hazardous waste treatment capacity
Temporary storage of imported cake	Storage pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection,	R13	N/A	Daily: <50 tonnes

Name of waste operation	Description of the waste operation	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity	Non - hazardous waste treatment capacity
	on the site where the waste is produced)			
Acceptance of liquid sludge waste (digestate) at post digestion	Physical treatment of waste. Recycling/ reclamation of organic substances which are not used as solvents.	R3	N/A	Daily: <50 tonnes
For all waste operations	Total storage capacity	Temporary storage of imported cake: 6,200 wet tonnes, 1,550 dry tonnes Acceptance of liquid sludge waste (digestate) at post digestion: N/A, as it is feed though the remaining process after digestion to the centrifuge for dewatering		
	Annual throughput (tonnes each year)	Temporary storage of imported cake: 12,400 wet tonnes, 3,100 dry tonnes Acceptance of liquid sludge (digestate) at post digestion for dewatering: 18,000 wet tonnes.		

6.1.1 Question 1: Table 1b: Types of waste accepted

Southern Water requires a permit for the Site to be authorised to accept sludge waste to undergo anaerobic digestion to comply with the Industrial Emissions Directive. It is requested that the annual quantity of indigenous sludge and liquid sludge imports to be accepted is 218,812 wet tonnes (site design capacity). A breakdown of the inputs for anaerobic digestion to the Site are presented in document reference 790101_AnnualThroughput_QUE August 2024. None of the requested wastes are hazardous. The codes for the types of waste accepted are shown in Appendix A.

6.2 Question 2: Point source emissions to air, water and land

6.2.1 Emissions to air

Table 6.3: Part C3, Question 2, Table 2: Point source emissions

Installation name	Queenborough STC			
Point source emissions to air				
Emission point reference and location	**Source**	**Parameter**	**Quantity**	**Unit**
Stack 1 TQ 90937 70589 (A01)	CHP engine exhaust stack burning biogas	Oxides of Nitrogen (as NO_2)	500	Mg/m^3
		Carbon Monoxide	1400	Mg/m^3
		Sulphur Dioxide	350	Mg/m^3
		Total VOCs	1000	Mg/m^3
Stack 2 TQ 90893 70555 (A02)	Waste gas burner (flare stack)	Operational hours	No limits set	Mg/m^3
Duty/standby Boiler 1 TQ 90930 70589 (A03)	Stand by boiler exhaust stack –operating on gas oil and biogas	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	250	Mg/m^3
		Sulphur Dioxide (if burning biogas)	200	Mg/m^3
Duty/standby Boilers 2 TQ 90930 70589	Stand by boiler exhaust stack –operating on gas oil and biogas	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	250	Mg/m^3

Installation name	Queenborough STC			
(A03)		Sulphur Dioxide (if burning biogas)	200	Mg/m^3
Gas holder TQ 90913 70583 (A04)	Gas holder pressure relief valve	Biogas release and operational events	No limits set	
Pressure relief valves on Digester 1 TQ 90944 70598 (A05)	Biogas release and operational events	Operational hours Recorded duration and frequency.	No limit set	
Pressure relief valves on Digester 2 TQ 90925 70608 (A06)	Biogas release and operational events	Operational hours Recorded duration and frequency.	No limit set	
Odour control units and air extraction fan outlet TQ 90905 70451 (A08)	Channelled emissions to air as identified on - site plan. Including tank vents and/or extraction system	Ammonia	20	Mg/m^3
		H_2S	No limit specified	
		Odour concentration	1000	Oue/Nm^3

The emission points are shown in drawing reference 790101_MSD_SiteLayoutPlan_QUE September 2024.

There are no emission to air associated with the waste operation activities ‘temporary storage of imported cake (raw or digested)’ and ‘acceptance of liquid sludge waste (digestate) at post digestion, for dewatering’.

6.2.2 Emissions to water (other than sewers)

Not considered applicable as the drainage network sends water to the head of the works for treatment. There will be no point sources emissions from the STC.

There are no direct potentially contaminated discharges to controlled surface waters.

There will be no direct discharge of wastewater to controlled waters from the STC.

There are no direct potentially contaminated discharges to groundwaters.

Accidental releases of materials to the environment are controlled through adequate containment measures and working procedures in accordance with the EMS. Spill procedures are in place under EMS363 and 364 as well as a pollution prevention procedure EMS360. All spillages are recorded in the site diary including actions taken.

6.2.3 Emissions to sewers, effluent treatment plants or other transfers off-site

The release of liquors from the sludge treatment process is considered to be a point source emissions or direct discharges to controlled waters or public sewers, as part of the permit operation. The site layout plan, drawing reference 790101_MSD_SiteLayoutPlan_QUE September 2024, identifies the point at which liquors leave the site to enter the WTW at the inlet. A sampling location has also been identified on the site layout plan (denoted as the letter M, followed by a number), although sampling will be undertaken as part of a wider implementation plan under BAT and IED. An implementation plan is shown in document reference 790101_MSD_ImplementationPlan December 2023. It is therefore, considered that this will be added as Improvement Conditions to the permit.

Any liquid waste will either be reused or discharged to the drainage system of the adjacent Queenborough WTW and will undergo treatment through the works before being discharged

under an existing water discharge permit. On-site WTW effluent will meet the requirements of the existing water discharge activity permit. The water used at the Site will be contained in a closed circuit; all wastewater streams will either be recycled within the process or captured and rerouted to the adjacent WTW.

Discharges will be minimal, typically arising from periodic maintenance/cleaning operations. As such, there are no direct potentially contaminated discharges to controlled surface waters and no significant impacts. All drainage (surface water or foul water) will be captured by the on-site drainage system and returned to the head of the WTW. A drainage plan of the Site is presented in document reference 790101_MSD_DrainagePlan_QUE.

The stormwater drainage of potentially contaminated areas from within the Site boundary will be routed into the sewage treatment process with no discharge outside of the Site. There will therefore be no risk of polluted runoff affecting off-site features due to the creation of a new hardstanding area.

Due to the anticipated very low levels of contamination of the water and the volumes involved, no monitoring of its composition is proposed prior to discharge to the WTW.

Any areas of the Site, where there is a risk of contamination of surface water, groundwater or discharge of process waters are located on impermeable concrete surface. All surface water from these areas drain to the WTW internal drainage system and are returned to the head of the works for treatment prior to discharge as final effluent.

A list of the point source emissions to sewers, effluent treatment plants and other transfers off-site is included as Table 6.3.

Table 6.4: Part C3, Question 2, Table 2: Point source emissions to sewers, effluent treatment plants or other transfers off-site

Emission point reference, and location	Source	Characteristics	Monitoring / mitigation measures prior to final discharge and emission point discharge.
C3- Schedule activity (anaerobic digestion)			
Gravity Belt Thickener (S2) TQ 90926 70556	Process liquors at Gravity Belt Thickener	Variable, from processes	Discharged to adjacent WTW via inlet works. Monitoring point for sampling as M2 on site layout plan (TQ 90928 70556)
Sludge reception (S4) TQ 90873 70594	Tankered waste entering from reception point	Variable	Discharged to adjacent WTW via inlet works. Monitoring point for sampling as M4 on site layout plan (TQ 90875 70594)
Rainwater (S5) TQ 90847 70602 (S7) TQ 90962 70505 (S8) TQ 90959 70594	Uncontaminated roof water from buildings.	Clean rainwater from building roofs only.	Discharged to adjacent WTW via inlet works. Monitoring point for sampling as M5 on site layout plan (TQ 90848 70602) Monitoring point for sampling as M7 on site layout plan (TQ 90963 70505) Monitoring point for sampling as M8 on site layout plan (TQ 90961 70594)
Rainwater (S5) TQ 90847 70602 (S7) TQ 90962 70505	Run off from impervious surfaces	Clean rainwater from runoff	Discharged to adjacent WTW via inlet works. Monitoring point for sampling as M5 on site layout plan (TQ 90848 70602) Monitoring point for sampling as M7 on site layout plan (TQ 90963 70505)

Emission point reference, and location	Source	Characteristics	Monitoring / mitigation measures prior to final discharge and emission point discharge.
(S8) TQ 90959 70594			Monitoring point for sampling as M8 on site layout plan (TQ 90961 70594)
Washwater (S5) TQ 90847 70602 (S7) TQ 90962 70505 (S8) TQ 90959 70594	From the washing down of mechanical equipment during maintenance activities	Variable.	Discharged to adjacent WTW via inlet works. Monitoring point for sampling as M5 on site layout plan (TQ 90848 70602) Monitoring point for sampling as M7 on site layout plan (TQ 90963 70505) Monitoring point for sampling as M8 on site layout plan (TQ 90961 70594)
Gas condensate (S6) TQ 90934 70587	Condensate from the gas pipelines and gas storage bag	Condensate with slightly elevated levels of H_2S dissolved from the biogas, resulting in a low level of acidity	Discharged to adjacent WTW via inlet works. Monitoring point for sampling as M6 on site layout plan (TQ 90935 70587)
Boiler Maintenance (S6) TQ 90934 70587	Boiler blow down to minimise damage from high mineral content water.	High purity water with traces of chemicals (used for boiler dosing).	Discharged to adjacent WTW via inlet works. Monitoring point for sampling as M6 on site layout plan (TQ 90935 70587)
Drain down of plant (S6) TQ 90934 70587	Occurs during maintenance when it is necessary to drain down the feed water, hot well or boiler shell.	High purity water with traces of chemicals (used for boiler dosing).	Discharged to adjacent WTW via inlet works. Monitoring point for sampling as M6 on site layout plan (TQ 90935 70587)
C3- Schedule activity (anaerobic digestion) and B4 – waste operation (acceptance of liquid sludge waste (digestate) at post digestion)			
Centrifuge liquors (S3) TQ 90978 70566	Process liquors from the STC (dewatering liquors, cess liquors)	Variable, from processes	Discharged to adjacent WTW via inlet works. Monitoring point for sampling as M3 on site layout plan (TQ 590979 170566)

There are no standalone emission to sewer associated with the waste operation activities ‘temporary storage of imported cake (raw or digested)’ and ‘acceptance of liquid sludge waste (digestate) at post digestion, for dewatering’.

Please refer to the ERA (doc ref 790101_ERA_QUE September 2024) on the environmental risk the water emissions pose and how these are mitigated, where relevant.

6.2.4 Emissions to land

There will be no point source emissions to land as part of the activities carried out on-site.

Indigenous sewer grit and screenings are collected in separate skips and removed off-site by road vehicle and transported to a suitably Permitted facility.

Discharges will be minimal, typically arising from periodic maintenance/cleaning operations, and is captured in spill trays.

Releases of raw materials to land are considered to be negligible due to adequate containment of the materials within suitable storage vessels, the provision of bunding and the presence of a contained drainage system.

Please refer to the ERA (doc ref 790101_ERA_QUE September 2024) on the environmental risk the water emissions pose and how these are mitigated, where relevant.

6.3 Question 3a: Operating techniques

This section provides a technical overview of the components, the proposed techniques and measures to prevent and reduce waste arising and emissions of substances and heat, including during periods of start-up or shut-down, momentary stoppage and malfunction, and leaks. Specifically, consideration is made of:

- The technology to be used
- The process, in terms of how it will be operated and controlled
- In-process controls and Best Available Techniques (BAT) Assessment
- Measures implemented to control emissions to air, water, sewer and land

Table 6.5 lists the technical guidance notes (TGNs) used to inform the techniques and measures proposed to prevent and reduce waste arising and emissions of substances, including during periods of start-up and shut down, momentary stoppage and malfunction, and leaks.

The technical guidance and BAT requirements will also be addressed within Southern Water's Queenborough Site Working Plan, as part of the EMS, to be made available to staff to ensure compliance with a permit, which covers the following:

- Management of activities, including security and staffing
- Emissions and monitoring, including:
  - point sources to air, water and land
  - fugitive emissions
  - site drainage
  - storage of waste
  - odour, noise and vibration
- Site record keeping

Table 6.5: Part C3, Question 3a, Table 3a: Technical standards

Installation name	**Queenborough STC**	
C3 – Installation		
Description of the schedule 1 activity or directly associated activity	**Best available technique (BATC, BREF or TGN reference)**	**Document reference**
Section 5.4 non-hazardous waste installation - anaerobic digestion installation regulated under the Industrial Emissions Directive, utilisation biogas for energy	• Biological waste treatment: appropriate measures for permitted facilities • Non-hazardous and inert waste: appropriate measures for permitted facilities	• https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities/1-when-appropriate-measures-apply • https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities
B4 – Waste activities		
Description of the waste operation	**Appropriate measure (TGN reference)**	**Document reference**
Temporary storage of imported cake (raw or digested) Acceptance of liquid sludge waste (digestate) at post digestion, for dewatering	• Non-hazardous and inert waste: appropriate measures for permitted facilities • Biological waste treatment: appropriate measures for permitted facilities	• https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities • https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities/1-when-appropriate-measures-apply
General		
	Guidance	**Document reference**

Installation name	Queenborough STC	
All activities	• Monitoring stack emissions: technical guidance for selecting a monitoring approach • M1 sampling requirements for stack emission monitoring • Environment Agency environmental permitting guidance, including: • Risk assessments for your environmental permit • Energy efficiency (Energy efficiency for combustion and energy from waste power plants) • Noise assessment and control • H4 Odour management • H5 Site condition report • Control and monitor emissions for your environmental permit	• https://www.gov.uk/guidance/monitoring-stack-emissions-technical-guidance-for-selecting-a-monitoring-approach • https://www.gov.uk/government/publications/m1-sampling-requirements-for-stack-emission-monitoring • https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit • https://www.gov.uk/guidance/energy-efficiency-standards-for-industrial-plants-to-get-environmental-permits • https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits • https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management • https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report • https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit

A copy of the schematics describing the operation and process can be found in document reference 7790101_MSD_Schematics_QUE September 2024.

6.3.1 BAT Assessment

Anaerobic digestion of sludge

An assessment against the BAT Conclusions set out in the 2014/738/EU: Commission Implementing Decision of 9 October 2014 establishing best available techniques (BAT) conclusions, under the Industrial Emissions Directive 2010/75/EU has been undertaken for all the 16 sites, as a whole, and the outcome of these conclusions can be found in document reference 790101_MSD_BAT_QUE January 2024. This document reflects the existing arrangement at site and any commitments Southern Water has already made during the ongoing application process. It is acknowledged that it does not fully meet BAT in some instances. Changes to site will be undertaken and completed to meet BAT, where applicable. The changes required will be submitted to the Environment Agency, in plans to be submitted as part of Improvement Conditions within the permit, for their agreement and Southern Water's subsequent implementation. An implementation plan has shown in document reference 790101_MSD_ImplementationPlan December 2023.

Included in the Implementation Plan is for the wastewater inventory monitoring to be undertaken as per BAT 2, and further information is addressed in section 6.2.3. On-going monitoring is proposed to be in line with BAT AELs and monitoring frequencies are applicable to treatment of water-based liquid waste and biological treatment of waste, these are outlined in Table 6.1 and Table 6.2 of the BAT assessment.

The Odour Management Plan (document reference 790101_ERA_OdourMP_QUE September 2024) has also been prepared in accordance with the following BAT conclusions, in additional to the H4 guidance:

- BAT 1: Environmental Management System to include the Odour Management Plan
- BAT 10: periodically monitor odour emissions

- BAT 12: Implement and regularly review an odour management plan, as part of the environmental management system, including protocols for:
  - Actions and timelines
  - Conducting monitoring
  - Response to identified odour incidents
  - Odour prevention and reduction
- BAT 13: Reducing odour emissions through the use of techniques
- BAT 14: reducing diffuse emissions to air
- BAT 33: control of odour emissions through pre-acceptance, acceptance and sorting the waste
- BAT 34: reduce channelled emissions

Supplementary documents for the BAT assessment are provided:

- BAT 2 Description of the Duty of Care procedures provided in 790101_WasteAcceptance_QUE August 2024
- BAT 14 Leak Detection and Repair Plan (LDAR) is provided in 790101_MSD_LDAR_QUE September 2024.
- BAT 1 Accident Management Plan (AMP) is provided in 790101_MSD_AMP_QUE September 2024. Catastrophic failures, of tanks for example, will be included in the AMP once final designs are agreed based on the findings in CIRA/ABDA assessment.
- BAT 1 Residues Management Plan (RMP) is provided in 790101_MSD_ResidueMP_QUE September 2024.

6.3.2 Appropriate measures assessment

In addition to the Bref and associated BATc, the appropriate measures will form part of the technical standards the Site operates:

- Non-hazardous and inert waste: appropriate measures for permitted facilities
- Biological waste treatment: appropriate measures for permitted facilities

As the Site is existing some aspects of the Appropriate Measures do not apply, as the Site was built and operated prior to the issue of the guidance. Southern Water are committed to develop the application of the key principles from the guidance into Site operation and associated management plans as soon as practicable, to ensure the following:

- Reducing or preventing contamination
- Preventing cross contamination by segregation
- Maintaining appropriate primary and secondary containment
- Ensure the Site does not exceed site capacity (design and permitting constraints)
- General management:
  - Operate with a Management System
  - Operate with applicable specific management plans (odour, accident and residue plans)
  - Inspection, maintenance and monitoring regimes
  - Maintaining and reviewing staff competency requirements
  - Maintaining appropriate security measures across the Site
  - Record keeping procedures
  - Contingency plans

- Maintaining appropriate waste storage and suitable segregation, to prevent environmental impacts. Includes tank inspection and maintenance regimes
- Operate and calibrate process monitoring systems
- Record keeping of process outputs, and appropriate handling of residues
- Emissions controls, including prepare an emissions inventory
- Apply process efficiency measures for energy, raw materials, water use and waste minimisation.

As per document reference 790101_Sampling proposal_QUE August 2024, sampling and analysis in relation to permitted waste operations, other than those related to Scheduled Activities, will be undertaken in line with 'Non-hazardous and inert waste: appropriate measures for permitted facilities' guidance text, using an MCERTS accredited, or equivalent, laboratory, where available. This commitment is related to the acceptance of imported wastes to the post digestion at the Site.

Temporary storage of imported cake (raw or digested)

A high-level assessment against the appropriate measures for inert and non-hazardous waste has been undertaken and is presented in document reference 790101_Appropriate Measures_QUE September 2024.

Acceptance of liquid sludge waste at post digestion, for dewatering

A high-level assessment against the appropriate measures for inert and non-hazardous waste has been undertaken and is presented in document reference 790101_Appropriate Measures_QUE September 2024.

6.4 Question 3b: General requirements

6.4.1 Overview

This section provides an overview of the measures in place at the Site for controlling fugitive emissions, noise and odour. An ERA has been completed and is provided with the application (Document reference: 790101_ERA_QUE September 2024). The response to this question relates to Table 4 in the Part C3 form.

6.4.2 Control of fugitive emissions to air

There are no significant fugitive emissions to air of gases, vapours, or particulates as part of normal Site operation.

Details of the procedures Southern Water follow with regards to the control of mud and debris and potentially polluting leaks and spillages are addressed in EMS.

An updated H1 assessment has been completed and can be found in 790101_H1 Tool v8_QUE January 2024.

An Air Quality Risk Assessment has been undertaken to assess the impacts from point sources emissions at the site, and the results are presented in 790101_AQRA_QUE August 2024.

The existing approaches and relevant procedures presented in the EMS and operational procedures are considered to adequately address the emissions that may present a risk, and, therefore, an Emission Management Plan is not considered be required.

6.4.2.1 Odour

The Site is situated in a remote location away from residential areas, with no sensitive receptor located within 300m of it.

No odour complaints have been received between 2018 to 2023.

There are no proposed works to be undertaken on the Site in respect of this permit application, therefore, the activities on-site are not anticipated to increase the off-site impact or result in adverse impact upon nearby sensitive receptors or the amenity of the area surrounding the Site.

All sources of odour identified at the Site have been either covered or enclosed within buildings and the air is extracted continuously to the odour treatment plant.

All sludge treatment processes and sludge storage tanks are covered or enclosed. Two current odour control units (OCUs) are present at the STC.

Odorous air is extracted by 2 No. duty, standby fans and dispersed via the stack. Odorous gases from tanks and treatment areas will be channelled to the odour control treatment units.

Leak detection (methane gas analyser) is installed on biogas holder/s to ensure any leaks from the inner bag are detected. Any leaks detected on the biogas system would always be fixed immediately by Southern Water due to the process safety risk posed by biogas.

The use of odour atomisers during unloading of waste into the system is to be considered. The removal of biosolids off-site will be undertaken as soon a practically possible whilst considering prevailing weather conditions.

The Site has an Odour Management Plan (OMP), reviewed and updated in September 2024, which identifies potential odour emissions from site operations and procedures to manage, control and minimise odour impacts. It sets out the procedures for engaging with neighbours and how the Operator will manage complaints, and the actions to be taken in the case of pollution events. The OMP also describes the monitoring and maintenance procedures to maintain the control measures.

The OMP was written in accordance with the Environment Agency's H4 Odour Management guidance (2011). The level of odour risk from the Site is considered to be low, as shown in Appendix B of the ERA (document reference 790101_ERA_QUE September 2024), and the Site's OMP provides sufficient mitigation.

The OMP can be found in document reference 790101_ERA_OdourMP_QUE September 2024.

6.4.2.2 Noise

Initial screening has been carried out for the Site. Since the Site is not undergoing changes to equipment and vehicle movements prior to application submission, a Noise Impact Assessment (NIA) is not considered to be required. Appropriate mitigation for noise and vibration impacts are provided in the ERA. The ERA can be found in document reference 790101_ERA_QUE September 2024.

A Noise and Vibration Management Plan would be required whereby the NIA concludes that noise and vibration requires management, such as monitoring and maintaining abatement measures. Since noise and vibration impacts are considered to be appropriately mitigated, where necessary, or of low risk, in the ERA, a Noise and Vibration Management Plan is also not considered to be required.

There has been one noise complaint received by the Site in the last five years, in 2022.

6.4.2.3 Dust and particulates

There are not considered to be any significant dust or particulate sources from the Site as identified in the ERA document reference 790101_ERA_QUE September 2024.

6.4.2.4 Bio-aerosols

A bio-aerosols risk assessment has not been undertaken for the Site as no sensitive receptor likes within 250m of the Site and the environmental risk assessment shows there are no impacts on sensitive receptors [5].

6.4.3 Control of fugitive emissions to surface water, sewer and groundwater

There are not considered to be any fugitive emissions to surface water, sewers or groundwater. There is appropriate containment for the control of liquid wastes put in place to minimise any potential releases, as identified in the EMS.

6.4.4 Control of fugitive emissions to land

Details of waste generated at the site is demonstrated in document reference 790101_MSD_ResidueMP_QUE September 2024.

To reduce volumes of waste:

- All materials and consumables delivered to Site are inspected to ensure that they are fit-for-purpose. Damaged items are refused and returned to the supplier.
- The sludge from the post digestion sludge storage tanks is dewatered by two centrifuges to reduce its volume. Dewatered digested cake is stored in the cake storage bays, before being transported off-site for storage prior to being recycled to agricultural land as a soil fertiliser. The treated sludge meets the Biosolids Assurance Scheme Quality Standards. The volume of sludge recycled to agricultural land is monitored by the waste services team.
- The biogas from the AD process is burned in a CHP engine and is used to provide power for the Site processes.
- Polymer intermediate bulk containers (IBCs) are sent back to the supplier for re-use.
- Grit is collected for composting and used as a soil conditioner. This process is licensed and controlled via the Environment Agency.
- WEEE, batteries, waste oils and oil contaminated items such as oily rags are treated as hazardous waste in accordance with legislation, these are removed from Site by an approved supplier, using approved waste carriers.

Queenborough WTW has a designated waste management area that is located on hardstanding at TQ 90991 70586. All skips and containers are located on a hardstanding to prevent leaching into the ground. Skips and containers are clearly labelled. All waste from the Site is sorted into this waste area.

If a complaint is made with respect to litter the complaints procedure will be followed. The Site Manager will arrange for litter pickers to clear up as appropriate and will assess whether further control measures will be required to ensure that the risk of recurrence is minimised. The details of the complaint and actions taken to resolve the issue will be recorded in the Site Diary and the complaints register.

[5] Environment Agency (2023) Bioaerosol monitoring at regulated facilities - use of M9: RPS 209. Available online at https://www.gov.uk/government/publications/bioaerosol-monitoring-at-regulated-facilities-use-of-m9-rps-209

6.5 Site security

Activities are managed and operated in accordance with the management system. Access to Site and waste is restricted by 2.5m high chain link security fence and a 40m wide watercourse which borders the Site. Electronically operated palisade gates secure the main access and are closed at all times when not in use and locked out of hours. The Site is staffed 0700-1800 Monday-Friday and 0700-1500 on weekends. The electric gate is operated by a fob system, for visitors and unauthorised personnel an intercom system at the Site entrance is used. The Site also benefits from a CCTV system (normal and thermal), with cameras positioned in key locations around the Site, including one Automatic Number Plate Recognition (ANPR) camera on the main gate. Regular inspections of the boundary fencing and buildings are undertaken to ensure that these have not been compromised and continue to prevent easy access to Site. Repairs are undertaken in accordance with the EMS requirements.

Other risks relating to human health and the environment are presented in Appendix B of the ERA in document reference 790101_ERA_QUE September 2024.

6.6 Complaints procedure

All complaints received relating to any aspect of the Site and its activities will be recorded and acted upon. Complaints, and actions taken, will be either recorded in the Site Diary or on a complaints record form. If a Site receives a complaint, this form should be completed and shown to the Environment Agency when they next inspect the Site. The forms will be used as evidence that any complaints received have been taken seriously and that actions have been taken to rectify any problems identified.

Complaints will be investigated promptly and any appropriate remedial action taken. The complainant and anyone else likely to have been affected, should be informed about what has been found and actions taken in a timely manner. The details of the complaint and the actions taken will be recorded in the Site Diary or log.

The aim will be to undertake measures to prevent complaints from being raised. However, where this is not possible, proactive measures will be taken to prevent further complaints from being made. For example, if a complaint is made with respect to dust, the Site Manager will arrange for dust suppression equipment to be used. The Site Manager will assess whether further control measures will be required to ensure that the risk of recurrence is minimised. The details of the complaint will be recorded in the Site Diary and the complaints register. If a complaint is received Southern Water will be informed as soon as is practicable and the complaints procedure will be followed. Confirmation will be recorded in the Site Diary or inspection log. The Site Manager will inform the Environment Agency of the complaint, if appropriate.

Any drivers who regularly cause a dust or mud and debris nuisance as a result of mismanagement of their vehicles will be discussed and advice will be sought from the Site Manager, if relevant.

If a complaint is made with respect to insects the Site Manager will investigate whether any of the activities at the Site could be the source of the nuisance.

If a complaint is made with respect to litter the Site Manager will arrange for litter pickers to clear up as appropriate and will assess whether further control measures will be required to ensure that the risk of recurrence is minimised. The details of the complaint will be recorded in the Site Diary and the complaints register.

Any complaints relating to fugitive emissions and the actions taken will also be recorded in the Site Diary and copies of the incident reports (including those provided to the Environment Agency) retained on-Site.

If a complaint is made with respect to vermin or an infestation is suspected, where normal treatment activities appear to be unsuccessful, the Site Manager will discuss and agree any further measures required with the pest control firm. The complaint reporting procedure will be followed as described below.

If a complaint is made with respect to noise or vibration the Site Manager will assess the cause of the complaint and will report the findings. If the noise or vibration leading to the complaint has been caused by a continuing operation, additional noise or vibration surveys may be required to confirm the degree of impact upon the receptor. The Site Manager will make any recommendations for further noise or vibration control to the Management Team and shall inform the Environment Agency of the complaint as soon as it is practicable to do so.

In the unlikely event that a complaint is made with respect to odour the Site Manager will investigate the source of the odour and take steps to reduce its impact. If the source appears to come from the Site then appropriate actions to reduce the odour will be taken.

6.6.1 Complaints investigation procedure

In the event of any complaint, this section deals with the complaint assessment procedures. The primary role of this assessment will be to ascertain whether the complaint is associated with any Site operations and what action should be taken to prevent or minimise the probability of a recurrence.

It is important that any person acting on behalf of Southern Water is appropriately trained and that all steps and decisions are documented.

Step 1 – Complaint received

The Site operator or Environment Agency receives a complaint regarding the STC. Details are logged within the Customer Services Management System (CSMS).

Step 2 – How to respond

Complainant is contacted to inform them the complaint has been received and request further information, where required.

The primary reasons for investigation of complaints are to identify the likely cause and source for the complaint and it is important to gather as much information about the complaint as possible. At the outset of any investigation, the Site Manager is to determine the priority for responding to the complaint.

If possible, someone from the Environment Agency will attend after a complaint has been made so that they can carry out an effective and subjective appraisal of the complaints and note any results into the CSMS.

Step 3 – Determine what to record and how

The complaint details and the investigation outcomes and actions taken are to be recorded in the CSMS. This information must be filled in on-site at the time of notification of the complaint.

Step 4 – Follow-up investigation

In order to resolve any problems successfully, it is essential to understand fully the source, reason and the operational conditions that led to the complaint. The first step in the investigation will be to select the most appropriate methodology for assessment. All the

information collected should be filled in on the internal complaints form and a note made referencing this in the CSMS.

Step 5 – Communication with the complainant

The Site Manager or contractor tasked with addressing the complaint is responsible for collecting all the information and providing feedback to the complainant, or the Customer Contact Centre will contact the complainant. Wherever possible an explanation of the actions taken and the reasons for the decision should be made to the complainant.

If it is decided that there was no ground for the complaint this should be clearly explained to the complainant, along with information about what they should do if they are unhappy with the response.

Step 6 – Monthly complaints records

A full report of the complaints logged within the CSMS is produced to present to the relevant Technician to allow a review of potential trends.

6.7 Question 3c: Types and amounts of raw materials

Details of raw materials is demonstrated in document reference 790101_MSD_ResidueMP_QUE September 2024.

6.8 Question 4: Monitoring

This section provides a summary of the proposed monitoring at the Site.

6.8.1 Emissions to air

Stack emissions monitoring will be undertaken for each stack in accordance with M5 monitoring guidance, MCERTS BS EN 14792 and the requirements of the environmental permit issued for the Site, where suitable and available.

Periodic monitoring will be undertaken on an annual basis as part of the routine maintenance programme. No abatement technology is required, and continuous monitoring is not considered necessary. Sample monitoring will be carried out after each maintenance period on the CHP and boilers, in order to ensure compliance with ELVs as required in the Environmental Permit.

Once permitted monitoring will be undertaken in accordance with the relevant standards. It is anticipated the monitoring standards required are as follows:

Table 6.5: Monitoring of air emissions

Emission point type	Parameter	Reference period	Monitoring frequency	Monitoring standard or method
Stacks on engines Burning biogas	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	periodic over minimum 1-hour period	Annual	In accordance with TGN M5 – Monitoring of stack emissions to air
	Carbon monoxide			
	Sulphur dioxide			
	Total volatile organic compounds including methane			
Boilers (biogas / gas oil)	Oxides of Nitrogen	periodic over minimum 1-	Annual	In accordance with TGN M5 –

Emission point type	Parameter	Reference period	Monitoring frequency	Monitoring standard or method
	(NO and NO_2 expressed as NO_2)	hour period		Monitoring of stack emissions to air
Channelled missions to air (scrubbing system)	Ammonia	periodic over minimum 1-hour period	Once every 6 months, or more frequent if stated in the permit	Emissions of pollutants into the environment through any kind of duct, pipe, stack, etc
	H_2S			
	Odour concentration		Once every 6 months, or more frequent if stated in the permit	BS EN 13725
Auxiliary flare	Operational hours	Recorded duration and frequency.	Continuous	Operational record including date, time and duration of use shall be recorded
Pressure relief valves	Biogas release and operational events	Recorded duration and frequency.	Daily inspection	Operational record including date, time duration of pressure relief events and calculated annual mass release

Southern Water acknowledges that the auxiliary flare is appropriate for emergency use (such as breakdown and maintenance).

6.8.2 Assessment of the sampling locations

Southern Water will employ sub-contractors accredited to MCERTS to monitor the emissions points in accordance with the permit requirements, where suitable and available. An assessment of sampling locations is therefore not appropriate as this will be the responsibility of the sub-contractors. Where suitable and available, any monitoring, sampling and analysis of emissions to air or water is undertaken according to MCERTS, or equivalent standards, by MCERTs accredited contractors.

6.8.3 Emissions to water (other than sewers)

There are no direct releases to controlled waters of emissions arising from the STC. As such, no monitoring or reporting is required.

6.8.4 Emissions to sewers, effluent treatment plants or other transfers off-Site

The release of liquors from the sludge treatment process is considered to be a point source emissions or direct discharges to sewers, as part of the permit operation. The site layout plan, drawing reference 790101_MSD_SiteLayoutPlan_QUE September 2024, identifies the point at which liquors leave the site to enter the WTW at the inlet. A liquor sampling location has also been identified on the site layout plan, although sampling will be undertaken as part of a wider implementation plan under BAT and IED.

Southern Water will undertake a chemical analysis of its wastewater, from the STC entering the adjacent WTW, to test all pollutants expected to be found in the discharge, to fully characterise the emissions to water. A minimum of 12 sampling runs over a 12-month period (one full sampling spec per month) is proposed initially to establish a baseline, in accordance with the surface water pollution risk assessment guidance or other applicable guidance such as MCERTS or ISO standards, where appropriate. Southern Water will then take an informed view of the determinants the samples contain demonstrating those that are not in the sample. An H1 assessment to screen out any that are not applicable or relevant will be completed. Sampling and analysis will be undertaken using a UKAS accredited, or equivalent, laboratory. This commitment falls within the Implementation Plan for meeting BAT and IED compliance. An implementation plan is shown in document reference 790101_MSD_ImplementationPlan December 2023. It is therefore considered, that this will be added as Improvement Conditions to the permit.

All condensate discharge directly to the Site drainage system which diverts water to the head of the works of the adjacent Queenborough WTW. Condensate from the CHP exhaust discharges to a container, which is emptied at least fortnightly to the drainage system of the adjacent Queenborough WTW and will undergo treatment through the works before being discharged under an existing environmental permit for discharge to water. This condensate is clean, uncontaminated water and occurs in small volumes. As such, no monitoring or reporting is required. There are no direct releases to public sewers, effluent treatment plants or other transfer off-site of emissions arising from the STC.

6.8.5 Emissions to land

There are no direct releases to land of emissions arising from the STC. As required by the Southern Water EMS various housekeeping and waste management practices are in place to monitor waste emissions. These include segregation of wastes according to their classification and nature, labelling waste and using designated storage containers.

In accordance with the Southern Water EMS Policy solid waste is disposed of in accordance with ‘Duty of Care’ Regulations. The composition of the waste, its hazard characteristics and any relevant precautions are clearly stated on the transfer notes provided to licensed waste contractors removing waste from Site for recycling and/or disposal. Records are maintained on-site and reported to the regulator as required by the Permit.

6.9 Question 5: Environmental impact assessment

The proposal is not subject to an environmental impact assessment under Council Directive 85/337/EEC of 27 June 1985 [Environmental Impact Assessment] (EIA).

6.10 Question 6: Resource efficiency and climate change

6.10.1 Basic energy requirements

Southern Water aims to maximise the efficiency of the energy flows from its processes ensuring that, where possible, heat is recovered, and energy is not wasted.

There are a number of pieces of infrastructure and equipment that use electrical energy supply including:

- Fans, coolers and heating;
- Motors and motor drivers and drive systems;
- Aeration;
- Pumps / boosters/conveyors;

- Facilities – heating and lighting;
- Sludge handling and management e.g. AD, dewatering and polymer dosing equipment; and
- Ventilation and odour control/abatement systems.

Biogas is used to provide energy, produced by burning in a CHP engine, for the Site's processes. There are two boilers which are used for heating the digestion process.

6.10.2 Question 6a: Basic measures for improving energy efficiency

Biogas is a renewable gas, produced from organic waste and is reused on-site to power its energy requirements. A key objective of the Southern Water EMS is to reduce energy consumption from the grid. Southern Water has a specific Energy and Carbon Manual which contains objectives for the energy consumption. Southern Water recognise that target setting for, and measurement of, energy and carbon reduction is pivotal to reducing energy use and carbon emissions in new and existing installations. Southern Water is currently in the process of better understanding economic levels of energy efficiency, renewable energy generation and carbon reduction (embodied and operational), which will help the company develop and set company and project level reduction targets.

Southern Water deals with the measurement and reporting of operational carbon emissions for existing installations through:

- Monitoring of energy use from electricity meters
- Annual estimation and reporting of operational carbon emissions for regulatory reporting (Southern Water Annual Report, Ofwat and SECR (Streamlined Energy & Carbon Reporting)

  ESOS audit reporting – the Energy Savings Opportunity Scheme (ESOS) is a regulatory requirement to undertake a company-wide audit of energy efficiency opportunities. This is approved by a Lead Assessor and completion is subsequently registered with the Environment Agency. Reporting is every four years. The last report was undertaken in December 2019. The next one is due August 2024.

Energy efficiency measures implemented at the Site include (but not limited to) the following:

- The combustion temperature is optimised for reduced NOx emissions and increased efficiency.
- CHP engine is equipped with turbocharger, further increasing energy efficiency.
- Modifications have been made to minimise the running of multiple blowers.
- Ferric dosing has been optimised to aid settlement in PSTs and reduce aeration demand.
- A means to protect the CHP from high H_2S levels in the biogas in summer is under investigation.
- DO probes are cleaned regularly to ensure plant is operating efficiently.
- Mixed liquor suspended solids (MLSS) are controlled closely by operatives to prevent unnecessary aeration demand.
- Consideration of energy recovery and the deployment of renewable energy systems – review of opportunities relating to CHP, wind and solar power generation opportunities for the site
- The Field Performance Manager can request advice from the Optimisation Team to improve efficiency of plant if required.

Biogas is a renewable gas, produced from organic waste. Heat generated from the CHP is used in the AD process. The energy created by burning of biogas in the CHP engine is used to supply the Site to reduce the need to import electricity from the grid.

The development of an energy efficiency plan will be considered once the Site is permitted; this will determine areas of improvement and will be developed under SWS Environmental Policy and EMS. Southern Water carries out planned maintenance as a means to ensure operations are energy efficient. Overall, the energy use is relatively low and the purpose of the installation is to produce energy by supplying biogas, no further measures are identified at this stage to improve upon energy efficiency. Nevertheless, Southern Water will regularly review energy use and disclose potential opportunities to reduce energy consumption from the four-yearly (or more frequent) energy reviews as required by a varied permit. In addition, Southern Water implements optimisation measures across all its sites in a proactive approach to ensuring efficiency measures across all its Site operations meets optimal and efficient operating requirements.

6.10.3 Question 6b: Changes to the energy the permitted activities use up and create

There will not be any changes to the energy that the permitted activities use or create.

6.10.4 Question 6c: Climate change levy agreement

Southern Water is not a participant to the Climate Change Levy (CCL) agreement.

6.10.5 Question 6d: Raw and other materials, other substances and water use

Details of raw materials is demonstrated in document reference 790101_MSD_ResidueMP_QUE September 2024.

All materials will be handled and stored in such a way as to ensure containment. Fugitive emissions to the environment are therefore negligible.

Biogas is the primary raw material. Its consumption will be monitored. The use of biogas as the fuel source offers the best environmental option and there is therefore no environmental incentive to reduce biogas consumption and consider an alternative source of fuel.

Biogas is stored within 1 No. double membrane inflatable bag type holder, constructed of Type IV fabric which is resistant to UV and microbial degradation. The base of the holders are constructed from reinforced concrete treated to withstand the potentially acidic conditions within the holder. The gas bag is completely enclosed so the gas is not in contact with the concrete.

Secondary raw materials include chemicals used in processes such as water treatment, polymer for the boilers. Their consumption will be monitored, based on purchase records.

Water treatment chemicals are stored on impermeable surfaces in a contained area. Polymer is stored in sealed IBC/bags located on bunded areas.

The Southern Water purchasing procedures are included in EMS. The procedures ensure purchased items conform to specified requirements, including quality parameters, and review suitability for use, including efficiency and minimisation of use of raw materials.

All substances are assessed for COSHH (Control of Substances Hazardous to Health) compliance, where relevant. Material safety data sheets for all materials used and kept on-site will be maintained on the Site.

All raw materials are handled and stored within the confines of the buildings on-site, or in IBCs in bunded areas, with the exception of biogas which is contained within the gas handling system.

Releases of raw materials to land are considered to be negligible due to adequate containment of the materials within suitable storage vessels and presence of a contained drainage system.

Potable water usage on-site include:

- Polymer make up - concerns over the impact of using final effluent for this purpose
- Heat exchanger system water - concerns over the impact of using final effluent for this purpose
- Eye baths and safety showers - potable water essential
- Centrifuges and thickeners
- Limited wash-down points where it would be uneconomic to extend the final effluent wash-water system
- Office mess facilities - kitchen, washing and welfare facilities etc

To ensure appropriate use of raw materials to prevent releases of substances to the environment and limit environmental impact Southern Water will follow quality assurance procedures for the purchasing of materials. The raw materials will be selected from specialist suppliers determined by pre-established material specifications, and will include environmental considerations. Priority choice of purchased raw material will be given to those with the least environmentally harmful chemicals compared to their alternatives, wherever practicable.

Resource efficiency will be achieved through the minimum use of raw materials and water (where possible), and Southern Water will undertake the following:

- Maintain records of raw materials and water used
- Routine resource efficiency audits
- Review the feasibility of alternative materials that could reduce environmental impact or provide further opportunities to improve resources efficiency at least once every four years
- Implement further appropriate measures identified from a review

6.10.6 Question 6e: Reducing production of waste

Southern Water manages its waste in accordance with the Council Directive 2008/98/EC on waste (the Waste Framework Directive), legal requirements and the EMS (ISO 14001:2015), by maximising materials re-use, prevent waste, minimise waste generation and maximise recycling and recovery of waste generated from the operation of the Site. There are procedures in the EMS which includes details of the types of waste produced on-site, how wastes are segregated, stored and removed from Site. Only minimal volumes of waste shall be generated at the STC, with waste streams segregated and recovered for recycling where possible. All waste streams shall be managed in accordance with existing EMS', with any final off-site disposal to be carried out by licensed waste contractors in accordance with Duty of Care requirements, and the application of the waste hierarchy is central to any decision-making process.

Implementation of EMS procedures and the current Environmental Policy ensures optimum disposal of the wastes produced. Submission of a detailed assessment is not considered necessary due to the minimal quantity of waste produced.

Further consultation with waste contractors will ensure that all waste streams have been considered. The sampling and characterisation of wastes will be covered under the requirements of Duty of Care. The wastes are handled to a minimum and are stored in suitably designed containers prior to being removed from Site, to minimise releases of pollutants to the environment.

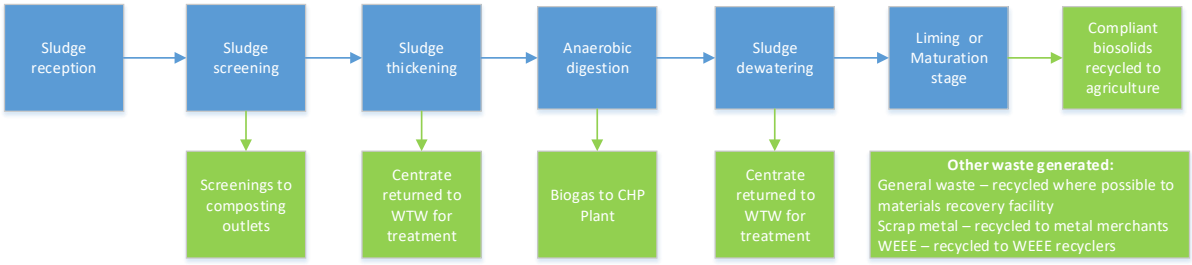
The main wastes produced by the installation are waste oils and filters associated with the operation and maintenance of the engines. Other wastes include from Site office (paper, packaging etc), waste collected from general housekeeping across the Site (debris, litter), scrap

metals and waste electronic and electrical equipment (WEEE), such as computer equipment, printers etc.

Waste generation from the operation of the plant is minimal and limited only to essential maintenance fluids and materials. Waste streams are segregated and recovered for recycling where possible, as shown in Table 6.5 for different Site activities. General waste is sent for recycling, where possible, scrap metal is sent to metal merchants for recycling and WEEE sent to specialist WEEE recycling facilities. Southern Water apply a Duty of Care by ensuring waste is removed by a suitable licenced waster carrier.

The sampling and characterisation of wastes and the final off-site transport of waste is carried out by licensed waste contractors in accordance with Duty of Care requirements. The implementation of EMS procedures and the current Environmental Policy ensures optimum disposal of the wastes produced.

A schematic of the main waste streams from the STC is shown below.



Schematic of STC with details of main waste streams

7 Part B6 – New bespoke water discharge activity or groundwater activity (point source discharge) or point source emission to water from an installation

The form responds to question listed in Table 1 of the B6 application form for the last listed option 'Effluent and/or contaminated surface water run‐off arising from the operation of an installation.

Therefore, only the following questions have been responded to:

Type of effluent	Charge band	Please tick box	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Effluent and/or contaminated surface water run-off arising from the operation of an installation	No additional charge, as already included as part of the installation permit application charge	☑	a, b, d	c	b, c, d, f	--	a, b2	a, b, c	b, c, d, e, f, g	b, d, e, f	a, b, d, e, f, h, i	a, b, c

* Check the relevant question and our guidance notes on part B6 to see if you need to give an answer.

Note Question 6c is not within the application, despite being listed as being required by Table 1 of the application form.

7.1 Question 1 About the variation you are applying for

Effluent description: Return liquors from the STC process and condensate from the gas pipelines and gas storage bag.

Effluent name: STC return liquors.

7.2 Question 2 How long will you need the discharge for?

The discharge will not be time limited. It will take place all year and continuously (ie for more than six days a year).

7.3 Question 3 How much do you want to discharge?

Southern Water is not aware of the quantity of water sent to the inlet works from the STC because it is not currently monitored, therefore no details have been provided for Question 3. An implementation plan has been developed as part of the accompanying IED permit application.

7.4 Question 4 Intermittent sewage discharges

It is not possible to answer Q4a-o. These do not seem applicable to the process.

7.5 Question 5 Should your discharge be made to the foul sewer?

The discharge point (inlet works (emission point W1 (document reference 790101_MSD_SiteLayoutPlan_QUE September 2024) is located within the operator's own wastewater treatment works, therefore, the distance to the nearest foul sewer is 0m and a response to Question 5b2 is not applicable.

7.6 Question 6 How will the effluent be treated?

Effluent is not treated before reaching the inlet works because once leaving the inlet works the effluent will be treated through the Wastewater Treatment Works. The process description is provided in Section 3. An implementation plan has been developed as part of the accompanying IED permit application. It is expected that Improvement Conditions in the IED permit will be provided and Southern Water will identify how it will monitor and characterise the liquors returning to the head of the adjacent Queenborough WTW.

7.7 Question 7 What will be in the effluent?

Southern Water is not aware of the composition of the effluent discharged to the inlet works from the STC because it is not currently monitored, therefore, no details have been provided for Question 7.

The temperature of effluent is not known but since the water is not direct from processes it is expected to be ambient.

An implementation plan has been developed as part of the accompanying IED permit application. It is expected that Improvement Conditions in the IED permit will be provided and Southern Water will identify how it will monitor and characterise the liquors returning to the head of the adjacent Queenborough WTW.

Where suitable and available, any monitoring, sampling and analysis of emissions to water is undertaken according to MCERTS, or equivalent standards, by MCERTs accredited contractors as set out in Southern Water's commitment in Section 6.8.4.

7.8 Question 8 Environmental risk assessments and modelling

Discharges to lakes, estuaries, coastal waters or bathing waters.

Southern Water is not aware of the composition of the effluent discharged to the inlet works from the STC because it is not currently monitored, therefore, screening cannot be undertaken at this time.

An implementation plan has been developed as part of the accompanying IED permit application. It is expected that Improvement Conditions in the IED permit will be provided and Southern Water will identify how it will monitor and characterise the liquors returning to the head of the adjacent Queenborough WTW.

Where suitable and available, any monitoring, sampling and analysis of emissions to water is undertaken according to MCERTS, or equivalent standards, by MCERTs accredited contractors as set out in Southern Water's commitment in section 6.8.4.

7.9 Question 9 Monitoring arrangements

Effluent monitoring will be in line with permit conditions. An implementation plan has been developed as part of the accompanying IED permit application. It is expected that Improvement Conditions in the IED permit will be provided and Southern Water will identify how, and the final locations of where, it will monitor and characterise the liquors returning to the head of the adjacent Queenborough WTW.

Where suitable and available, any monitoring, sampling and analysis of emissions to water is undertaken according to MCERTS, or equivalent standards, by MCERTs accredited contractors as set out in Southern Water's commitment in Section 6.8.4.

7.10 Appendix 4 Discharges to tidal river, tidal stream, estuary or coastal waters

The final effluent discharge from the WTW is permitted under the permit reference A697/K/96, via Outlet 1 (‘A1 Secondary treated sewage effluent’ and ‘A2 Settled storm sewage’) within the Swale Estuary at point, TQ 9085 6997. The permit authorises the discharge of secondary treated sewage effluent and settled storm sewage only.

8 Part F1 – Charges and declarations

8.1 Question 1: Working out charges

Table 1, Table 2 and Table 3 are completed on the Part F1 form.

8.2 Question 2: Payment

Payment will be made by BACS.

8.3 Question 4: Confidentiality and National security

Southern Water do not wish to claim confidentiality with this application.

8.4 Question 6: Application checklist

Table 8.1 provides a list of section/document references included in the application.

Table 8.1: Part F, Question 6, Table 4: Application checklist

Question reference	Document title	Documents reference
Part A – Q5c Part A – Appendix 1 Part C2 – Appendix 2	Details of Directors	790101_MSD_Directors_December 2023
Part C2 – Q3a Part C2 – Appendix 2	List of Relevant Offences	790101_MSD_RelevantOffences_December 2023
Part C2 – Q3b	Competency Management System Agreement	790101_MSD_CMS December 2023
Part C2 – Q3d	Environmental Management System Certificate	790101_MSD_EMS December 2023
Part C2 – Q5a Part C2.5 – Q4b Part E2 – Q3a	Site Location Plan	790101_MSD_SiteLayoutPlan_QUE September 2024
	Site Layout Plan	
	Drainage Plan	790101_MSD_Drainageplan_QUE 121021
Part C2 – Q5b Part E2 – Q4a	Site Condition Report	790101_SCR_QUE August 2024
Part C2 – Q6	Environmental Risk Assessment	790101 _ERA_QUE August 2024 790101_MSD_Maps_QUE January 2024
	Climate Change Risk Assessment	790101_ERA_CCRA_QUE
	Air Quality Risk Assessment and model files (within folder)	790101_AQRA_QUE August 2024 Model files folder: ‘Queenborough Models’
	H1 assessment tool	790101_H1 Tool v8_QUE January 2024
Part C2.5 – Q2	Air Quality Risk Assessment Combustion Plant data	790101_AQRA_QUE August 2024 790101_CombustionPlant_QUE August 2024
Part B4 – Q1b Part C3 – Q1b Part C4 – Q1b	Waste Codes	Appendix A of 709101_MSD_Main_QUE September 2024
	Annual throughput	790101_AnnualThroughput_QUE August 2024
	Waste Transfer Notes	790101_MSD_WasteTransferNotes_QUE August 2024
Part C3 – Q3a Part C3 – Q3c Part C4 – Q3a	Schematics	7790101_MSD_Schematics_QUE September 2024
	BAT Analysis	790101_MSD_BAT_QUE January 2024
	Implementation Plan	790101_MSD_Implementation Plan December 2023
	Leak detection and repair Plan	790101_MSD_LDAR_QUE September 2024

Question reference	Document title	Documents reference
	Residues Management Plan	790101_MSD_ResidueMP_QUE
	Accident Management Plan	790101_MSD_AMP_QUE September 2024
	Duty of Care (waste acceptance)	790101_WasteAcceptance_QUE August 2024
Part B4 – Q3b Part C3 – Q3b Part C4 – Q3b	Odour Management Plan	790101_ERA_OdourMP_QUE September 2024
Part B4 – Q4a	Monitoring	790101_Sampling proposal_QUE August 2024
Part C3 – Q3c, Table 5	Materials Safety Data Sheets	790101_MSD_MSDS_QUE January 2024
Part B6	Discharges	Section 7 – 790101_MSD_Main_QUE September 2024
Part A – Q7 Part B4 – Q1,2,3 Part C2 – Q2,3,5,6 Part C2.5 – Q3,4 Part C3 – Q1,2,3,4,6 Part C4 – Q1,2,3,4 Part F1 – Q1,2,6	Main Supporting Document	790101_MSD_Main_QUE September 2024

A. Waste Codes

A.1 Part C3: Wastes imported for Anaerobic Digestion

It is requested that the annual quantity of indigenous sludge and liquid sludge imports to be accepted is 218,812 wet tonnes per year.

EWC Code	Description	Where accepted	Indigenous or imported	Justification for use
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**			
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)	AD	Indigenous/ Imported	Pre-AD
19 08	**wastes from waste water treatment plants not otherwise specified**			
19 08 05	sludges from treating urban wastewater	AD	Indigenous/ Imported	Pre-AD

A.2 Part B4: Temporary storage of imported cake (raw or digested)

It is requested that the annual quantity of imported cake for temporary storage to be accepted is 12,400 wet tonnes (3,100 dry tonnes) per year.

EWC Code	Description	Where accepted	Indigenous or imported	Justification for use
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**			
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)	Cake Bay	Imported	Raw (pre-digested) and digested dewatered cake for temporary storage only.
19 06	**wastes from anaerobic treatment of waste**			
19 06 06	digestate from anaerobic treatment of animal and vegetable waste - digested cake	Post digestion and dewatering	Imported	Used for intersite transfers raw (pre-digested) and digested dewatered cake for temporary storage only.

A.3 Part B4: Wastes to import for dewatering

It is requested that the annual quantity of imported liquid sludge to be accepted for dewatering is 18,000 wet tonnes per year.

EWC Code	Description	Where accepted	Indigenous or imported	Justification for use
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**			
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)	Post-digestion for blending/dewatering	Imported	Used for intersite transfers of post digested liquid sludge as per EMS480. Common example of this is if centrifuges are offline which necessitates exports of digested liquid. Definition is with reference to RPS231. https://www.gov.uk/government/

EWC Code	Description	Where accepted	Indigenous or imported	Justification for use
				publications/waste-codes-for-sewage-sludge-and-sludge-containing-other-materials-rps-231/waste-codes-for-sewage-sludge-and-sludge
19 06	**wastes from anaerobic treatment of waste**			
19 06 06	digestate from anaerobic treatment of animal and vegetable waste - digested cake	Post digestion	Imported	Used for intersite transfers of post digested liquid sludge as per EMS480. Common example of this is if centrifuges are offline which necessitates exports of digested liquid. Definition is with reference to RPS231. https://www.gov.uk/government/publications/waste-codes-for-sewage-sludge-and-sludge-containing-other-materials-rps-231/waste-codes-for-sewage-sludge-and-sludge

A.4 Other wastes accepted to the site

A.4.1 Wastes received under the Controlled Waste Regulations 2012*

EWC Code	Description	Where accepted	Indigenous or imported	Justification for use
20 03	**Other municipal wastes**			
20 03 04	septic tank sludge	Head of works	Imported	
20 03 06	waste from sewage cleaning	Head of works	Imported	

*Southern Water acknowledge these waste codes will not be included in the permit

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