1 Non-technical summary

1.1 Overview of the Site and activities

1.1.1 Millbrook Sludge Treatment Centre

Millbrook Sludge Treatment Centre (STC), accepts sludge that is pumped via an underground pipe from the pumping station at Slowhill Copse, sludge reception area (SHCSR) located on the opposite bank of the Western Docks. These two sites have a 'technical connection' due to the presence of an underground pipe, and therefore, these two facilities are collectively referred to as the "Site".

The address of the Millbrook STC is Millbrook Wastewater Treatment Works (WTW), Western Docks, Millbrook, Hampshire, SO15 0HH.

National Grid reference: SU 38755 12378.

The Millbrook WTW, adjacent to the STC, is operated under the Urban Wastewater Treatment (England and Wales) Regulations 1994 (UWWTR), 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 registered T21 exemption. The waste activity comprises imports, physio-chemical and anaerobic digestion treatment (AD), 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 Millbrook site currently has an Environmental Permit in operation. Permit EPR/CP3535XU allows for the running of two Combined and Heat Power engines (CHPs), three diesel generators and two boilers. The three diesel generators are not Directly Associated Activities for the permit variation, and therefore not referenced therein for the remaining application.

1.1.2 Slowhill Copse sludge reception area

Slowhill Copse WTW, adjacent to SHCSR, is operated under the UWWTR, and has a standalone Water Discharge Activity Environmental Permit. The SHCSR also has a bespoke permit (EPR/GP3792HY) for tankered waste imports (domestic and sludge), as the site is classed as 'A23' Biological Treatment Facility[1]. It is understood that this permit will have to vary to enable the inclusion of the 'technically connected' sludge assets to be included in the Millbrook STC IED permit and to consolidate the waste activities, if appropriate.

The SHCSR is situated on Bury Road which approximately 1.1km to southeast of the Site. The SHCSR is bordered by green spaces to the east, south, west, and River Test.

Site address: Slowhill Copse Wastewater Treatment Works, Bury Road, Marchwood, Southampton SO40 4UD.

National grid reference: SU 38396 11159

[1] Environment Agency (2017) Opra for EPR version 3.91 Annex B – Opra Scheme for Waste Facilities April 2017. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/782755/LIT_6663.pdf

1.2 General overview of IED

As advised by the Environment Agency through consultation at WaterUK Waste and Recycling Network and a letter sent to all Water and Sewage Companies at director level in July 2019. Following a joint decision made by Environment Agency and Department for Environment, Food and Rural Affairs (DEFRA) that 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 Millbrook STC operation is a non-hazardous waste activity which is currently carried out under registered a T21 exemption. The site also holds an environmental permit EPR/CP3535XU for a Tranche B specified generator (Combined Heat and Power unit, CHP) and Tranche A CHP both utilising biogas to generate electricity, and two auxiliary boilers. Southern Water is applying to vary permit EPR/CP3535XU into an installation permit.

The primary permitted installation activity will be the AD treatment facility at Millbrook STC. The AD facility will treat indigenously produced and imported sludges. Permitted Directly Associated Activities (DAAs) will be the:

- import of waste from other WTW assets;
- sludge storage and transfer activities associated with SHCSR;
- physio-chemical treatment of imported and indigenously produced sludges;
- storage of indigenously produced sludges, imported sludges and the sludge cake from the AD facility;
- storage of biogas derived from the AD treatment of waste and
- 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.

The application will retain the import of sludges to the sludge reception point and the tankered wastes to the head for works at Slowhill, as a waste operation.

Southern Water wishes to vary permit EPR/CP3535XU into an installation permit for the Site, and consolidate the permit EPR/GP3792HY, as the updated permit boundary surrounds Slowhill and Millbrook and connected by pipeline. It is intended that the AD installation, waste recovery activity and operation of the CHP will be two separately listed activities on a single consolidated Installation permit.

1.3 Overview of the STC process

SHCSR serves as a liquid sludge transit centre, receiving around 3477 m^3 per week of liquid sludge from local sites. At the reception point, co-settled primary sludge and imported sludge pass into three pre-screening sludge holding tanks before being screened by two strain presses. Screened sludge is then pumped to two screened sludge tanks before being pumped to Millbrook STC for treatment.

Currently, Millbrook STC accepts both indigenous and imported primary sludge and sludge cake.

Sludge is screened and pumped by a sludge pumping station at SHCSR via a sludge rising main to Millbrook STC. 5,100m^3 of additional pre-thickening sludge storage capacity is provided at SHCSR. This helps to balance the sludge throughput at Millbrook STC.

Millbrook STC accepts imported liquid sludge transported to the Site by road tankers. Indigenous sludge and imported liquid sludge are pumped through three sludge screens and stored in two post screening storage tanks (PSST)/ sludge reception tanks.

Indigenous sludge and imported liquid sludge are pumped through the sludge screens. Imported pumped sludge is screened at SHCSR and is discharged directly into the PSSTs/ sludge reception tanks. Screened sludge, from the PSSTs/ sludge reception tanks, is fed to two belt thickeners and dosed with flocculant polymer.

Thickened sludge with 7-8% total dissolved solids (TDS) is stored within thickened sludge storage tanks (TSSTs) where it is mixed with imported cake. It is then fed to four anaerobic digesters. Digested sludge discharges into two post digestion storage tanks from where it is fed to three centrifuges for dewatering. Lime is dosed into digested sludge before the centrifuges to achieve the required sludge quality for recycling.

Digested cake is stored in a silo and transported by covered skips to recycle to agricultural land. When the silo is not in operation, an alternative cake bay (a skip within the building housing the conveyor) is used.

Odour control is provided for the sludge reception tanks, cake blending building, PSSTs/ sludge reception tanks, gravity belt thickeners, thickened sludge storage tanks (TSSTs)/ digester feed tank and centrifuges. Foul air is treated by a caustic and hypochlorite wet chemical scrubber.

Liquors from the STC are pumped from the buffer storage tanks (no treatment is undertaken) by the liquor pumping station upstream of the primary settlement tanks.

Biogas produced by the digestion process is stored in a double skinned gas bag (1,040m^3). Biogas is fed to the two CHP plants where it is used to generate heat (i.e., to control the temperature of the digestion process) and electricity to power the STC's electrical equipment and processes. The CHP units have an aggregated thermal rated input of 5.25MWth. The specifications of the combustion plant are presented in Table 1.1.

Table 1.1: Combustion Plant Details

	CHP1	CHP2	Boiler 1	Boiler 2
Make/Model Number	Jenbacher JMC 412	Caterpillar G3516	Strebel Eurograde RU2S-11	Strebel Eurograde RU2S-11
Date that MCP became operational/was commissioned	After 1st December 2016 and before 20 December 2018	2008	Before 1st December 2016 and before 20 December 2018	Before 1st December 2016 and before 20 December 2018
Thermal Input (MWth)	2.02	3.23	0.81	0.81
Stack height (m)	8.3	15	10	10
Fuel used (biogas, diesel etc)	Biogas	Biogas	Biogas (and natural gas for testing ~ 1 hour in a year)	Biogas (and natural gas for testing ~ 1 hour in a year)
Estimated total hours of operation per year	Unlimited	6,570	<870 (emergency use only if CHP 1 is offline)	<870 (emergency use only if CHP 1 is offline)
MCPD and SG Regs status	Existing MCP Tranche B	Existing MCP Tranche A	Existing asset. Not MCP/SG	Existing asset. Not MCP/SG

The IED permit will include the following. Note that some assets have two names according to site staff. These have been included to maximise efficient interpretation of this document.

Slowhill:

- 2 No. Sludge strain press
- 1 No. Sludge reception point
- 2 No. Screened sludge tanks (1141m^3 each)
- Grit and screening unit
- 1 No. Odour control unit (OCU) (biofilter)
- 3 No. Unscreened sludge tanks
  - 2 No. 2055m^3 each
  - 1 No. 1889m^3 each

Millbrook:

- Raw cake reception area
- 1 No. Cake silo (240m^3)
- 2 No. Thickened sludge storage tanks (TSSTs) (639m^3 each)
- 2. No Post screened sludge storage tanks (PSSTs) (2,500m^3 each)
- 2 No. Post digestion storage tanks (PDSTs) (535m^3 each)
- 1 No. Alternative cake bay (15 tonnes)
- 1 No. Cake blending area
- 2 No. Gravity belt thickeners
- 1 No. Liquor buffer storage tank
- 4 No. Anaerobic digesters
  - 3 No. 2,500m^3 each
  - 1 No. 3,251m^3 each
- 3 No. Centrifuges within the former dryer building
- 1 No. Gas bag holder (1040m^3)
- 2 No. CHPs powered by biogas
  - 1 No. 2.02MWth
  - 1 No. 3.23MWth
- 1 No. Biogas burner (flare)
- 2 No. Boilers powered biogas (0.8MWth each)
- 1 No. Odour control unit (OCU) (wet scrubber)

The following are the outputs from the process:

- Screenings and grit – deposited into skips before being removed off-site.
- Biogas – stored in an existing gas holder, then either:
  - Burnt in the CHP or back-up boilers to generate electricity for use onsite
  - Flared in the waste biogas burner
- Digested cake – recycled# to agriculture (soil conditioner).

A process flow of the process can be found in 790101_MSD_ProcessFlow_MIL&SHC September 2024.

The layout of the site is presented in 790101_MSD_SitelayoutPlan_MIL&SHC October 2024.

1.4 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: Key Technical Standards

Installation name	**Millbrook STC**	
C3		
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
C4		
Description of the waste operation	**Appropriate measure (TGN reference)**	**Document reference**
Physical treatment of non-hazardous waste (Accepting cess and tankered wastes to Head of the Works)	Non-hazardous and inert waste: appropriate measures for permitted facilities	https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities
General		
	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	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

Installation name	Millbrook STC	
	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/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

1.5 Revisions since 2022 application submission

The application was first submitted in 2022. 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 being 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_MIL October 2024	Resubmitted – updated to include wider feedback from the Environment Agency.
Environmental Risk Assessment	790101_ERA_MIL September 2024	Resubmitted – updated to include complaints recorded since 2020 and dealing with fire water.
Environmental Constraints Maps	790101_ERA_Maps_MIL August 2024	Resubmitted. Human receptor map screening distance increased to 2km.
Bio-aerosol Risk Assessment	790101_ERA_BioaRA_MIL September 2024	Resubmitted – updated to include bio-aerosol monitoring proposals and new windrose.
Odour Management Plan	790101_ERA_OdourMP_MIL September 2024	Resubmitted – updated to include new windrose, updated complaints recorded since 2020 and feedback from the Environment Agency.
Climate Change Risk Assessment	790101_ERA_CCRA_MIL	No change. To be included as part of the management system for the site.
Site Condition Report	790101_MSD_SCR_MIL August 2024	Site scope defined and screening distances clarified in relation to STC permit boundary.
Envirocheck Report	790101_SCR_MIL_App B Envirocheck	Additional document
BAT analysis	790101_MSD_BAT_MIL August 2024	Resubmitted – updated to include changes by Southern Water and wider feedback from the Environment Agency.
Site Layout and Location Plan	790101_MSD_SiteLayoutPlan_MIL&SHC October 2024	Resubmitted – updated to reflect proposed secondary containment, liquor transfer point, liquor sampling

Document name	Latest document reference	Summary of amendments
		point and changes to point source emissions. To extend the boundary to Slowhill Copse sludge reception area and show the pipeline connection.
Drainage Plan - Millbrook	790101_MSD_DrainagePlan_MIL November 2021	No change – shows the Millbrook STC
Drainage Plan – Slowhill Copse	790101_MSD_DrainagePlan_SHC April 2008	Additional document to cover Slowhill Copse
Schematics	790101_MSD_Schematic_MIL August 2024	Resubmitted – updated to reflect connection to Slowhill Copse
Environmental Management System Certificate	790101_MSD_EMS December 2023	Resubmitted. Certificate has been renewed.
Relevant Offences	790101_MSD_RelevantOffences_February 2024	Updated. It is up to date to August 2024
Details of Directors	790101_MSD_Directors August 2024	Updated to time of resubmission. Sent separately by Southern Water
Competency assessment certificates	790101_MSD_CompetencyAssessmentCertificates_MIL	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_MIL	Updated documents
Leak Detection and Repair Plan	790101_MSD_LDAR_MIL August 2024 790101_MSD_LDAR_SHC August 2024	Additional documents
Waste Acceptance and Pre-acceptance	790101_WasteAcceptance_MIL August 2024	Updated based on Environment Agency feedback.
CIRIA assessment and modelling	790101-MMD-IED-MIL-SIM-M-101 Do-nothing(Tank Failure Only).mp4 790101-MMD-IED-MIL-SIM-M-102 Do-nothing(With Rainfall).mp4 790101-MMD-IED-MIL-SIM-M-103 Option1(Tank Failure Only).mp4 790101-MMD-IED-MIL-SIM-M-104 Option1(With Rainfall).mp4 790101-MMD-IED-MIL-SIM-M-105 Option1A(Tank Failure Only).mp4 790101-MMD-IED-MIL-SIM-M-106 Option1A(With Rainfall).mp4	No changes from September 2022 submission
Residue Management Plan	790101_MSD_ResidueMP_MIL September 2024	Additional document
Accident Management Plan	790101_MSD_AMP_MIL September 2024	Additional document.
Revised containment plan (ABDA Tool)	790101-MMD-IED-MIL-CA-C-001 - IED Millbrook ADBA Tool P02	Updated document – to be read in conjunction with the CIRIA assessment and modelling above. Additional detail included in tab 6 Revised containment plan
Implementation Plan	790101_MSD_ImplementationPlan December 2023	Additional document
Annual throughput summary	790101_MIL&SHC Annual Throughput Diagram September 2024	Additional document

Document name	Latest document reference	Summary of amendments
Waste transfer notes	790101_WasteTransferNotes_MIL August 2024	Additional document – evidence of acceptance of requested waste streams.
Sampling proposal	790101_Sampling proposal_MIL October 2024	Additional document – showing proposed sampling and monitoring points.
Air Quality Risk Assessment	No required	Not required – justification text provided in MSD
H1 Assessment	Not required	Not required
Air Dispersion Modelling	As per existing MCP permit	No change
Form Part A	790101_App_PartA_MIL	No change
Form Part C2	790101_App_PartC2_MIL	No change
Form Part C3	790101_App_PartC3_MIL	No change
Form Part C4	790101_App_PartC4_MIL August 2024	Additional document
Form Part C6	790101_App_PartC6_MIL	No change
Form Part F1	790101_App_PartF1_MIL	No change