Asset Management
Asset Standard
Odour Management Plan

Rye Meads STW

RYEMS1ZZ

Document Reference	AM-OMP Rye Meads STW	
Issue Date/Version	Date: November 2024	Version: 6.3
Data Owner	Asset Standards Manager	
Document Author	[redacted]	
Approved By	[redacted]	
Document Location	SharePoint	
Reason for Issue	Updated site plan	
Next Review	November 2025	

0 Document Control & Procedures

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Owner Review Requirements

Document to be reviewed when any changes are made to the site or processes

Local Review Requirements

Site Manager should be informed when handwritten amendments are made to this document

Revision No	Reason for Revision	Prepared by	Approved by	Date
1	Update Version		[redacted]	Sept 06
2	Update Version		[redacted]	May 09
3	Updated 3.1 Responsibilities			July 10
4	Updated Responsibilities			Nov 10
4.1	Conversion and validation of OMP into new standard format	[redacted]		October 2013
4.2	Updated to reflect permit variation V002 including cake pad within permit boundary	[redacted]		May 2016
5	Annual review and update	[redacted]		May 2017
6.0	IED Permit Application			January 2022
6.1	IED AD Permit resubmission			November 2023

6.2	Updated site plan	[redacted]	March 2024
6.3	Updated site plan		November 2024

0.4 Sign Off

Area Operations Manager	[redacted]	Date: November 2024
Performance Manager	[redacted]	Date: November 2024

0.5 Glossary of Terms

TERM	DESCRIPTION
AD	Anaerobic Digestion
BNR	Biological Nutrient Removal
CHP	Combined Heat and Power
CSM	Customer and Stakeholder manager
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EHO	Environmental Health Officer
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2016
FFT	Flow to Full Treatment
H4	Environment Agency - How to comply with your permit – H4 Odour Management, March 2011
ICA	Instrumentation Control & Automation
IED	Industrial Emissions Directive
OCU	Odour Control Unit
OMC	Operational Management Centre
OMP	Odour Management Plan
PFT	Picket Fence Thickener
PM	Process Manager
PS	Pumping Station
PST	Primary Settlement Tank
Receptors	Sensitive receptors are any fixed buildings or installations where odour annoyance may occur, such as residential homes, schools, hospital, offices, shops or garden centres. Open areas such as playgrounds and public footpaths should also be listed where these are known to have been affected by odour.
SAP	Thames Water's enterprise resource and planning system
SCADA	Supervisory Control And Data Acquisition
SHT	Sludge holding tank
SOM	Site Operating Manual

STC	Sludge Treatment Centre
STW	Sewage Treatment Works
TM	Team Manager
TCM	Technically Competent Manager
UWWTD	Urban Waste Water Treatment Directive

1 Introduction

This Odour Management Plan (OMP) forms part of the Rye Meads STW Best Operating Practice and is a constituent part of the Environmental Management System (EMS). A key related document is the Site Operating Manual (SOM) – this document can be found as a hard copy in the Rye Meads administration building and on Thames Water's asset record database SharePoint, within the EMS pages. Changes to OMP procedures are captured in the SOM as part of the periodic reviews of this document. The Odour Management Plan is to be used by all personnel involved in site operations.

The effectiveness of the odour control measures will be reviewed annually or sooner if any of the following occur:

- If the site in question acquires any other permitted activity with the potential to increase the risk of odour off site.
- When significant changes are made to the site which may affect odour, e.g. capital spend.
- As a result of a change in pattern of odour complaints, increase in public concern and as soon as possible after a significant incident.
- When the site Performance Manager changes.
- If there is a material change in relevant regulations or guidance.
- If there is an odour release incident
- If a contingency measure is triggered

The purpose of this OMP is to define how the potential and actual generation of odour from Rye Meads STW are identified, and how, as far as is reasonably practicable, they are controlled and recorded. It is primarily a management guide; detailed procedures are contained within the SOM referred to above.

This OMP is an operational document that has been developed following a review of the potential risk areas for odour release. It details operational and control measures appropriate to the reduction or elimination of the impact of odours from wastewater treatment works. It provides detail to allow operators and maintenance staff to understand the operational procedures for both normal and abnormal conditions.

This OMP was updated in 2022 to incorporate appropriate odour control measures for activities that will be newly regulated under an Environmental Permit issued under the Environmental Permitting (England and Wales) Regulations 2016 (EPR), following the principles transposed through the Industrial Emissions Directive. This follows the reinterpretation of the Industrial Emissions Directive in exclusion of UWWTD activities - meaning that anaerobic digestion (AD) on a Sewage Treatment works now needs an Environmental Permit.

The Odour Management plan has been structured to distinguish between the two regulatory regimes, which are fully described in the Site Information chapter. The wastewater treatment process is covered by the Urban Wastewater Treatment Directive (UWWTD). The Environmental Permit for the Sludge Treatment Centre (STC) covers various process including but not limited to, the anaerobic digestion (AD) process, combustion of biogas in the CHP plant and the storage of resulting sludge. This OMP

responds to odour risks from both UWWTD and STC permitted processes (referred to as the Sludge Treatment Centre Permit).

This OMP and SOM are stored electronically within SharePoint.

A hard copy is kept on site within the Site Operating Manual.

Regulatory Guidance

The following guidance has been used to inform the contents of the OMP where it relates to activities regulated under the Sludge Treatment Centre Permit. This guidance does not apply to UWWTD activities.

- Environment Agency - How to comply with your permit – H4 Odour Management', March 2011 (H4)
- Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (Waste Treatment BAT Conclusions)

Where this Odour Management Plan relates to STW activities regulated under the UWWTD this OMP may still draw upon elements of best practice taken from H4 but this should not be inferred as H4 being applicable to these activities.

The OMP format used is in line with that adopted for other Thames Water sites.

Copies of the Odour Risk Assessment, Odour Improvement Plan, Customer Communications Plan, Site Drawings, and generic site and sludge rounds are included in Appendices 1-6.

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2 Site Information

2.1 Location and Receptors

Site Address:

Rye Meads STW
Rye Road
Ware
Hertfordshire
SG12 8JY
EPR Permit number: EPR/FP3235LN/V004
What 3 words: bunch.pens.soft

Rye Meads STW is located close to Stanstead Abbots, near Harlow. Access is from a toll road open to public traffic which runs through the site. This road links the B181, close to the junction with the A414, and Rye Road, which runs past the Rye House station on the edge of Hoddesdon.

The site serves a total population of approx. 415,000. Sewage gravitates to the works via two main trunk sewers, which extend as far as Stevenage and Welwyn Garden City to the West and Harlow and adjoining villages to the East.

Receptors

As the name suggests, the site is located on a low-lying flood plain. The RSPB site adjacent to the final effluent lagoons is dependent on the works for maintaining the water levels for the aquatic environment that this site boasts.

A toll road runs through the site, traffic passing along this section could therefore be potentially subjected to any odour nuisance produced on site.

The nearest receptors are given in Table 2.1:

Table 2.1 - Location of potentially sensitive odour receptors.

Recptor Number	Receptor Type	Receptor Name	Approximate distance to the nearest site boundary (km)	Direction from the site	Receptor sensitivity
1	Recreational	Rye House Stadium (motorsport)	0.43	South-West	High
2	Recreational	Rye House Kart Raceway	0.48	South-West	High
3	Open area	Rye Meads Nature Reserve	0.09	North-West	Low
4	School	The John Warner School	0.94	West	High
5	Recreational	The John Warner Sports Centre	0.86	West	High
6	Hotel	Roydon Marina Village	0.51	East	High
7	Open area	Marina on River Stort	0.20	East	Low
8	Transport	St Margarets Station	1.75	North-West	Medium
9	School	Forres Primary School	1.25	West	High
10	School	The Cranbourne Primary School	1.29	North-West	High
11	Recreational	Hoddesdon & Rye Park Bowling Club	0.87	West	High
12	Commercial	Parkside Business Centre	0.61	West	Medium
13	Industrial	Binder Carpet Services	0.90	North-East	Low
14	Farm	Farm on B181 Rd	0.91	North-East	Low
15	Farm	Farm on Netherfield Ln	0.64	North	Low
16	Residential area	Housing on Roydon Rd	0.93	North	High
17	Farm	Cold Harbour Farm	0.82	North-East	Low
18	Residential area	Stanstead Abbotts Residential Area (between Roydon Rd and Hunsdon Rd)	1.13	North	High
19	Residential area	Stanstead St Margarets Residential Area (between River Lea, A414 Rd, Hoddesdon Rd and B181 Rd)	1.07	North-West	High
20	Residential area	Stanstead St Margarets Residential Area (between River Lea, B181 Rd, Roydon Rd and Marsh Ln)	1.51	North-West	High
21	Open area	Stanstead Marina	1.31	North-West	Low
22	Residential area	Residential area on High Street	1.18	South-East	High
23	School	Roydon Primary School	1.23	South-East	High

24	Residential area	Residential area on Epping Rd, Hansells Mead and Park Fields	1.22	South-East	High
25	Recreational	Roydon Tennis Club	1.39	South-East	High
26	Industrial	Sainsbury's Distribution Centre - Rye Park	0.25	South-West	Low
27	Transport	Rye House Train Station	0.33	South-West	Medium
28	School	Lollipops Day Nursery	0.46	South-West	High
29	Industrial	Hoddesdon Industrial Centre (North) (between New River and the railway)	0.57	South-West	Low
30	Industrial	Hoddesdon Industrial Centre (South) (between the railway and River Lee Navigation)	0.35	South-West	Low
31	Industrial	Rye House Power Station	0.51	South-West	Low
32	Industrial	Hoddesdon Advanced Thermal Treatment Plant (waste incineration)	0.62	South-West	Low
33	Industrial	Biogen Hoddesdon (biogas plant)	0.83	South-West	Low
34	Recreational	Old Highway Recreation Ground	0.47	West	High
35	Transport	Roydon Station	1.08	East	Medium
36	Open area	Rye Park	1.50	South-West	Low
37	Open area	Kingfisher Hide and Gadwell Hide	0.59	North-West	Low
38	School	Rivers Education Support Centre	1.51	South-West	High
39	School	Cornerstones Pre School	1.52	South-West	High
40	School	Tiny Toes Nursery	1.84	South-West	High
41	School	Rye Park Nursery School	0.98	West	High
42	Residential area	Residential area between Rye Rd, Old Highway, Cranbourne Drive and the railway	0.56	West	High
43	Residential area	Residential area between Rye Rd, Stanstead Rd and Old Highway	0.86	West	High
44	Residential area	Residential area between Rye Rd, New Riv Path and River Ave	0.66	South-West	High
45	Residential area	Residential area between Stanstead Rd, Dinant Link Rd (A1170), Ware Rd and Bridleway S	1.21	West	High
46	Residential area	Residential area between Bridleway S, Bridleway N and Stanstead Rd	1.04	North-West	High
47	Residential area	Residential area between Bridleway N, A1170 Rd,	1.09	North-West	High

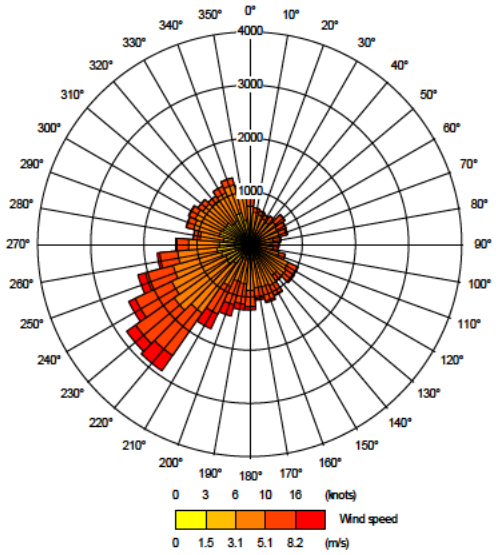
		St Margarets Rd and Stanstead Rd			
48	Residential area	Residential area between A1170 Rd, Hertford Rd (B1197 Rd), A10 Rd and Hailey Ln	1.79	West	High
49	School	Hailey Hall School	1.99	North-West	High
50	Residential area	Residential area between Dinant Link Rd, A10 Rd, B1197 Rd and A1170 Rd	1.84	South-West	High
51	Residential area	Residential area between Dinant Link Rd, A1117 Rd, Brocket Rd/Beach Walk and Barclay Park	1.73	South-West	High

2.2 Off-site sources of odour

There is a domestic AD on the other side of the river downstream of the site which may have the potential to generate odour. Historically this has led to odour complaints.

2.3 Wind Rose and Weather Monitoring

Figure 2.3.1 Stansted Airport Wind Rose, 2016 -2020



Stansted Airport meteorological station (approximate location NGR E 553940 N 223076) is located approximately 19.5 km northeast of the site and is considered the closest most representative meteorological monitoring station to the site. Data is recorded at the meteorological station in hourly measurements and the figure below presents the relationship between the frequency and speed of wind from compass point directions for the combined years 2016 – 2020. The figure illustrates the predominant wind direction to be southwesterly, which means receptors northeast of the site would have the highest probability of experiencing potential increases in odour emissions.

There is no on-site weather station at Rye Meads. Weather on site can be reviewed if complaints are received or during periods of abnormal operations. The internal ‘Weather’ Shareoint site provides adverse weather information, and the UK Met Office website can also be used.

2.4 Site Layout and Treatment Processes

For site plans, see Appendix 4. Further details of the site layout and treatment processes are given in the following sections of the Site Operating Manual and are therefore only given summary attention in this OMP:

Section	Description
1	Governance & Control
2	Location, key layout plans and diagrams. Site services, including power, water, drainage, SCADA and ICA. Consent details, process overview, chemical and waste handling.
3	Detailed description of each treatment process, including sludge and odour control.
4	Maintenance
5	Plant control, monitoring, and logging.

2.5 Process Description

2.5.1 UWWTD Activities

Preliminary Treatment

- Sewage gravitates to the Inlet PS from where it is lifted by 5x DWF and 3x Storm Water pumps.
- There are 3x Escalator Screens with 6mm mesh, from where the screenings are conveyed to 2x Washpactors and thence to open skips for landfill disposal off site.
- Flows pass through 3x Grit Channels with travelling dredger systems to deliver the grit to skips via two grit classifiers for off-site disposal.

Storm Water Management

- An automated storm water plant handles storm flows to the Works in excess of the maximum flow to full treatment.
- From the storm collection tower, flows gravitate via a stone trap to the storm inlet works.
- At the storm inlet works, screenings are removed by two Longwood fine step-screens and then washed and dewatered by two Jones & Attwood Washpactors and fed into skips prior to disposal by contract to a landfill site.
- Screened storm flows then pass via a distribution chamber to the six storm tanks, which are sequentially cascade filled. When flow to treatment has dropped to 1600l/s, the storm tanks will automatically decant back to the works drain controlled by a preset SCADA monitored programme.
- The four old Storm Tanks of the same design and construction as the PSTs and have scrapers.
- The two new Storm Tanks do not have a cleaning system and rely on manual cleaning as required.

Primary Treatment.

- The sewage passes for primary treatment into eight rectangular primary sedimentation tanks.
- The tanks have a retention time of approximately four hours depending upon flow.
- The primary tanks are desludged 8 times a day under SCADA control. The scrapers can be operated in manual control, if required.
- The sludge removal has a solid content of approximately 1.5% and is pumped by ram pumps to the picket fence thickeners (PFT's).

Secondary Treatment.

- The activated sludge plant consists of a total of 14 aeration tanks,

- Stages 1-3 each have four lanes with diffusers that are fitted to achieve tapered aeration. There are three sets of four tanks (tanks 1-4 stage 1, tanks 4-8 stage 2, tanks 8-12 stage 3) in parallel and each stage has its own set of final settlement tanks. Stage 1 FST numbers 1-4, stage 2 FST numbers 5 to 13, stage 3 FST numbers 14 to 22.
- Stage 4 activated sludge plant consists of 2 aeration tanks, each having three lanes with membrane diffusers, and four final settlement tanks FST No's: 23 to 26.
- Each stage has an anoxic zone with a mixer. MLSS and SSVI charts are logged in the Control Room.
- Target MLSS Summer April to Sept 3000 to 3500; Winter Oct to March 3500 to 4000
- Mixed liquor samples are taken 2 times a week and analysed on site for solids.
- Air flow to the aeration lanes is controlled automatically by PLC operated air valves to maintain pre-set air main manifold pressure and D.O. set points.
- No target sludge age or plant f/m ratio has been calculated for the plant.
- Flows into the aeration lanes are recorded on SCADA. SAS rate is also recorded on SCADA.

Tertiary Treatment

- The final effluent then flows on to tertiary treatment that consists of eight lagoons (2 banks of four interlinked) for polishing the final effluent before being discharged via the Toll House stream to the River Lee.
- The lagoons are classified as reservoirs under the Reservoirs Act – subject to inspection. The retention time of these lagoons is approximately 24 hours, depending upon flow.
- The final effluent from the tertiary treatment discharges to Toll House stream to the River Lee.
- The Deephams Hoddesdon Transfer Main (HTM) Pumping Arrangement can be used to back flush and prime the Main drawing effluent from the Final Effluent Tanks outlet culvert.

2.5.2 Activities under Sludge Treatment Centre Permit

The STC treats both indigenous sludges and imported sludges. Indigenous sludge is generated from the incoming flow to the STW, which passes through the aerobic treatment process, under the UWWTD. Indigenous sludges removed from the aerobic process are subject to thickening before they are ~~is~~ mixed within the Sludge Blending Tank prior to transfer to one of the six Primary Digester Tanks (PDTs). Liquors from the thickening processes are returned to the Works Inlet of the STW via Liquor Return Pumping Station 1 and the site drainage.

Imported sludge from other works is imported via a sludge import point into the Sludge Import Tank and mixed with the indigenous sludges in the Sludge Blending Tank. SAS can also be imported to the SAS Buffer Tank.

The STC comprises an offloading point for permitted imported tankered wastes at the inlet of the sewage treatment works. The waste arrives at the STC via tanker and is discharged directly to a subsurface chamber where it combines with the low-level sewer and is pumped to the inlet, where it combines with other sewer derived materials and subject to aerobic treatment, under the UWWTD. All imports will be assessed using the Thames Water standard waste pre-acceptance checks to ensure that they are appropriate for treatment via the UWWTD. Once pre-approved as suitable for treatment via the UWWTD route, the waste carriers are approved. Wastes will be subject to appropriate waste acceptance checks in accordance with Thames Water procedures. Incoming tanker vehicles are directed to the inlet offloading point, which is an impermeable surfaced area, equipped with sealed drainage.

Blended sludge from the Sludge Blending Tank is treated in the PDTs over an appropriate number of days. Digested sludge is then transferred to one of four Secondary Digester Tanks (SDTs), where it is treated over an appropriate number of days to achieve the required pathogen kill. The sludge is then transferred to one of two Digested Sludge Buffer Tanks which have air mixing, before digested sludge

is subject to dewatering through either a belt press or a centrifuge (Digested Sludge Belt Dewatering or Digested Sludge Centrifuge Dewatering). Liquors from the dewatering process are captured by the site drainage and transferred to the head of the UWWTD process via the Liquor Return Pumping Station 2. Dewatered digested sludge is then taken to the Cake Pad for storage.

Biogas produced by the PDTs is stored within the Floating Roof Biogas Holders of the PDTs. The biogas is combusted on site and the pipeline is equipped with condensate pots that capture entrained moisture from the generated biogas and allow it to be drained into the site drainage system for treatment. The PDTs and Floating Roof Biogas Holders are fitted with pressure release valves (PRVs) and sensors as a safety precaution in the event of over pressurising the system.

Biogas is combusted within one of the two CHP Engines on site to produce electricity for the site and the heat generated is used to maintain the temperature of the PDTs. The site also exports electricity to the National Grid. In the event that additional heating is required for the six PDTs, this is provided by two onsite dual fuel boilers. The two boilers combust diesel or biogas. There are also two additional gas/oil boilers onsite which provide heat to offices and workshops in the winter.

In the event there is excess biogas, i.e., more than the CHP Engines can utilise, or in the event that the CHP Engines are unavailable, there is a ground mounted Emergency Flare. The Emergency Flare is utilised under 10% of the year or less than 876 hours per year.

This OMP includes the import of treated sludge cake from other works, for temporary storage on the Cake Pad pending offsite recovery. All such imports will be subject to appropriate waste pre-acceptance and acceptance checks, prior to import, including checking whether the incoming cake complies with the requirements of SUiAR and BAS.

Imported treated sludge cake is offloaded into an area on the Cake Pad, so as to be stored separately to indigenous sludge cake. The waste stream is the same as that arising from the treatment of sludge within the Rye Meads STC with the same characteristics, composition and eventual end use – application to land. As such, the infrastructure which is acceptable for use for site cake is appropriate for the imported material. Cake is stored on an impermeable engineered surface on the Cake Pad, for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank.

3 Site Management Responsibilities and Procedures

3.1 Site Roles

Figure 3.1 - Site Roles

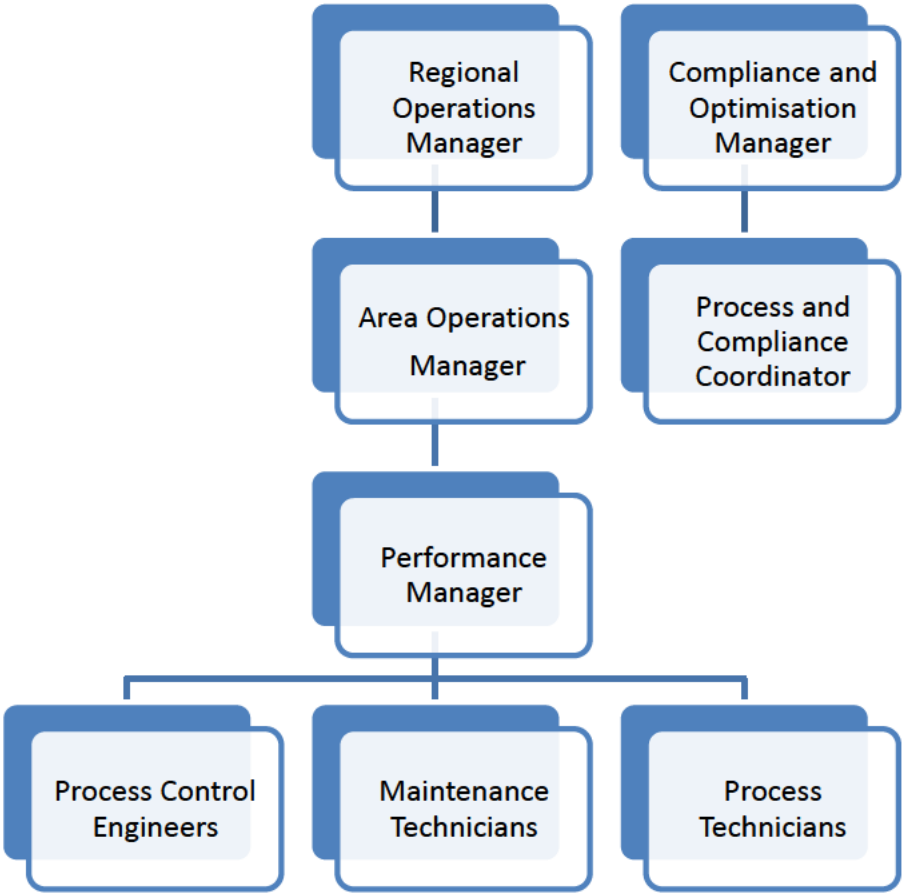


Table 3.1 - Tasks and Responsibilities

Role	Tasks and Responsibilities
Area Operations Manager	Responsible for the overall performance of the STW and catchments areas.

Role	Tasks and Responsibilities
Performance Manager	Responsible for overall performance of the STW and will be responsible for • odour control and management at the site • day to day implementation of the OMP • assessing the scope of, and updating, the OMP as it is implemented. • dealing with customer complaints • day-to-day operation of the STW • Ensuring staff Thames Water staff undergo appropriate training
Technician 1/Operator	Day to day duties include maintaining and operating process equipment.
Process Controller (where applicable)	Monitoring and recording of site data and operating process plant.
Customer and Stakeholder Manager	Responsible for managing liaison with all external customers and stakeholders in liaison with customer centre, escalation team, local govt. liaison team etc.
Compliance and Optimisation Manager	Responsible for process investigations and technical assistance.
Process Compliance Coordinator	Reports to Compliance & Optimisation Manager. Responsible for process monitoring, improvement and troubleshooting.
Duty Manager	The duty manager is centrally based (off-site) and is responsible for event management across the business.
Customer Centre	Responsible for receiving all customer calls, logging them and passing them to the appropriate operational departments.
Technically Competent Manager	Hold the required WAMITAB qualification to support the activities on site under EPR, ensuring permit conditions are complied with.

The site is manned 24 hours per day and 7 days per week.

3.2 Key Contacts

Role	Name	Email address	Phone Number
Area Operations Manager	[redacted]	[redacted]	[redacted]
Performance Manager	[redacted]	[redacted]	[redacted]
Customer Centre	[redacted]	[redacted]	[redacted]
Technically Competent Manager	[redacted]	[redacted]	[redacted]

3.3 Operator Training

Grade B Managers have received or are working towards TCM status, Additionally Grade B Managers have received or are working towards the qualification Management of Wastewater Treatment Level 5 (MOWWT)

Technicians have received or are working towards training appropriate to their grade in passing the Process Tech Evaluation (PTE) an element of training and assessment covers control of odour.

Staff working on site undergo a site induction that is carried out by the Performance Manager. The site induction includes direction to the presence and location of the various operational procedures which include the SOM and the OMP.

All training records are currently held on Learning on Tap.

4 Odour Critical Plant Operation, Monitoring and Management Procedures

Odour prevention and reduction is achieved at Rye Meads through at least an annual review, or sooner as mentioned in Section 1, of the Odour Risk Assessment, Odour Improvement Plan and Odour Management Plan. In combination with the maintenance and monitoring carried out on site mentioned in sections 4 and 5.

Through our Odour Management Plans and maintenance procedures, the primary focus is on effective process control to minimise the risk of off-site odour nuisance. Similarly, our site-based frontline Wastewater Treatment Operations team are focussed on effectively managing the on-site process.

4.1 Odour Sources, Critical Issues and History

The site has had intermittent odour complaints over the years, which can most likely be attributed to certain process steps of the STW (odour critical plant) and sludge operations.

There were no odour complaints from 2016 – 2020. 2 odour complaints were recorded in 2021, and none formally recorded in 2022.

An Odour Risk Assessment is included as Appendix 1.

An Odour Improvement Plan is included as Appendix 2.

Critical Odour Issues, Emergency Response and Mitigation Measures are summarised in Table 4.3-4.7.

4.2 Identification of Odour Critical Plant

4.2.1 Odour Risk Assessment

An Odour Risk Assessment has been reviewed and updated, a copy is included in Appendix 1.

The Odour Risk Assessment is not a ‘one-off’ exercise but an on-going process. The Odour Risk Assessment should be reviewed whenever the site undergoes an operational or capital change which could significantly affect odour.

It is constructed in the following manner:

- Each part of the treatment process is considered under different operating modes – e.g. normal, failure, abnormal: system overload, summer conditions, maintenance etc.
- The nearest customers to the particular odour source are identified.
- The likely frequency and duration of occurrence for each eventuality is identified.
- A score is assigned to the severity (0 – 5) of odour under each operating mode.
- A score is assigned to the probability (0 – 5) of causing an odour nuisance for each operating mode.
- Multiplying the severity of odour and probability of causing an odour nuisance generates a ‘Current Odour Emission Risk’ score. Between 0 (zero risk) and 25 (maximum risk), this is used

to decide where mitigation should be applied in the short term, and determine where in the longer term enhanced improvement measures are required. Where improvements are identified as necessary (i.e., where suitable mitigation measures are not already in place), entries are made onto the Odour Improvement Plan.

- The need for operational mitigation, enhanced measures and customer communication is stated and brief details given.

Items scored in the Odour Risk Assessment with a risk score greater than 10, are classified as odour critical, and where existing operational mitigation measures are not sufficiently robust, will have Improvement Plans generated to address the odour issues. The Odour Improvement Plan for Rye Meads STW is included in Appendix 2.

4.2.2 Potential Odour sources

The following list of potential UWWTD odour sources been identified during the risk assessment:

- General Odour
- Site Drainage
- Works inlet
- Screens
- Grit Removal
- Primary Settlement Tanks
- Fats, Oils and Grease Scum removal
- Primary Raw Desludge Pumping
- Activated Sludge Plant Lanes & Zones
- Skip Management
- Cess reception
- Final Settlement Tanks
- Scum removal
- RAS and SAS chambers and pumping
- Lagoons
- Storm Tanks

The following list of potential odour sources under EPR been identified during the risk assessment:

- Sludge Reception, Screening, Wash down & Drainage
- Cess reception
- Screens and skip management
- Picket Fence Thickeners
- SAS thickening and pumping
- Sludge Blending & Mixing
- Return liquors
- Digester Feed Pumps
- Primary Digesters
- Secondary digestion and mixing

- Centrifuge
- Beltpresses
- Cake pad and drainage (including imports)
- Vehicle movements and washdown
- Biogas systems
- Waste gas burner
- OCU
- Waste Treatment Plant

4.2.3 Odour Critical Plant

The following list of critical odour plant[1] has been identified during the risk assessment:

- Storm Tanks
- Sludge Blending & mixing
- Cake pad and drainage
- Vehicle movements and washdown
- Odour Control Unit.

Refer to Site Operating Manual for operating information

4.2.4 Waste Storage for Sludge Treatment Centre Permit

Table 4.0 Sludge Treatment Centre Permit Tank Inventory

An inventory of potential odorous materials relating to the Sludge Treatment Centre Permit is shown in Table 4.1 below. Air Emission Points are listed, and the locations shown on the site plan in Figure C of Appendix 4.

Waste is not stored on site prior to treatment through the UWWTD or AD process. A list of the main tanks relating to the sludge treatment process and their associated volumes and retention times is

Tank Purpose	Number	Operational Volume (m^3 unless stated otherwise)	Material	Average retention time (where applicable)
Primary Picket Fence Thickeners	2	904	Concrete	2 days
SAS Buffer Tank	1	238	Steel	4.5 hours
Sludge Blending Tank	1	800	Steel	2.5 days
Sludge Import Tank	1	50	Concrete	7 hours
Primary Digester Tanks	6	3,400	Concrete	17 days
Secondary Digester Tanks	4	6,227	Concrete	10 days

Digested Sludge Buffer Tanks	2	6227	Concrete	21 days
SAS polymer silo	1	8 Tonnes	Steel	NA
Boiler fuel oil tanks	2	65,000 litres	Steel	NA
Boiler day tank	1	6,000 litres	Steel	NA
Domestic boiler day tank	1	1,000 litres	Steel	NA

Table 4.1 Odorous materials for Sludge Treatment Centre Permit

Odorous and potentially odorous material (any solid, liquid or gas)	Location of odorous materials on site	Maximum quantity on site at any given day	Maximum time held on site (hours or days)	EWC Codes	Type of emission	Odour potential High Risk / Medium Risk / Low Risk
Cake (including imports)	Cake Pad	3,510 m3	30 days	19 06 06	Diffuse	Low
Biogas	Roof mounted gas holders on primary digesters; see air emissions plan.	Digester roof storage	Continuous operation	N/A	Point Source	Low
Liquor	site wide drainage system	-	-	16 10 02	Diffuse	Low
Raw imported sludge	Sludge import tank	Refer to Table 4.0 Site Tank Inventory	Retention times for each stage of the process are detailed in Table 4.0	19 08 05	Point Source (See OCU entry)	Medium/High
Indigenous Sludge (primary/SAS)	PFTs; SAS buffer tank Sludge Blending tank	Refer to Table 4.0 Site Tank Inventory	Retention times for each stage of the process are detailed in Table 4.0	19 08 05	Diffuse Point Source (see OCU entry)	Medium/High

Odorous and potentially odorous material (any solid, liquid or gas)	Location of odorous materials on site	Maximum quantity on site at any given day	Maximum time held on site (hours or days)	EWC Codes	Type of emission	Odour potential High Risk / Medium Risk / Low Risk
Digested Sludge	Digested Sludge buffer tanks	Refer to Table 4.0 Site Tank Inventory	Retention times for each stage of the process are detailed in Table 4.0	19 08 05	Diffuse	Medium
Sludge import SAS import	Sludge import tank SAS buffer tank	Refer to Table 4.0 Site Tank Inventory	Retention times for each stage of the process are detailed in Table 4.0	19 08 05	Point Source (see OCU entry) Diffuse	Medium/High
Sludge screening skips	Before primary sludge buffer tank	3 skips	Removed by framework contractor within 4 days when full	19 08 01	Diffuse	Low
Odour Control Unit	See section 5.1.2	See Section 5.1.2	NA	NA	Point Source	Low/medium

Table 4.2 Odorous raw materials for Sludge Treatment Centre Permit

Raw Material	Odorous	Storage	Mitigation	Odour Risk
FO4440SSH	Not odorous	3.0 tonnes within 6x 750 KG bulk bags		Low
EM 640 HIB	Mild odour	1 2 tonnes in a bunded silo	Fully contained	Low
EM 640 LOB	Mild odour	28 tonnes within 28x 1,000 litre IBCs stored on portable bunds	Fully contained	Low
White diesel	Petroleum	2x 64,000 litre fuel tanks. 1x 6,000 litre double skinned diesel day tank.	Fully contained	Low

PETRO CANADA SENTRON LD 8000	Oil	4,800 litres consisting of 2x 1,200 litre clean oil tanks and 2x 1,200 dirty oil tanks within CHP engine container.	Fully contained	Low
Texaco Delo XLC Antifreeze/Coolant - Premixed 40/60	Solvent	4,000 litres stored in 1,000 litre IBCs on portable bunds	Fully contained	Low

Low odour raw materials are chosen for use, as far as practicable.

4.3 Odour Control Measures

The SOM referred to above complies with Thames Water's Asset Standards – Operating Standards. It states the operational procedures to be followed in order to maintain and operate plant to agreed company standards. These standards include, where appropriate, procedures for ensuring that generation of odour is kept to a minimum.

The routine operational tasks carried out at Rye Meads STW to specifically mitigate against generation of odour are listed in the above SOM.

Refer to risk assessment in Appendix 1 where these measures are summarised as:-

"Normal Mitigation"

4.3.1 Site Specific Measures

H4 has been used to guide the preparation of this OMP where it relates to activities regulated under the Sludge Treatment Centre Permit. As this guidance does not apply to UWWTD activities, where reference to H4 is made within this document this should not be inferred as H4 being applicable to UWWTD activities. Specific tasks and measures taken in intermittent, abnormal, and emergency events associated with the control of odours at Rye Meads STW are summarised in the tables below.

The routine operational tasks carried out at Rye Meads STW to specifically mitigate against generation of odour are also listed in the tables below.

Tables 4.3-4.7 - Summary of Critical Odour Issues, Emergency Response and Mitigation Measures

The purpose of Tables 4.3-4.7 shall be to identify site specific emergency response procedures and mitigation measures relating to site odour generation and release. They include:

- Generic odour issues and mitigation measures relating to site-specific process stages; and,
- Additional site-specific odour issues and mitigation measures associated with process stages identified under the site Odour Risk Assessment.

4.3.1 Odour Control Units

Sludge OCU (A17)

There is an OCU which draws foul air from Sludge blending tank, Sludge import tank, primary sludge buffer tank and primary sludge belt tanks. The OCU is a single stage biofilter with pumice bio-media.

Table 4.3: Summary of routine odour mitigation tasks for assets under UWWTD

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timeframe
General		Ensure site is kept clean and tidy	Site Tech 1s Team Manager	Visual Inspection	Daily	Spillage identified.	Clean up as soon as possible and no later than the end of the day.
		Any spillages to be cleaned up as soon as practicable	Site Tech 1s	Visual Inspection	Daily	Elevated odour on site identified.	Reports to Performance Manager at team huddle/SAP Plus entry where corrective action identified. For a spillage; immediate/asap resolution
		Site odour acceptability. As a routine, staff should continually be conscious of levels of on-site odour and should report any significant change or increase in odour to the Team Manager.	Site Tech 1s	Visual	Daily	Elevated odour on site identified.	Reports to Performance Manager at team huddle/SAP Plus entry where corrective action identified. For a spillage; immediate/asap resolution

Cess Reception Linked tasks in Appendix 5 section 2.1	Sewage (L)	Contained area with washdown point and bunded Ensure tankers coupled correctly	Site Tech 1s	Visual	Daily	Spillage identified	Clean up as soon as possible and no later than the end of the day.
Screens & Screening Conditioning, Drainage & Rag Skip Management Linked tasks in Appendix 5 section 2.3 and 2.4	Sewage (L)	Replace skips. Housekeeping. Repeat order once a week. Ensure screenings washed and dewatered before discharge to skip	Performance Manager	As required	Weekly	Wash water system not operating to full efficiency	Clean spray nozzles/remove any obstructions blinding/hair pinning); check angle/coverage of delivery; check lubrication. High priority for effective function so timescales would be within 2 working days on identification. Replacement of parts could be up to 6 weeks depending on spares availability.
Storm Tanks Linked tasks in Appendix 5 section 2.6	Sewage (L)	Cleaned when required	Site Tech 1s	Visual	Daily	Deposits left on tank floor	Clean as required
Grit Removal Linked tasks in Appendix 5 section 2.5	Sewage (L)	general housekeeping	Site Tech 1s	Visual	Daily	spillage	Clean up as soon as possible and no later than the end of the day.

Screens Linked tasks in Appendix 5 section 2.3 and 2.4		Any blockage to be cleared and service resumed as soon as practicable	Site Tech 1s	Visual Inspection	Daily	Impaired screen function for any reason	Attention to blocked screens is immediate/asap on detection since will have significant impact on subsequent process. Timescales of remedial tasks such as repairs to screen brushes would be 2 to 8 hours; full replacement over 6 weeks duration. Screens replaced according to wear but within every 7 years typical.
		Ensure skips are covered and removed from site as soon as practicable. Full skips are not to be stored on site	Site Tech 1s	Visual Inspection	As required	Skip identified that is not covered or not watertight. Skips over two thirds full are always prioritised for emptying given potential for odour.	Covers to be fitted at point of identification. Full skips aim to be removed within 1 week by waste removal contractor.

Fats Oils and Grease Scum removal system	Earthy (L)	Any spillages to be cleaned up as soon as practicable	Site Tech 1s	Visual Inspection	Daily	Blockage	Unblock the channel
Primary Settlement tanks Linked tasks in Appendix 5 section 3	Earthy (L)	Scrapers should be regularly checked and maintained to ensure they are working effectively, and any blockages cleared.	Site Tech 1s	Visual Inspection	Daily	Broken scraper	Increase desludging. Repair scraper. Empty tank if necessary.
Primary Raw desludge pumping	Earthy (L)	Check pump condition regularly	Site Tech 1s	Visual Inspection	Daily	Spillage	Clean up as soon as possible and no later than the end of the day.
Aeration and Final Settlement Linked tasks in Appendix 5 section 4 and 5	Earthy (L)	Drain down of aeration lanes or FSTs - hose down immediately after draining to minimise odour release. Hose down anoxic and anaerobic zones to prevent sludge drying out and causing odour release	Tech 1	Visual	As required	Floating sludge, odour issues, compliance impacts	Organise drain down of tank and sufficiently cleanse area with hydrant hoses or tanker unit.
Scum removal system	Earthly (L)	Any spillages to be cleaned up as soon as practicable	Site Tech 1s	Visual Inspection	Daily	Scum accumulation	Repair scum removal system. Clean up as soon as possible and no later than the end of the day
SAS and RAS chambers and pumping	Earthy (L)	Check pump condition regularly	Site Tech 1s	Visual Inspection	Daily	Spillage identified	Repair/maintain pumps

Table 4.4: Summary of routine odour mitigation tasks for assets under Sludge Treatment Centre Permit

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timeframe
Raw/SAS sludge thickening streams Linked tasks in appendix 5 section 8	Earthy (L)	Doors kept closed. Inside Building, under hoods, Odour controlled via Sludge building OCU	Site Tech 1s	Visual	Daily	Sludge spilling off belt, blockages, odour issues Fault with odour control/doors	Stop feed to belts, clean belt with hoses/jet wash. Clean sensors and nozzles. Raise job on SAP. Job allocated to Tech 1 for review within c.8 hours. If cannot be resolved, escalate to Site Manager. Arrange for contactor to attend site if required.
General	Low	Ensure site is kept clean and tidy	Site Tech 1s Team Manager	Visual Inspection	Daily	Spillage identified.	Clean up as soon as possible and no later than the end of the day.

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timeframe
	Low	Any spillages to be cleaned up as soon as practicable	Site Tech 1s	Visual Inspection	Daily	Elevated odour on site identified.	Reports to Performance Manager at team huddle/SAP Plus entry where corrective action identified. For a spillage; immediate/asap resolution
	Low	Site odour acceptability	Site Tech 1s	Qualitative assessment	Daily		
Sludge Import Linked tasks in Appendix 6 section 1 and 2	sludge, (Low)	Discharged to sludge blending tank through close coupled connector. Tank connected to Odour Control Unit. Discharge logged by tanker driver using swipe card. Records and accounts are managed by TW via cess logger website Sludge buffer tanks. Checked weekly by CoTC holder and quantities monitored. Up to 250,00 tonnes per annum	Managed by TW Operations	Visual	Weekly	Fault with Bauer connection point presenting risk of leaks; spills or accumulated debris	If simple issue such as a spill, clear immediately. Remedial actions/timescales similar to Cess logger. If Bauer connection damaged beyond repair close logger off & immediately alert BioRecycling and ops team to replace hose.

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timeframe
Sludge Import Linked tasks in Appendix 6 section 1 and 2	Sludge (Low)	Spillages are cleaned up promptly. The OCU must be kept in operation. Ensure tankers coupled correctly	Tech 1	As required	Daily	As above	As above
Screening and skip management Linked tasks in Appendix 6 section 2	Sludge (L)	Replace skips. Housekeeping. Repeat order once a week. Ensure screenings washed and dewatered before discharge to skip	Performance Manager	As required	Weekly	Wash water system not operating to full efficiency	Clean spray nozzles/remove any obstructions blinding/hair pinning); check angle/coverage of delivery; check lubrication. High priority for effective function so timescales would be within 2 working days on identification. Replacement of parts could be up to 6 weeks depending on spares availability.

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timeframe
Picket Fence Thickeners Linked tasks in appendix 5 section 8	Sludge (Low)	The tanks are inspected every shift; in the event of rising sludge, then the rate of desludging is checked and adjusted as required. In the event of sludge inversion, then the tank will be emptied and recommissioned.	Tech 1	Visual	Daily	Spillages or leaks	Ops team to isolate area and wash down with hoses.
Cess Reception Linked tasks in Appendix 5 section 2.1	sewage, (low)	Discharged directly to inlet works through close coupled connector. Discharge logged by tanker driver using swipe card. Records and accounts are managed by TW Biorecycling and checked by CoTC holder for the site. 390m^3/week normally Monday to Friday deliveries Ensure tankers coupled correctly	Quantity managed by TW Biorecycling to be within permit limits	Visual	Daily	Tanker seen discharging in an inappropriate manner. Spillage identified	Stop operation Clean up spillage soon as possible.
Dewatering building	Sludge (Low)	Keep building doors closed when not occupied	Tech 1	Visual	Daily	Open doors seen	Operator to Close doors
Centrifuge Linked tasks in appendix 6 section 13	Digested sludge (L)	General housekeeping	Tech 1	Visual	Daily	Spillage	Clear as soon as reasonably practicable.
Sludge Blending and mixing Linked tasks in appendix 6 section 3	Sludge (Low)	Clean any spillages immediately OCU	Tech 1	Visual	Daily	Rubbish Identified. OCU failure	Repair OCU as soon as possible

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timeframe
Digester Area Linked tasks in appendix 6 section 6	Sludge (Low)	Clean any spillages asap. Check for blowing Whessoes or gas leaks in general	Tech 1	Continuous	As required	Spillages noticed	Isolate digester and contain and clean area with hoses.
Secondary Digesters Linked tasks in appendix 6 section 7	Digested sludge (low)	Check air mixing is functioning correctly at correct intervals. When tanks are drained down, hose down immediately to prevent odour release from drying sludge	Tech 1	Visual	Weekly	As above	As above
Cake Pad and drainage (including imports) Linked tasks in appendix 6 section 16 and 17	Digested Cake (M)	Cake in storage forms a crust after a day or two reducing risk of odour. No additional turning or handling during cake storage. Imports subject to pre-acceptance checks.	Tech 1	Visual	Daily	Spillage	Clear as soon as reasonably practicable
Vehicle movements and washdown Linked tasks in appendix 6 section 16 and 17	Digested Cake (M)	General housekeeping, wheel wash in place	Tech 1	Visual	Daily	Cake on access roads	Clear as soon as reasonably practicable

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timeframe
Flare Stack Linked tasks in appendix 6 section 8	Biogas (L)	Check flare stack is operating OK to prevent gas emissions	Tech 1	Visual	When in use	Gas leak/ or flare state failure	Int/Ab: Impaired availability of engine/boilers. E: failure of CHP engine &/or ground flare. If repair not possible, response would be recourse to a standby boiler/engine/flare to limit whessoe/PRV releases. Lead in time of c. 4 to 6 weeks. Potential for odour to be present from released biogas

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timeframe
Sludge blending tanks Linked tasks in appendix 6 section 3	Sludge (L)	Covered tank. Tank vented to the odour control unit (biofilter). Alarm for fan failure on SCADA system. The inspection hatches are kept closed at all times. The OCU must be kept in operation. Continuous operation with automatic operation of standby fan in event of fan failure. Daily inspection of fan operation	Tech 1	SCADA	Continuous	OCU failure	Repair OCU as soon as possible.
Odour control unit Appendix 7	Sludge (L)	Biofilter to treat extracted odours under all conditions of load and temperatures. Duty/standby fans. Stack located away from site boundary to minimise impact. Continuous operation with automatic operation of standby fan in event of fan failure. Daily inspection of fan operation Local alarm for fan failure on SCADA Monitoring of outlet as deemed necessary.	Tech 1	SCADA	Continuous	Alarm raised by SCADA/Issue identified by Tech 1.	Raise job on SAP. Job allocated to Tech 1 for review within c. 8 hours. If cannot be resolved, escalate to Site Manager.

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timeframe
Odour Control Unit	Sludge (L)	All routine site checks as per SOM. See OCU site round Appendix 7. Monthly performance checks by specialist Framework agreed contractors.	Tech 1	See appendix 7 for Information	See appendix 7 for Information	Alarm raised by SCADA/Issue identified by Tech 1. Service Report	Raise job on SAP. Job allocated to Tech 1 for review within c. 8 hours. If cannot be resolved, escalate to Site Manager.

Table 4.5: Intermittent, abnormal, and emergency events for assets under UWWTD

Process stage	Event	Status (Ab-Abnormal, Int – Intermittence, E – Emergency)	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Cess Reception	Spillage	Ab	Clean up ASAP	contained area with wash down point, bunded.	Low
Storm Tanks	Deposits left on the floor of the new Storm Tanks are cleaned out manually as deemed necessary.	Ab	Tank emptied manually from time to time.	Keep minimum reserve volume for the returning sewage	High

Screens & Screening Conditioning, Drainage & Rag Skip Management	Filled skips not removed. Spillage of screenings/ sewage.	Ab	Replace skips. Housekeeping.	2 rag skips and 2 roll on/roll off grit skips present. Ab: Skips only accumulate due to presence of liquids. Ramps and tankering used as appropriate. Coverings used	Low/medium
Grit Removal	Spillage	Ab	Clean up ASAP		Low
Primary settlement tanks	Rising sludge Scraper broken	Ab	Increase desludging. Repair scraper. Empty tank if necessary.		Low
Final settlement tanks	Rising sludge Scraper broken	Ab	Increase desludging. Repair scraper. Empty tank if necessary.		Low
Activated Sludge Plant Lanes & Zones	Surface accumulation of sludge. Septicity in Anoxic zone.	Ab	Break up/ remove scum. Refer to PCO.	Change over blowers and break up surface scum manually if possible	Medium
Lagoons	Dredging of lagoons	Ab			Medium

Table 4.6: Intermittent, abnormal, and emergency events for assets under Sludge Treatment Centr Permit

Process stage	Event	Status (Int- intermittent, Ab - Abnormal, - E- Emergency, –Int - Intermittent)	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Sludge Reception, Screening, Wash down & Drainage	Failure of OCU	Ab	Repair OCU. Keep tank covered.	Raise job on SAP. Job allocated to Tech 1 for review within c. 8 hours. If cannot be resolved, escalate to Site Manager. Job may be raised for Service Contractor to rectify.	Medium
Sludge Reception, Screening, Wash down & Drainage	Spillages.	Int	Clean up.	If simple issue such as a spill, clear immediately.	Medium
Screening and skip management	Filled skips not removed. Spillage of screenings.	Int	Clean up		Medium
Sludge Blending & Mixing	Failure of OCU. Covers left open	Ab	Repair OCU. Keep tank covered. On daily visual inspection, Keep covers closed.	Raise job on SAP. Job allocated to Tech 1 for review within c. 8 hours. If cannot be resolved, escalate to Site Manager. Job may be raised for Service Contractor to rectify.	Medium
Picket Fence Thickeners	Tanks inversion. Build-up of sludge.	Ab	Empty tank. Recommission.		Medium

Process stage	Event	Status (Int- intermittent, Ab - Abnormal, - E- Emergency, –Int - Intermittent)	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Digester Feed Pumps	Spillages from the pump or split pipework.	Int	Repair. Clean up spillage immediately.	Hoses down and jet wash area. Soak up and oil of sludge spillages	Medium
Primary Digestion	Spillages	Int	Clean up immediately.	Hoses down and jet wash area. Soak up sludge spillages	Medium
Centrifuge	Spillages	Int	Repair. Clean up spillage.		Medium
Cake Pad & Drainage (including imports)	High volume in storage. Extreme weather - flooding or baking.	Ab	Maximise removal during favourable ambient conditions.	Bio recyling manage cake movements	Medium
	Storage of imported raw sludge cake.	Int	Avoid this practice. Cover or mask if possible.	As above	High
Odour Control - Gas scrubber (Sludge holding tanks)	Pump failure, Media in need of replacement.	Int	Repair plant. Replace media.	Raise job on SAP. Job allocated to Tech 1 for review within c. 8 hours. If cannot be resolved, escalate to Site Manager	Medium
Digester Tanks	Seal failure, which can give rise to odorous releases, is manually inspected.	Ab	Continuous operation. Covered tanks feeding CHPs. Tanks vented to CHPs	Hoses down and jet wash area. Soak up sludge spillages	Medium

Process stage	Event	Status (Int- intermittent, Ab - Abnormal, - E- Emergency, –Int - Intermittent)	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Cake Pad	Spillages	Int	Daily inspections, Monitoring of weather conditions, (wind direction) Delivery vehicles covered. Delivery on an impermeable hard standing. Any spillages or run off are washed into the site drainage. Use of mobile odour control units	Wheel wash on site to be used to cleanse vehicles before leaving site.	Medium
SAS Thickening & Pumping	Plant failure, build-up of solids on belt, floor etc.	Int	Clean up. Repair plant. Contractors called out onto to site, response by the next day	Stop feed to belts, clean belt with hoses/jet wash. Clean sensors and nozzles.	Low

Table 4.7: General Intermittent(Int), abnormal (Ab), and emergency (E) events

Incidents and emergencies	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Fire	Failure of fans or sludge building	E	Use of SHTs for storage of sludge. Tanker from site		Low/Medium

Severe weather	Transport of sludge from site inhibited resulting in back up of sludge in site resulting in additional odour release from tanks and PSTs	E	Event unlikely as there is provision for storage on site plus additional storage in the existing sludge holding tanks		Low
Flooding	Flooding causing process or equipment problems	E	Flood risk study has been carried out at Rye Meads. Site incident procedures would be followed.		Low
Illness/absence of key staff	Accumulation of sludge/loss of odour control etc.	E	Task allocation is independent of individual staff.		Low
Power cuts	Loss of power to fans leading to loss of odour control	E	Emergency power generation for critical activities until power restored.		Low
Other incidents	Transport of sludge to land inhibited for other reasons leading to back up of sludge in site resulting in additional odour release from tanks and PSTs	E	Provision for 70days storage on site plus additional storage in the existing sludge holding tanks. Transport to other STWs if necessary		Low

4.3.3 Spillages

Spillages significant enough to cause odorous emissions will be cleared as soon as practicable. The person discovering the spillage will inform site management, who will utilise resources as required to clear it.

Spill response guidance is also available in the Pollution Prevention Essential Standard at Environmental Management System - Pollution Prevention (sharepoint.com).

4.4 Routine Monitoring

Overall plant performance is assessed daily as part of the generic Site and Sludge Rounds, which apply to Thames Water large STW sites, and have been included in appendices 5 and 6, respectively. The objective of these are to ensure that treatment processes, including odour control, are checked for effective operation as per the SOM. Any of the checks that result in performance of the process outside of the limits defined in the SOM or a fault being detected will require an Operator to change the process to bring the plant back into acceptable limits or the fault needs to be logged and reported for follow up maintenance/repair.

Various process parameters are monitored using a combination of online instruments (to measure flows, temperatures, pressures, levels); samples that are taken to our UKCAS accredited laboratories or run through sampling tests at the on-site laboratories (%DS, pH, alkalinity, ammonia).

The online instruments all have signals that are taken back to the site SCADA system and these 'alarm' if the readings are outside pre-set trigger points. Similarly, laboratory analysis samples will have expected ranges, which if outside of these, a notification is sent to the site process controllers.

In all instances that parameters are out of 'range', the operational teams will carry out an investigation to understand the cause and initiate corrective actions. If the reasons are not obvious, the process optimisation team is contacted to evaluate further.

Additionally, each week the various recorded parameters are recorded in the site Cockpit reports to look at trends. These are used to establish if there are gradual changes in performance over time so that early intervention can be carried out.

A range of process parameters are subject to routine monitoring or checking to ensure that the digestion process is operating optimally so that the required sewage cake output quality is achieved.

- pH: At a conventional digestion site such as Rye Meads the processes is maintained around pH 7 but within the range 6.72 – 7.6 (this is % dry solids and digester load dependant) for healthy operation.
- alkalinity: Levels dependant on feedstock characteristics (primary sludge: surplus activated sludge (SAS) ratio). Conventional digestion typically, 3,500 - 5,000mg/litre range.
- temperature: minimum target of 38°C. This is maintained within the range 36-40°C.
- HRT (hydraulic retention time): minimum target is 15-days, there is no upper limit. Retention times shall not be less than 12-days during plant outages to keep the product pathogen kill efficiency control.
- OLR (organic loading rate): see table below - this is dependent on the primary/SAS ratio. Rye Meads fits into the first row of the table.
- Dry solids feed: see table above, Rye Meads has a target of 6%DS, but this can vary between 3-8%DS and impacts the HRT.

Type of Digestion	0%- 35% SASx	36%- 45% SAS	46%- 50% SAS	51%- 55% SAS	>55% SAS	Max Feed %DS
MAD* in Conventional Digestion	3	2.5	2	1.75	n/a	6
MAD after Pre-pasteurisation	4.5	4	3.5	3	n/a	7
MAD after Acid Hydrolysis	4.5	4	3.5	3	n/a	7
MAD after Thermal Hydrolysis	7	6.5	6	5.5	5.5	14

* mesophilic anaerobic digestion
X surplus activated sludge, arising from the UWWTD treatment route.

- VFA (volatile fatty acid) concentration: There is no specific range for VFAs as it depends on the feedstock. It is used as an indicator of digester health rather than a process control. The production of organic acids depends on the volume of solids fed to the digester. The typical range for VFAs in a primary digester is between 50 and 800 mg/L. When VFA concentrations climb above 1000 mg/L, the digester could be overloaded or experiencing other problems.
- Ammonia - Ammonia concentrations of 50 to 1000 mg/L are beneficial, but ammonia levels of 1500 to 3000 mg/L (pH greater than 7.4) could be inhibitory but not always. An ammonia concentration higher than 3000 mg/L for prolonged period is toxic.
- VFA to Alkalinity ratio: Very important parameter to monitor for digestion process. The VFA to alkalinity ratio of below 0.4 is good and above this threshold value means diminishing alkalinity and low pH i.e. sour digester content. As long as this ratio is maintained higher VFA and alkalinity digester content can be acceptable and the digestion process is deemed healthy. Anaerobic digestion process is always controlled based on holistic parameters based but not based on single parameter.

Further details of routine monitoring tasks are included in the Site Operating Manual.

A maintenance contract for the Odour Control Unit is in place with our OCU inspection.

Sniff Testing

Sniff testing has been incorporated into our Odour Improvement Plan (Appendix 2). This is to allow time to ensure that the most effective sniff testing can be carried out using personnel not sensitised to smells on site.

The procedure will be undertaken in response to complaints or if a risk of odour nuisance at sensitive receptors is expected and/or has been substantiated.

- Sniff testing will be normally carried out at by someone not routinely based at site, who are less sensitised to odour produced on site.
- Assessing potential odour sources within the Urban Waste Water Treatment (UWWT) and Sludge Treatment Centre (STC) processes and attempt to trace the odour to its source.
- The procedure and recording form which will be used can be found in appendix 8 of the OMP.

Site operatives' complete daily walkovers of site which includes assessing 'If site odour level is acceptable'. This is captured and recorded in the e-log book to ensure steady state monitoring.

Further details of routine monitoring tasks are included in the Site Operating Manual.

4.4.1 Performance Checks and Testing

Overall plant performance is assessed daily as part of the generic Site and Sludge Rounds, which apply to Thames Water large STW sites, and have been included in appendices 5 and 6, respectively. The objective of these is to ensure that treatment processes, including odour control, are checked for effective operation as per the SOM. Any of the checks that result in performance of the process outside of the limits defined in the SOM or a fault being detected will require an Operator to change the process to bring the plant back into acceptable limits or the fault needs to be logged and reported for follow up maintenance/repair.

Further details of routine monitoring tasks are included in the Site Operating Manual.

With respect to the Odour Control Units these receive visual checks to ensure fans and recirculation pumps are working per OCU Site rounds which are detailed in Appendix 7. Any problems are reported to the Process Controller for action to be initiated.

4.5 Record Keeping

Records of routine monitoring, inspections and sludge blanket checks are kept in the E-logbook. Records of skip management, which collect wastes generated from UWWTD activities, and any spillages and remedial actions are held in the site diary. Sludge blanket levels are recorded on run charts and electronically via the Cockpit. There is a SCADA system on this site.

A monthly condition report on the OCUs is sent to the team manager by the contractor.

Records of all OCU Maintenance Framework contractor reports are held locally.

All other routine reporting is held on the log sheets kept on site.

4.6 Emergency Response and Incident Response Procedures

Emergencies such as fire, flood and severe weather are managed by Thames Water's Business Resilience and Security team. The processes employed can be found on Thames Water's portal intranet site and are entitled: 'Security and Emergency Risk Management Process' and 'Event Management Procedure'. These are company confidential documents and therefore, are not included in the Appendices of this document.

Hazard reporting and accidents are all recorded on the Health and Safety software SpheraCloud (https://sphera.com) and monitored by Thames Water's Health, Safety & Environment team.

In the event of power failure, the site will run on island mode for critical plant. Such an event would be expected to have a temporary impact on the operation of the OCUs.

Absence of key staff does not affect the running of Rye Meads STW, as Tech 1s from other sites can be called upon to cover, if required.

Odour mitigation for emergency events have been detailed in Tables 4.5 - 4.7. The purpose of Tables 4.3 - 4.7 shall be to identify site specific emergency response procedures and mitigation measures

relating to site odour generation and release as well as additional site-specific odour issues and mitigation measures associated with process stages identified under the site Odour Risk Assessment.

Our Operations Team and odour contractor have recommended consideration of the following techniques either proactively (so accompanying planned or reactive works with known odour risk) and in an investigative capacity attached to an incident:

(a) Targeted use of 'Jerome' hydrogen sulphide analysers
(b) Targeted use of sniff tests ('calibrated nose')
(c)H2S measurements of stored materials where septicity is either present, or the material is at risk of septicity from continued storage especially in the open air, for example, prior to de-watering where measurements of sulphide & dissolved O2 would inform a condition assessment. Quantities and storage times precipitating a need for such assessments. This recommendation is being raised with the Area Process Scientist.
(d) Inclusion of temporary odour suppressants/misting agents and continued access to process critical spares (odour minimisation by early intervention).
(e) Further expansion of odour risk within site incident planning (this is already referenced in Tables 4.5, 4.6 & 4.7 under relevant Intermittent; Abnormal Operation & Emergency scenarios)
(f) Temperature assessment in secondary digester tanks on the basis that increased temperatures give greater potential for volatilisation of odours
(g) For PSTs, asset condition (wear/damage) would consider odour risks where assets are taken offline
(h) Telemetry/alarming of whessoe valve releases – there is an existing phased project within TWUL to enhance this at our sludge locations).

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5 Maintenance and inspection of plant and processes

5.1 Routine Maintenance

5.1.2 General Requirements

Site staff have a schedule to ensure routine maintenance for key mechanical items. In addition, a dedicated maintenance team provide additional support for more specialised equipment, e.g. regular calibration of Dissolved Oxygen probes.

In addition to the routine operational tasks, planned preventative and defect maintenance of plant is carried out. Plant which may have an impact on odour release is assigned an appropriate criticality rating to ensure effective performance is maintained. Plant assessed to be odour critical is listed in Section 4.2.3 above.

All maintenance procedures are detailed in the SOM, and when carried out is captured on the corporate system SAP, which generates work requests for the various activities for the treatment process assets at the appropriate frequency.

5.1.2 OCU selection and performance validation

Sludge OCU (A17)

The nominal design basis for the system is summarised below.

Parameter	Value	Units
Design total air extraction rate	2,392	Nm^3/hr
Design operating temperature	0 to 30	°C
Design average inlet H_2S concentration	75	ppm
Design maximum inlet H_2S concentration	500	ppm
Design average inlet NH_3 concentration	5	ppm
Design maximum inlet NH_3 concentration	7.5	ppm
Design average inlet RSH concentration	5	ppm
Design maximum inlet RSH concentration	15	ppm
Design average inlet DMS concentration	0.25	ppm
Design maximum inlet DMS concentration	1	ppm
Design average inlet VOC concentration	1	ppm
Design maximum inlet VOC concentration	20	ppm
Design inlet relative humidity	70	%RH
Design outlet H_2S concentration	0.05	ppm
Design OCU outlet odour concentration (based on an inlet odour concentration <40,000 ou_E/m^3	<2000	ou_E/m^3
Design system H_2S removal efficiency	>98	%

For continuous operational monitoring, system incorporates:

- Fan status identified on SCADA with alarms
- Washwater failed alarm
- Main supply failed alarm

For periodic monitoring:

- Inlet and outlet Hydrogen Sulphide concentrations recorded and assessed for removal efficiency and below maximum designed inlet loading during monthly inspections. Following the monthly inspections, hydrogen sulphide concentrations are trended by specialist contractors which would enable identification of a decrease in H_2S removal. Should this occur, specialist contractors would include this in the recommendation section of their inspection report, for example media replacement.
- System integrity checked during daily site rounds and monthly inspections to confirm extraction points and routes undamaged.

Evidence of the systems continuing ability to treat the input flow are confirmed by monthly inlet and outlet odorous gas (hydrogen sulphide) concentrations. Examples of such reductions are given in 5.1.3 iii) of the OMP

5.1. 3 Maintenance of Odour Control Units

Refer to Odour Control Unit Asset Standard and Site Operating Manual.

Condition of the media in the OCU is monitored by performance checks and by additional testing as required.

Operation and maintenance of OCUs is delivered in accordance with the Company's Asset Standards. This is either delivered in-house by Operations or outsourced to Contractor.

Operation and maintenance of OCUs is delivered in accordance with the Company's Asset Standards. This is delivered in house by Operations as per OCU Site Rounds, included in Appendix 7.

Parameter	Monitoring Method	Action if red flag identified and Expected timescales	Frequency	Biofilter	Carbon	Chemical scrubber
Performance monitoring						
Gas inlet temperature (5-40C)	Temperature probe	Investigate any anomalies relating to temperature, such as individual process checks	Monthly	X	X	X
Gas outlet temperature (5-40C)	Temperature probe	Investigate any anomalies relating to temperature, such as individual process checks				
Gas inlet flow rate or velocity (6m/sec)	Calibrated velocity meter	Investigate any anomalies relating to flow rates; velocities and pressure drop across the system by measuring the inlet and outlet pressure. Check fan functionality; presence of obstructions; bring forward contractor service. If fan replacement needed c. 2* months minimum typical duration depending on severity of issue/condition of back up fan (*time of order to mobilisation; assumes second duty fan runs; timescale includes time to install replacement and fabrication). If solely an electrical issue, recourse to TWUL ICA Technician mostly likely within a week. Other root causes are usually blocked media; duct and failure of non-return dampers around fan sets.	Monthly	X	X	X
Gas outlet flow rate or velocity (6m/sec)	Calibrated velocity meter					
Gas inlet humidity (Post biofilter humidification > 90% Carbon units <70%)	Hygrometer	Check any preheaters fitted to system before carbon, or check irrigation is working on biofilter.	Monthly	X	X	-
Back pressure (to assess media thatching or media compaction)	Calibrated digital pressure meters	Values above threshold would be 'RAG' banded in the OCU contractor inspection reports. If pressure gauges are over-pressurised to the extent fouling is or has occurred to be treated	Monthly	X	X	X

Typically systems work around 0.5 kPA		as high priority. Check for blockages, poor FFE quality/check if media is of a type susceptible to biodegradation.				
pH of discharge irrigation water (2-3pH)	pH paper	Less than 2 increase irrigation.	Monthly	X	-	-
pH of scrubber liquor (9.2 pH)	Calibrated pH probe (calibrated with standard solutions)	Recalibrate pH probe and check dosing and chemical availability	Continuous	-	-	X
Redox potential of scrubber liquor (700-730 mV)	Calibrated redox probe (calibrated with standard solutions)	Recalibrate redox probe and check dosing and chemical availability	Continuous	-	-	X
Gas inlet/outlet concentrations for hydrogen sulphide (50ppb used for media change out)	Drager Tubes/CEN TS 13649 for sampling NIOSH 6013 for analysis OR US EPA M11*	Check functionality of odour control unit. If repair or replacement media required raise a job on SAP or APS risk and arrange for contractor repair. Timescale Bespoke to root cause/see later entries. Arrange re-test post remedial work. Major repairs up to 6 months depending on complexity	Monthly/ 6 monthly	X	X	X
Gas inlet/outlet concentrations for ammonia (20mg/m3)	EN ISO 21877 OR CEN TS 1369 for sampling NIOSH 6016 for analysis*	Check functionality of odour control unit. If repair or replacement media required raise a job on SAP or APS risk and arrange for contractor repair. Timescale Bespoke to root cause/see later entries. Arrange re-test post remedial work. Major repairs up to 6 months depending on complexity	6 monthly	X	X	X
Gas inlet/outlet concentrations VOCs and RSH	RSH – Drager tubes VOC – PID as isobutylene		Quarterly	x	x	x
Maintenance checks and inspections						
Check integrity of tank covers for damage and ensure access hatches are closed		Close hatches ASAP	Daily	X	X	X
Check building & door integrity for damage or leakage; doors closed (if required)		Closed doors ASAP	Daily	X	X	X

Check damper positions on ductwork are in the correct positions	Correct positioning	Daily	X	X	X
Check irrigation and humidification systems are functioning	Turn on systems or investigate malfunction.	Daily	X	-	-
Check for free discharge of effluent from drain	Investigate blockage	Daily	X	-	-
Check irrigation water supply is working at required rate	Visual check on flow gauge, investigate if required.	Monthly[1]	X	-	-
Check condensate removal points for free flow of liquid	Visual check	Daily/Monthly[1]	X	X	X
Check OCU condition for signs of damage or leaks	Call specialist contractor if identified	Daily / Monthly[1]	X	X	X
Check general ductwork for signs of damage or leaks	Condition of ductwork would be 'RAG' banded in the OCU contractor inspection reports. If broken, then odours not being conveyed to OCU and can be indicated by low inlet load. Worst case the ductwork is disconnected ('sucking air') such that odour removal is not taking place.	Daily / Monthly[1]	X	X	X
Check spray pattern from irrigation nozzles and clean nozzles as required	Adjust spray pattern, clean the strainer and unblock nozzles or replace as deemed necessary. Timescale durations of c. 2 weeks where just irrigation required.	Daily / Monthly[1]	X	-	X
Check flexi joints between fans and ductwork for leaks	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	X	X
Check fans for excessive vibration or noise, belt tension and bearing temperature	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	X	X

Check irrigation water pH	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	-	-
Check irrigation pumps condition and operation	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	-	
Check chemical reagent levels and supply	Order when required. Ensure no low-level alarms.	Weekly	-	-	X
Check chemical dosing and blow down pump condition and operation	If outside pH levels, investigate. Initiates blow down to correct level.	Daily/Monthly	-	-	X
Check blow down rate is within correct range	If outside pH levels, investigate. Initiates blow down to correct level.	Monthly	-	-	X
Check ph and Redox probes are working and in calibration	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	-	-	X
Check recirculating liquor strainer and replace if necessary	Flows recorded on SCADA	Monthly	-	-	X
Check water softener is working correctly (if installed)	Water hardener test papers used to check water quality.	Monthly	-	-	X
Check dampers are operational and in good condition	Swap over duty fan to stand by fan and record flow volumes to identify issue.	Monthly	X	X	X
Inspect electrical control panel and check for faults and alarms	Visual inspection by monhtly contractor and investigation any alarm conditions.	Monthly	X	X	X
Simulate duty / standby fan and pump changeover	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale	Monthly	X	X	X

	durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)				
Check H_2S meter is functioning and calibrated (if installed)	Check calibration is still in date during monthly contractor inspection.	Monthly	X	X	X

*Only required on OCUs covered by STC permit

Condition of the media in the OCU is monitored by performance checks and by additional testing as required.

The OCU at Rye Meads STW is covered by a service and maintenance contract with a specialist Contractor. They are inspected on a monthly basis and reports are sent to site management. Figure 5.1 below highlights the scope of work required from our OCU Maintenance Contractors through their monthly visits. Monitoring during the visits is as follows:

- Monthly – flow (m^3/h), differential pressure(kPa) and hydrogen sulphide(ppm) at both the inlet and outlet. Where applicable, monitoring may also include fan hours run and removal efficiency of hydrogen sulphide.
- Quarterly – VOC(ppm) and mercaptans(ppm) at the inlet and outlet.

>50ppb hydrogen sulphide will be used as a threshold value for media change out.

The OCU is specifically designed to minimise the release of odour, bioaerosols and microorganisms.

Optimum flow rates; trigger levels; odorous components/concentrations in the gas stream and associated physical properties are all important to OCU function and are described below:

(i)Optimum flow rate through the system to allow for effective treatment.

A '**Maximum velocity in duct work'**; rather than volume; is the key design aspect informing effective treatment for new/existing OCUs. Not exceeding 10m/second in a piece of ductwork will avoid noise break out; the industry benchmark for new plant being 8m/second. Given velocity is directly related to the volume; the specification is +/- 20% to reflect instrumentation variation; and therefore all 1 x 2 OCUs are checked to see ***if they can meet 6m/second*** with escalation in monthly contractor inspection reports where this value is not reached. This is a good indicator of functionality, appropriate sizing, and system health.

ii) The trigger levels/ranges for action if processes monitoring parameters are breached/ outside optimal parameters.

All OCUs, irrespective of media type, *will stipulate a minimum of 30 seconds* ***retention time***, for a biofilter to achieve a minimum of 95%, removal efficiency.

H2S readings are reported in the monthly service reports which inform odour equivalents (OEs). The accepted OEs for H2S at 0.5 part per million is equivalent to 1,000 odour units. A "red action" would be raised for any value 0.5 ppm from the Biofilter.

Trigger levels are more difficult to identify for other parameters, such as mercaptans and ammonia since the design assumptions for OCUs are informed by H2S removal. Removal for these parameters is therefore limited. For Total VOCs, *in respect to methane rather than small chain VOCs*, there is no removal.

From a qualitative value, from visual inspections, 'red flags;' would include if irrigation pipework to the biofilter is broken (no water entry to media); neither extraction fan running; broken ductwork leading to the OCU sucking in atmospheric air.

On identification of such red flags, such that the effective function of the OCU is at risk of being compromised, the following actions would be taken:

(i) For significant issues relating to any aspect of 'condition monitoring' - including effective function of the biofilters - impacting upon parameter reductions at the inlet/out; differential pressures or irrigation volumes – the Performance Manager would urgently contact Head of Maintenance at ERG to book in reactive maintenance attention. Timescales would be of highest priority but response times/duration dependent on the issue identified

(ii) For issues relating to housekeeping (leaks) or issues relating to OCU power supply (electrics) – for example, impacting either fan operation - these would be referred to a TWUL Electrician for assessment and either rectified by the area operational team or escalated to an external contractor where repairs are more complex. Timescale for expectation of resolution would typically be within 24 hours.

For either (i) and (ii) if any significant pollution risk (odour) was identified the Performance Manager would contact TWUL's incident help desk. A supporting risk would be recorded in APS (risk assessment software) to support funding where a need for remedial works was identified.

iii) Odorous components in the gas stream and concentrations of emissions

The monthly contractor inspections of each OCU provide data for H2S; VOC; Mercaptans (RsH). The sampling methodology being Drager (gas analysis) tube for c. 30 seconds to 2 minutes duration.

To achieve an appropriate level of surveillance on OCU performance, outside of the contractor monthly inspections, there is additional oversight from the Operations Management Team through:

- Visibility using local SCADA control panels for OCU , which records fan status
- Daily site rounds by Thames Water technicians. These are Psion based checks using SAP Plus for escalations including, for example, internal MANDAT tickets or identifying a need for contractor support. The tasks in the daily checks mirror the numbered tasks in the contractor 'Monthly Health Checks'. See Figure 5.1 and section 9 in Appendix 5 in the OMP. There is connectivity between the site rounds and SCADA, for example, if excessive noise is recorded this could relate to an operational fault in OCU fan, and in turn, is visualised on the local SCADA screens.

iv) Physical properties of the air stream at point of control i.e., humidity, optimum temp, pH for effective odour control

For **humidity**, *the gas is humidified before being received by the biofilter,* so this parameter has less relevance. Biofilter post humidification should achieve a level of >90%.

For **temperature**, this is fairly constant throughout the year as this is informed by the need to achieve fairly constant temperatures in the digestion process. A range of 20 to 40^{o}C being standard.

pH will be slightly variable depending on the H2S that is there from the condensing air stream contributing to SO2 formation. This tends not to be an issue at the biofilter itself since the active component of the biofilter will in itself produce SO2 as a waste product from converting the H2S.

pH off a bio-scrubber is checked on the quarterly inspections since it might suggest an issue with the active component of the biofilter being impacted by the accumulation of its waste product thereby making the lower part of the bed inactive. A pH of 2 to 3 would be expected as a theoretical upper limit to liquor discharged from the biofilter but recorded values are significantly less; pH 4 to 5 being typical (reflecting the logarithmic scale). Note if efficiency of the process is being impacted; pH would also be part of the investigative checks (i.e., more than quarterly).

5.1 Fault Reporting

Faults identified during routine inspections are reported to the Performance Manager or Process Controller (where applicable) who assesses criticality before entering the task into the job scheduling system for allocation to an appropriate person to a timescale appropriate to the criticality.

5.2 Emergency Repairs

24-hour maintenance cover is available at the discretion of the Process Controller, Performance Manager or Duty Manager, with planned follow up.

Less urgent repairs are assessed for criticality and dealt with during normal working hours.

6 Customer Communications

6.1 Customer Odour Complaints Process

Customer contacts regarding Rye Meads STW will be made via the Customer Centre, logged, and passed (directly, or via the OMC) to local Operations (Performance Manager) via e-mail. Operations will investigate and take appropriate action.

Customers / residents are encouraged to communicate with local Thames Water Operations via the Customer Centre to report if they are noticing odour from Rye Meads STW, to ensure that all contacts are recorded and actioned.

Thames Water Website – www.thameswater.co.uk

customer.feedback@thameswater.co.uk with the subject ' Rye Meads Sewage Treatment Works'

Thames Water Customer Services
Telephone: 0800 316 9800

If the customer / resident would prefer to contact either East Hertfordshire District Council or the Environment Agency instead, their contact details are as follows:

East Hertfordshire District Council – Environmental Services
Telephone: 01279 655261
Environment Agency
Incident hotline: 0800 80 70 60
Email: incident_communications_service@environment-agency.gov.uk

Customer contacts regarding Rye Meads STW that are received directly on site are responded to by the local Operations team. The Performance Manager, at the earliest opportunity, will inform the Customer and Stakeholder Manager (CSM) of the contact details in order that they can ensure the complaint is captured and recorded by the Customer Services Centre.

Complaints received via Customer Services Centre:

- Complaint information is logged electronically by the Customer Services Centre.
- An action is raised to Waste Operations Control Centre (WOCC) who contact the CSM by telephone and email the complaint information to both the CSM and Performance Manager
- The Performance Manager and CSM will review the complaint and take action to investigate (see section 6.3)
- The CSM is responsible for contacting the customer and updating them on the outcome of the investigation.
- Any problems are noted and remedial work actioned. An update of action taken and feedback given to the customer is emailed to the WOCC by the CSM.

- The WOCC update the electronic complaint report and it is closed down.

Complaints received via email or post:

- Complaint information is logged electronically by Customer Relations and allocated a Case Manager.
- The complaint is emailed to the CSM who reviews the complaint and investigates with the Performance Manager (see section 6.3).
- Actions taken are emailed back to the Case Manager who updates the electronic system and updates the Customer.

Complaints received via Customer Centre out of normal working hours

- For a large number of calls, or serious concerns, the Out of Hours Coordinator will be contacted to respond.
- For all other calls Rye Meads STW site management will investigate and respond the next working day.

6.2 Customer Communication Plan

The Customer Communication Plan in Appendix 3 identifies how and when contact will be made with customers and stakeholders in relation to stable, abnormal and emergency site operation.

6.3 Investigating a complaint

Upon receiving a complaint, the Wastewater Control Centre have 24 working hours to respond to the customer with an update. Within these 24 hours, the Customer & Stakeholder Manager will contact to the performance manager who will carry out an investigation to determine whether the odour source is coming from the Thames Water site. If the odour is determined to be from the Thames Water site, then the root cause is investigated.

Should the source of the odour be confirmed as coming from the Thames Water Operations then the performance manager will review all activities currently taking place on site, including any maintenance, cleaning, and non-standard activities to identify the root cause, and ensure appropriate mitigation measures are in place.

If the performance manager cannot identify the source of the odour, but complaints persist, the Customer & Stakeholder Manager will ensure the customer who made the complaint is contacted and obtain further details. These details include their address in relation to the site location, the time of occurrence and for how long. If odour problems continue to persist, Thames Water may even ask the customer to keep a detailed odour diary to ensure their issue can be fully addressed.

The root cause investigation may include site walkaround checks, which look for irregularities such as spillages / open doors and hatches, ensuring appropriate measures as detailed in table 4.3-6 are in place.

When the root cause of the odour is found, the customer will be updated with an explanation and provided with a timescale for its resolution. Furthermore, the situation is assessed for hazards to determine any possibility of health risk to the local community.

To ensure any limitations regarding everyday staff becoming desensitised to the odour, if site odour complaints persist with no result in locating its source, personnel who do not spend prolonged time on a single site, such as the Area Operations Manager, will participate in the walkaround checks.

6.4 Notification of Operations with Potential to Cause an Odour Problem

Where operations may impact on local residents, notification will be made to the Customer Centre who will log the details on their Bulletin Board. This will be used to provide information directly to customers who call with queries. Letter drops may also be used.

The Environmental Health Officer of East Hertfordshire District Council will be contacted directly if there are risks of odour generation (e.g. digester cleaning, tank cleaning or process issues). NOTE: This will typically only take place on known sensitive sites where Local Authorities and the EHO are already involved.

For assets under STC permit, we will notify the EA in accordance with the permit conditions and notifications procedure, see appendix 3.

If notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, Thames Water shall investigate and carry out a review of the OMP and appropriate measures if deemed necessary.

Appendices

Appendix 1. Odour Risk Assessment

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Appendix 2. Odour Improvement Plan

Odour Improvement Plan Rye Meads STW

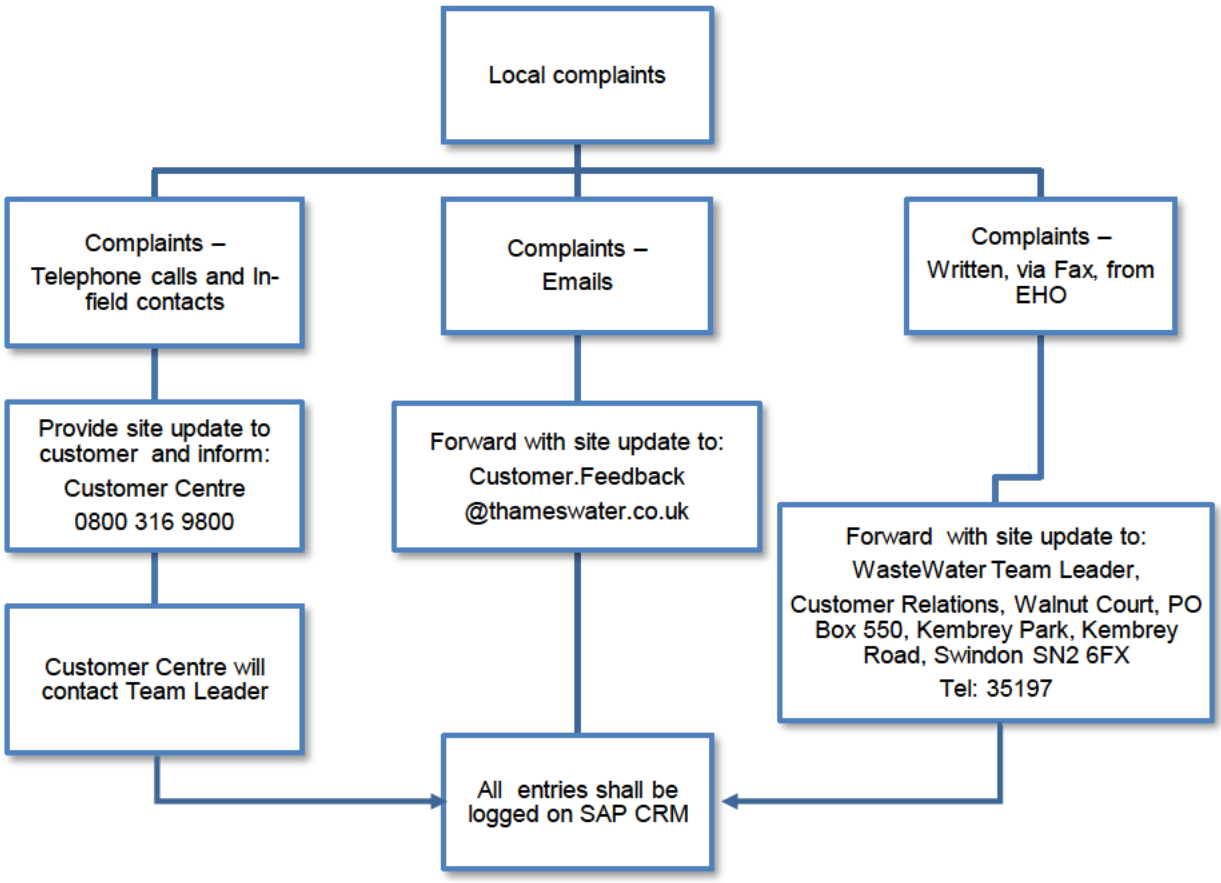
Review Date Oct-23

Process Stage	Owner	Plan	Action	Expected difficulties	Measures to mitigate	Timeframe
Sludge Dewatering	Harry Calder	Replace Klampress 1 with second permenant centrifuge to site.	Replace Klampress No.1 in order to allow second centrifuge to be brought into site. APS risk: 97937	Funding	Running 1 mobile centrifuge and 1 permenant mobile centrifuge	Ongoing
Storm tank	Harry Calder	Assess benefit of automated storm tank cleaning	Cost benefit assessment of installing automated cleaning system on the two new storm tanks identified in odour risk assessment. Existing storm tanks are manually cleaned. EA aware. APS risk: 82403. Obtained quote.	Funding	Manual clean as required.	Ongoing
Sniff Testing	Odour Specialis t	Implement Sniff Testing Procedure	Procedure written for sniff testing, in order to achieve effective sniff testing personnel needs to be identified to carry out the procedure who are not acclimatised to smells on site.	resource	daily site rounds, monthly OCU inspections	6 months from permit issue
OCU recommendations	Harry Calder	Action recommendations laid out by monthly health checks	Action recommendations laid out by monthly health checks	funding	monthly OCU inspections and daily site rounds	Ongoing

Appendix 3. Customer Communications Plan

Complaints Process

All locally received complaints are re-directed to the Customer Centre. Please see below for details.



IMPORTANT NOTE:	
Any communications received from the local Member of Parliament or senior council officers need to be forwarded to the Local/Regional Government Liaison person:	
Name:	[redacted]
Telephone:	

Communications

Level 1	Stable operations: Compliant with Operational Asset Standards.			
Communications Approach	Standard regular proactive contact with key stakeholders.			
Stakeholders External	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
East Hertfordshire District Council Environmental Health Department	As required but at least quarterly	Telephone / email / meeting	Update on operational activity on site	Performance Manager and Customer & Stakeholder Manager
Local residents associations *(if applicable)*	As required but at least annually	Telephone / email / meeting	Update on operational activity on site	Performance Manager and Customer & Stakeholder Manager
Environment Agency	As required	Telephone / email / meeting	Update on operational activity on site	Performance Manager or Customer & Stakeholder Manager
Stakeholders Internal	**Frequency of Contact**	**Method & Level of Contact**	**Aim of Contact**	**TW Contact/Level**
Press Office	As required	Report sent out by operations to the business	Update the business on operational activity on site	Duty Manager
Customer Centre (Swindon)	As required	Report sent out by operations to the business	Update the business on operational activity on site	Duty Manager

Level 2	Unstable operations: • Non-compliant with Operational Asset Standards on one or more sub-processes leading to increased odour risk.			
Communications Approach	As Level 1 plus: • Use of Contact Centre Bulletin Boards/Briefing Contact Centre agents/Briefing statement with Q&A prepared for the press office (to use reactively). • Monthly discussions with, and quarterly visits from, the EHO. • Commence proactive communications with other stakeholders.			
Stakeholders External	**Frequency of Contact**	**Method & Level of Contact**	**Aim of Contact**	**TW Contact/Level**
East Hertfordshire District Council Environmental Health Department	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager and Customer & Stakeholder Manager
Local residents associations *(if applicable)*	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager and Customer & Stakeholder Manager
Environment Agency	Potential for notification procedure	As required as per notification procedure	As required as per notification procedure	Pollution desk or Performance Manager and Customer & Stakeholder Manager
Stakeholders Internal	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Press Office	Immediately then weekly	Q&A prepared for press office by Operations	To enable the press office to deal with queries from the press (reactive only).	Duty Manager
Customer Centre (Swindon)	Immediately then weekly	Telephone / email	To enable the Customer Centre to deal with queries from the press (reactive only).	Duty Manager
Other areas/stakeholders outside Rye Meads STW potentially impacted				
Stakeholder	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Local businesses	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager and Customer & Stakeholder Manager

Level 3	Emergency • Temporary or transient activities not deemed to be compliant with Operational Asset Standards. High risk of odour emitting plant.			
Communications Approach	As level 2 plus: • Odour event set up internally (including OOH's cover from OMC (Kemble Court)). • Weekly discussions with EHO. • Monthly Stakeholder meetings, (internal and external – include MPs, Councillors, schools, businesses etc.). • Press release may be required.			
Stakeholder External	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
East Hertfordshire District Council Environmental Health Department	Immediately then weekly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5 Manager (Operations Manager) / Level 4 Manager (Regional Operations Manager)
Local residents associations (if applicable)	Immediately then monthly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Performance / Site Manager
Councillors (Include names if Operations have regular contact with them) / MPs for local areas	Immediately then monthly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5 Manager (Operations Manager) / Level 4 Manager (Regional Operations Manager)
Environment Agency	As required as per notification procedure	As required as per notification procedure	As required as per notification procedure	Pollution desk or Level 5 Manager (Operations Manager) / Level 4 Manager (Regional Operations Manager)
Stakeholders Internal	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Press Office	Immediately then daily	Q&A and press release prepared by press office	To enable the press office to deal with reactive queries from the press and prepare a media strategy if required.	Duty Manager
Customer Centre (Swindon)	Immediately then daily	Telephone / email	To enable the Customer Centre to deal with queries from customers (reactive only)	Duty Manager

Other areas/stakeholders outside Rye Meads STW potentially impacted				
Stakeholder	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Local businesses	Immediately then monthly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Performance Manager and Customer & Stakeholder Manager

Appendix 4. Site Drawings

Figure A - Site Location Map

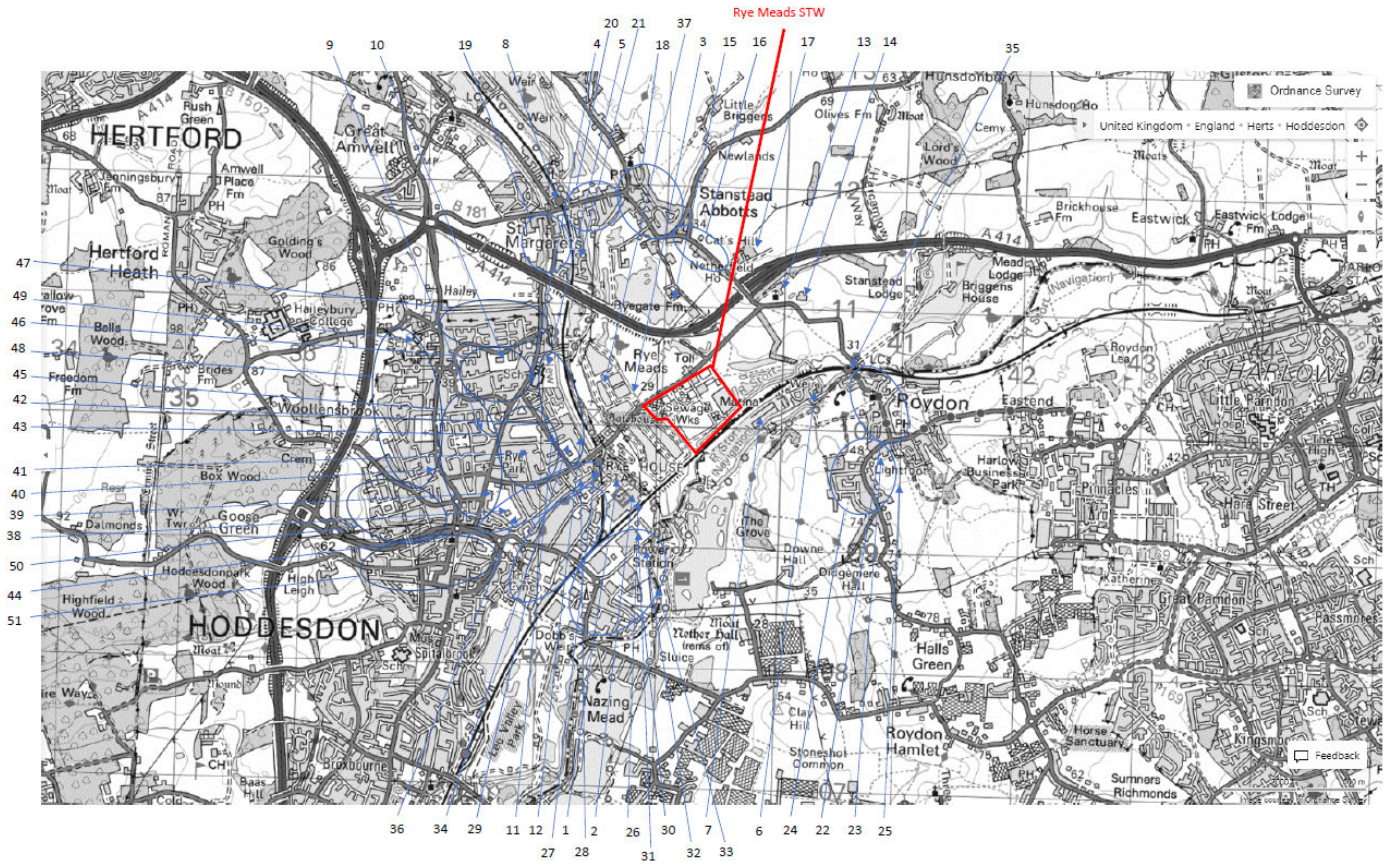


Figure B - Site Plan

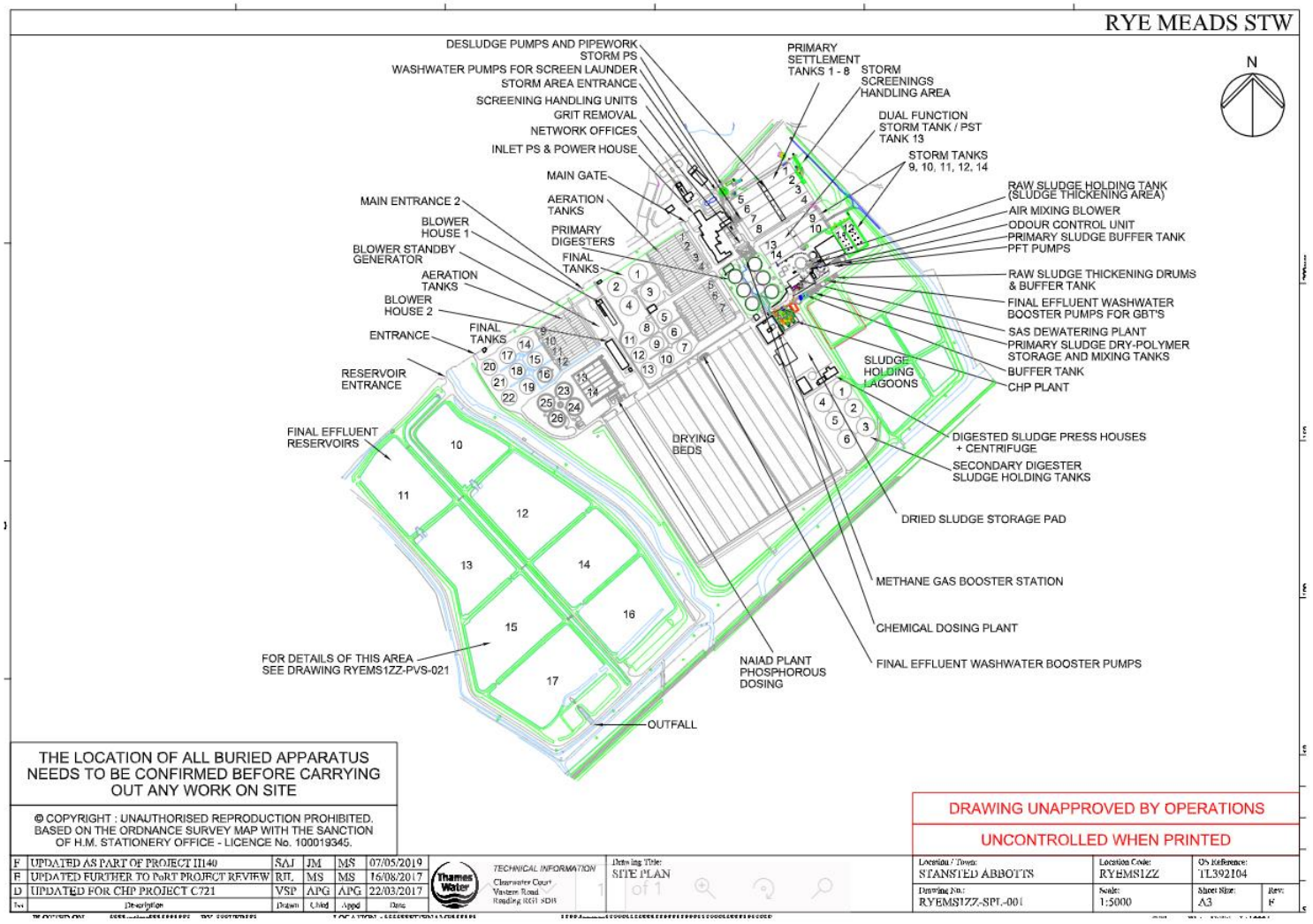


Figure C - Site Plan Showing Area of Permitted Activities

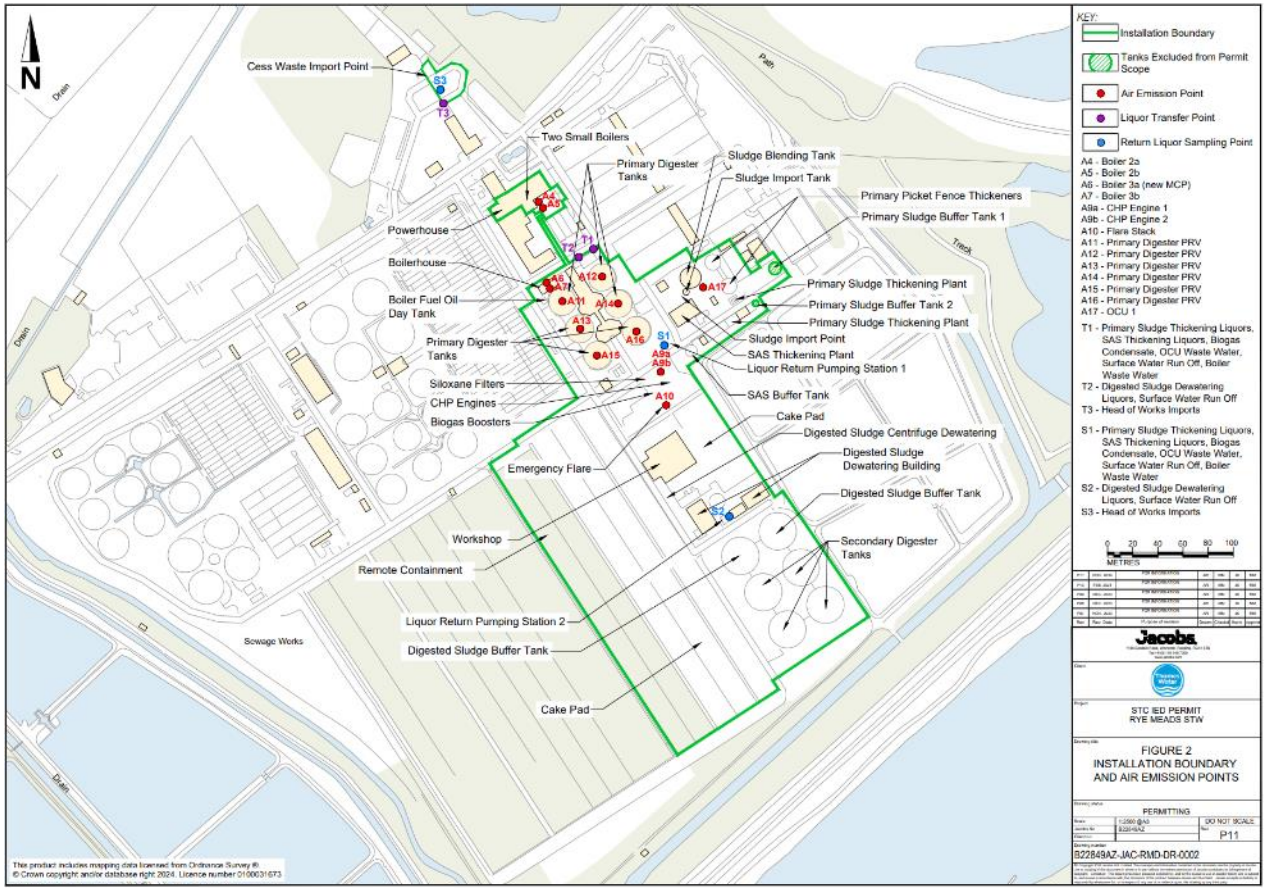


Figure D - Process Block Diagram for Sludge Treatment Centre Activities

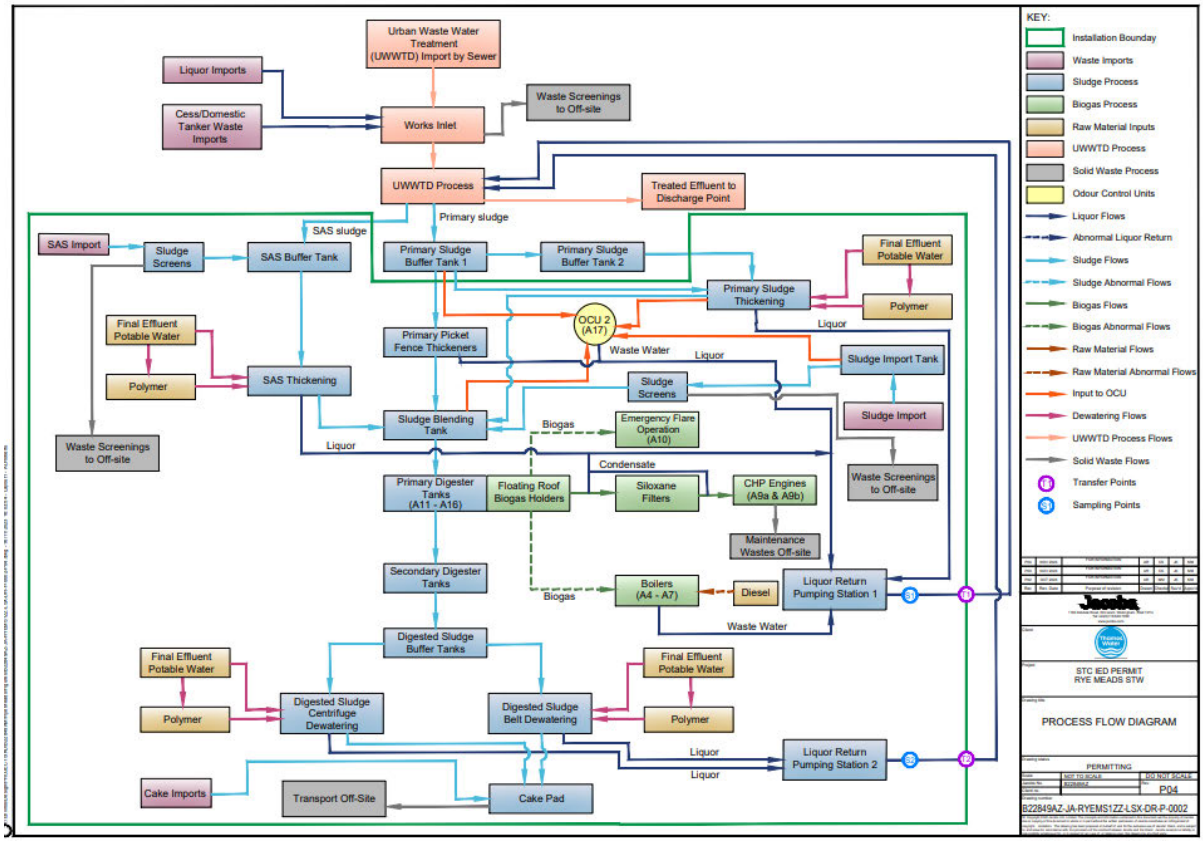
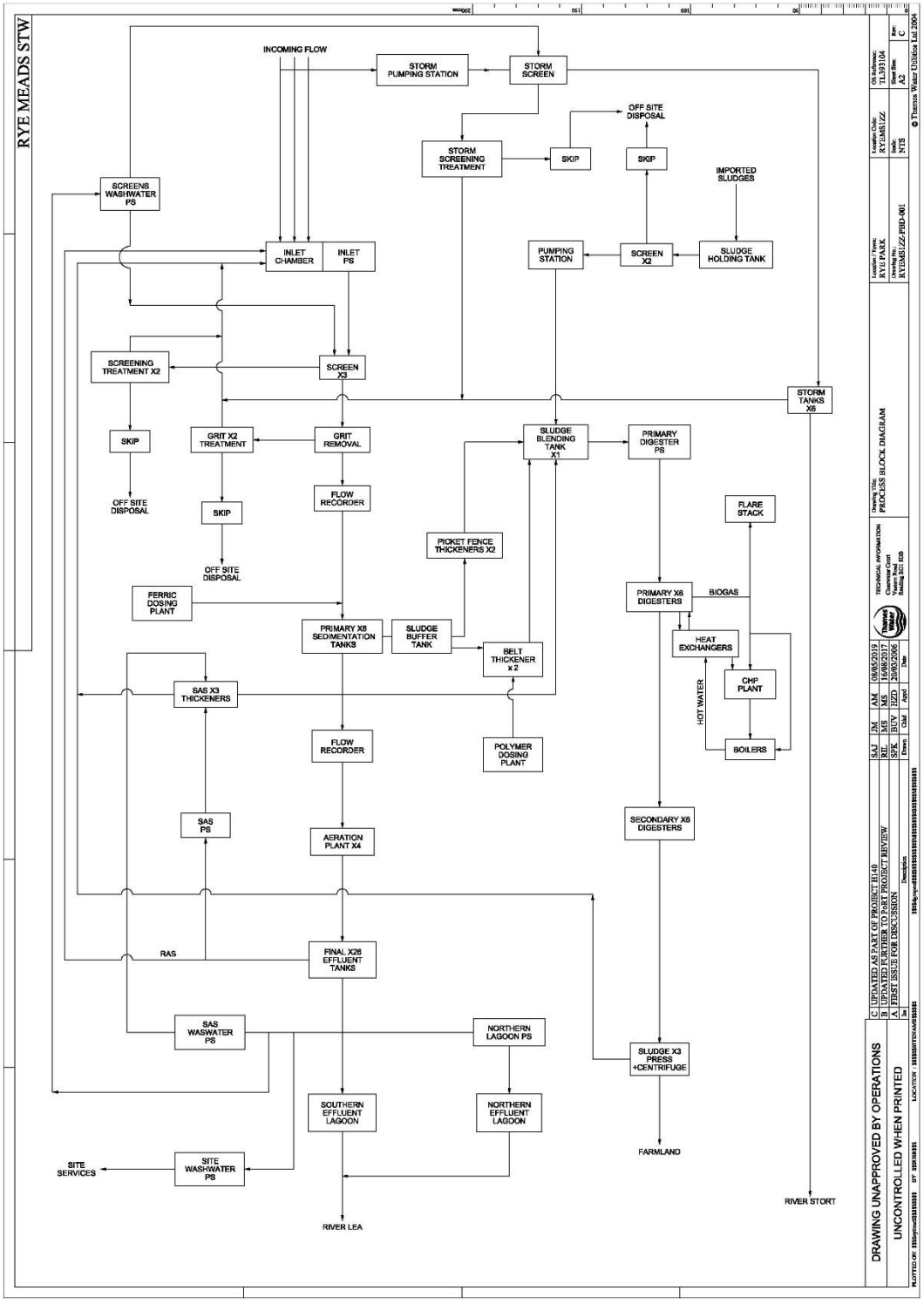


Figure E - Process Block Diagram for UWWTD Activities



Appendix 5. Site Rounds

ID	Instruction	Daily	Weekly
1	**Final Effluent**		
a)	Check the effluent quality at the sample point. Sample (ammonia, phosphorus, temperature & turbidity) in accordance with SOM. Record in site log book & via Direct Text.	**X**	
b)	Check final effluent sampling point is accessible. Highlight to manager if need to clean inline monitor, channel/chamber.	**X**	
c)	Check storm sampling point is accessible. Highlight to manager if need to clean inline monitor, channel/chamber.	**X**	
d)	Visual check on point of discharge to the watercourse if accessible. Check operability of outfall flap valve if fitted.	**X**	
e)	Check storm discharge point, if shared & if accessible.	**X**	
f)	Compensation water pumps. Check and clear ultrasonic head of cobwebs etc.	**X**	
g)	Check data and operation of inline monitor. Check inline monitor installation for damage, take appropriate action where required.	**X**	
h)	Remove and clean inline monitor probe.		**X**
i)	Check flow meter & flume is clear of debris. Take appropriate action.	**X**	
2	**Preliminary Treatment**	Daily	Weekly
a)	Check Crude sewage appearance. Does it look normal for the site?	**X**	
2.1	**Cess Waste Reception Point**		
a)	Note any suspicious activity or discharges as required	**X**	
b)	Check logger system is operating correctly	**X**	
c)	Check all pipework is in good condition	**X**	
d)	Where a macerator is fitted, check operation and oil reservoir	**X**	
e)	Where a manual stone trap is fitted, clear of accumulated material	**X**	
f)	Check grit bins are available and stocked with grit for winter	**X**	
g)	Carry out general housekeeping, remove litter, clear debris, washdown any spillages, empty bins	**X**	
h)	Ensure all signage is in good condition, clean and legible	**X**	

ID	Instruction	Daily	Weekly
i)	Check washdown equipment is operating correctly	X	
2.2	**Inlet / storm pumping station**	Daily	Weekly
a)	Check Ammeter reading, Too high could indicate a blockage. Too low could indicate an air lock or impeller damage. Where reading is unusual ensure appropriate action is taken.	X	
b)	Check the well level is within the normal operating limits taking into account the flow conditions at the time (such as storm conditions & peak flow to site). If level is too low or high, this could indicate control issues or pumping issues.	X	
c)	Check condition of the wet well. Does it have more than the usual scum or debris floating on top that will indicate the need for a wet well clean?	X	
d)	Check fault light(s) are not on, take appropriate action as required.	X	
e)	Check flow rate (where meter is fitted); is it within the normal operating range?	X	
f)	Inspect buildings, kiosks and control/switchgear panels for general condition, damage and that they are securely locked. Clean and tidy the interior of the buildings and/or Kiosks. Remove rubbish from site or if large volume arrange for collection.	x	
g)	Listen for undue pump noise and check for undue vibration by safely touching the lifting chain or guide rail.	X	
h)	Check non-return valve is operating correctly Non return valves prevent water from flowing back through the pump when it is not in operation. If a weighted arm is fitted is it at the usual angle? If it is low and chattering it could indicate the pump is blocked.	X	
i)	Check operation of the ultrasonic level control. Is it reading correctly? Compare the well level with the normal readout from the display. Check hard wired control floats, clean as required. Are floats weighed down with rag or debris preventing them from lifting if the water level rises?	X	
j)	Check pumps, pipelines and couplings for leaks where possible.		X
k)	Start the cleaning cycle manually where required.	X	
l)	Pumps - Log hours run		X
m)	Pumps - Log kWhrs		X
2.3	**Screen(s) / macerator(s)**	Daily	Weekly

ID	Instruction	Daily	Weekly
a)	Check inlet channel level is normal taking into account the flow conditions at the time (such as storm conditions & peak flow to site).	X	
b)	Check screen operation and check for screenings carryover. Check for blockages and blinding (hairpinning) on screen panels and remove where necessary. Check for rag rolling or rag balls upstream of the screen and remove where necessary. Check for any grit build up in front of screen	X	
c)	Inspect debris disposal mechanism for correct operation and verify screenings are being removed. Check & clean any obstructions impeding the operation of screen mechanisms.	X	
d)	Check screens bypass is available and clean	X	
e)	Clean area around screen. Check & clean screen panels of any obstructions.		x
f)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action to replace them if needed. Inspect grease pots and fill them when level is below the standard. Use grease nipples to lubricate required parts of screen.	X	
g)	Visually check unit and its associated equipment for the following: Safety & security with all panels locked & guards secure and in good condition. Excessive noise or vibration Overheating External damage, leaks, missing fixings Where applicable, ensure main and brush drives turn and that brushes are spinning	X	
h)	Check operation of wash water system for screens Ensure wash water pressure of spray bar is correct. Check the inline filter is present, clean and feeding the spray bars (where applicable). Check the spray bar pattern and clean the spray bar nozzles as required.	X	
i)	Check & clean accumulation of screenings and fat from debris disposal mechanism Check & clean launder chutes and channels for accumulation of grit, sand, rag, fat,	X	
j)	Check the lip, labyrinth or other seals between the screen and the channel wall are making an effective seal.	X	
k)	Visual check on the screenings removal brushes for blinding and wear.	X	

ID	Instruction	Daily	Weekly
	Clean the brushes as required. Ensure the brushes are in correct contact with the screen and that screenings are being removed.		
l)	Check and clean instrumentation probes, floats and ultrasonic heads (where applicable).	X	
2.4	**Screenings handling**	Daily	Weekly
a)	Check control system and amps on panel for normal levels / operation, take appropriate action as required. Jumping amps indicates a blockage.	X	
b)	Where installed, visual check for normal operation of macerator. Look for visible blockages/build up on unit, high flows in front of macerator. Listen for unusual noise. Take appropriate action as required.	X	
c)	Where installed, check and empty stone trap.	X	
d)	Clean area around screenings handling units and skips.		X
e)	Check operation of wash water system for screenings handling. Check the inline wash water filter is present, clean and feeding the spray bars (where applicable Ensure wash water pressure of spray bar is correct. Check the inline filter is present, clean and feeding the spray bars (where applicable). Check the spray bar pattern and clean the spray bar nozzles as required.	X	
f)	Check screenings product quality and quantity, Check level of screenings in skip and change skip when full.	X	
g)	Check operation of auto drain.		x
h)	Where installed check operation of the trough desludge system. Check for grit build-up in trough - hose out where required.		x
i)	Visual check on condition and operation of brushes (ensure trough is being cleaned). If blinding occurs regularly have wear on screw brushes checked.		x
j)	Check screw conveyor and brushes for wear and central running.		x
k)	Clean and check mesh for blinding and hairpinning.		x
2.5	**Grit removal**	Daily	Weekly
a)	Check mechanical plant is operating correctly. Check equipment– Compressor, Rake, Detritor & Pista grit.	X	
b)	Check manually de-gritted constant velocity channels for build-up of grit, take appropriate action as required.	X	
c)	Check inflow and outflow for normal rate of flow and correct distribution.	X	

ID	Instruction	Daily	Weekly
d)	Check volume, dryness and quality of grit produced.	X	
e)	Remove rag from the areas around baffles and mechanical equipment	X	
f)	Log manual de-gritting operations where required.	X	
g)	Log abnormal grit volumes.	X	
h)	Clean grit channel as required. Check grit build up in inlet channels and clean out if necessary.		X
i)	Check operation of wash water system and check the inline filter is present, clean and feeding the spray bars (where applicable)	X	
j)	Check aerated grit channels for air flow and bubble pattern (where applicable).	X	
2.5	Skips	Daily	Weekly
a)	Check skip capacity is adequate, and inform contractor when skip is full.	X	
b)	Rake skip where required.	X	
c)	Remove excess water if there is a facility to do so.	X	
d)	Ensure only prescribed material is in the skip. Remove any materials not prescribed.	X	
2.6	Storm separation and treatment	Daily	Weekly
a)	Check Flow To Full Treatment penstock is set at correct level.	X	
b)	Check storm return system is operational, manually return storm contents where required.	X	
c)	Check storm tanks cleaning system, check level sensors, check tanks are clean and empty outside of storm conditions.	X	
d)	Check and clear storm screens where required. (automatic clearance and manual clearance linked to safe system of work)	X	
e)	Check screens bypass is available and clean	X	
f)	Check and clear/replace any outlet screening sacks		X
g)	Check separation weirs and clean where required.		X
h)	During storm check that the flow to treatment is normal. (Treating Flow To Full Treatment)		X
i)	Log abnormal flows. Log storm discharge flows. Log storm flows in dry weather conditions.		X
j)	Log storm events.		X
k)	Remove any debris in the system.		X

ID	Instruction	Daily	Weekly
l)	Storm LTA – Visually check area is clean and operating within site parameters. Remove any debris.		X
m)	Storm LTA – Check for short circuiting during operation. Inspect banks for leakage		X
2.7	**Flow measurement**	Daily	Weekly
a)	Check site is within flow permit (treating Flow To Full Treatment before going to storm). Check that flow is going through site as expected.	X	
b)	Check flow meter and flume and clean where required	X	
c)	MCERTS – Log & record flow meter readings	X	
d)	Check EDM (Event Duration Monitor) sensor is clean and weir is free of debris	X	
3	**Primary Treatment- Primary Settlement Tanks**	Daily	Weekly
a)	Check and log sludge level by dipping tanks (Mon/Wed/Fri)	X	
b)	Check bridge/scraper operation	X	
c)	Check de-sludge pump(s) and timer for normal operation	X	
d)	Check scum boards for breaks or carry under	X	
e)	Check scum trap for normal operation and clean/hose out	X	
f)	Check settled sewage quality (visual check only)	X	
g)	Check stilling chamber for rag, clear as necessary	X	
4	**Secondary Treatment**		
4.1	**Secondary Treatment – Activated Sludge**	Daily	Weekly
a)	Check air filters indicators for normal readings. Check blower control panel. Check the blowers for normal operation. Check there are no illuminated fault lights.	X	
b)	Check and record dissolved oxygen (D.O) readings, where probes are installed.	X	
c)	Sample, measure and record Mixed Liquor Suspended Solids (MLSS) /RASS concentration and sludge settleability (Stirred Specific Volume Index) (SSVI), (Monday/Wednesday/Friday)	X	
d)	Vent condensate from air lines		X
e)	Check SAS pump(s) are operating correctly	X	
f)	Check and record sludge return from the final settlement tanks (RAS rate)	X	
g)	Check D.O probe and / or timers are carrying out the correct control functions. Aeration control function.	X	

ID	Instruction	Daily	Weekly
h)	Check flow distribution to aeration lanes if more than one lane present	X	
i)	Log changes to RAS rate, Log flows (where meters are fitted), Log KWh, Log SAS Rate.	X	
j)	Check and record bubble pattern and size of the bubbles	X	
k)	Check mixers for rotation in anoxic (un-aerated) zones	X	
l)	Check recycle pumps are running, as required (Biological Nutrient Removal -BNR plants)		X
m)	Check redox monitor is operating correctly (BNR plants)		X
n)	Check VFA / liquor return (BNR plants)		X
o)	Check and record rate and frequency of SAS removal	X	
p)	Withdraw the D/O probe from the tank and remove clean		X
4.2	**Secondary Treatment – Biological Filters**	Daily	Weekly
a)	Visually check for correct flow distribution across the filter (radial distribution)	X	
b)	Keep filter surface clear of all debris and any significant moss or weed growth. Deal with ponding as appropriate.	X	
c)	Where recirculation is installed, check for normal operation at the correct flow rate	X	
d)	Check all air vents and under drains are clear and not flooded	X	
e)	Clear distribution arm orifices and or weir plates of debris	X	
f)	Remove end caps and rod/flush arms - clear debris from open channel arms	X	
g)	Check for appropriate flow distribution between filters to suit filter size	X	
h)	Check operation of distributor arms (uniform speed of rotation)	X	
i)	Check for leakage at the centre column seals and end caps. Short circuiting etc.	X	
j)	Check rotation timer. Check alignment of rotation alarm sensor and target plate	X	
5	**Secondary Settlement – Humus Tanks / Final Settlement Tanks**	Daily	Weekly
a)	Check correct operation of desludging pump(s) or valve(s)	X	
b)	Check scraper/bridge operation where installed	X	
c)	Check and log blanket level with portable blanket meter where detectors not fitted. (Monday, Wednesday, Friday)	X	

ID	Instruction	Daily	Weekly
d)	Check tank surface for buildup of floating debris. Visually check effluent quality over the weir for solids carry over	X	
e)	Check RAS pump(s) are operating correctly (FSTs only)	X	
f)	Check Bellmouth and de-rag where required	X	
g)	Check effectiveness of weir brushes, chains, "other systems" where fitted	X	
h)	Check scum boards for breaks or carry under	X	
i)	Check scum removal system for correct operation, clear any fouling where necessary	X	
j)	Check flow of recirculation bleed back/constant draw off where used	X	
k)	Check operation of fixed blanket detectors and alarms		X
l)	Check operation of Mallard pump by test running in hand, where installed		X
m)	Clear overflow weirs and launder channels of any build-up that will affect the tanks or effluent performance	X	
6	**Chemical Dosing**	Daily	Weekly
a)	Check that chemical is discharging, rather than dosing pump running dry (any nozzles blocked?)	X	
b)	Check chemical storage tank level - reorder as required. Log level in storage tank, Log discharge rate.		2 days a week
c)	Check for excessive vibration in the dosing pump		2 days a week
d)	Check the level in the internal bund and empty as required. Report any abnormalities.		2 days a week
e)	Visual check for leaks on tanks and visible chemical lines		2 days a week
f)	Check the trace heating system		2 days a week
g)	Check external storage tank bund for rainwater and/or chemical. Empty as appropriate.		X
7	**Tertiary Treatment**		
7.1	**Low Head Sand Filter**	Daily	Weekly
a)	Check smooth movement of bridge, unusual sounds and vibrations, and abnormal flow patterns	X	
b)	Check water level in each filter, compare with other units and relate to flow rate, and last backwash	X	
c)	Check unit isn't in bypass	X	

ID	Instruction	Daily	Weekly
d)	Check for evidence of chemical leaks	X	
e)	Check cleanliness of carriage & filter area	X	
f)	Check sodium hypochlorite level in the bridge tanks where fitted and fill from bulk tank	X	
g)	Check sodium hypochlorite bulk tank level	X	
h)	Check the amount of sand in the wash water	X	
i)	Check the colour of the backwash water	X	
j)	Check the correct amount of hypochlorite is being dosed	X	
k)	Check water level in each filter, compare with other units and relate to flow rate, and last backwash	X	
l)	Log backwash timer settings and head loss	X	
m)	Log flows and flow rate, where meters are fitted	X	
n)	Clean the level sensor head		X
o)	Log clarity of feed (compare with final effluent)	X	
7.2	**Disc Filter**	Daily	Weekly
a)	Log backwash pressure	X	
b)	Check frequency of backwash is within correct range		X
c)	Check bypass is not working during normal operations	X	
d)	Check depth in and out of the drum for normal operation	X	
e)	Check drum is rotating in correct mode and sounds normal	X	
f)	Check all ancillaries are operating normally	X	
g)	Log flows and flow rate where meters are fitted	X	
h)	Sample and record turbidity on feed (compare with final effluent)	X	
i)	Inspect inside filter for large pieces of debris		X
j)	Check for accumulation of weed in backwash trough		X
k)	Check and clean backwash water strainer.		X
l)	Check for soundness of mesh panels by lifting inspection panels		X
m)	Check wash water pressure and nozzles for normal operation		X
8	**Raw Sludge Holding & Thickening**		
8.1	**Sludge Holding Tanks**	Daily	Weekly
a)	Check mixing regime is correct	X	
b)	Log levels in tank(s)	X	

ID	Instruction	Daily	Weekly
c)	Decant liquors	X	
d)	Check tank(s) for ragging and blockages and clear or remove (where safe access is possible)	X	
e)	Check that holes on sludge cage(s) are clear where fitted, Clean sludge cage(s) dewatering holes (where safe access is possible)	X	
f)	Log tanker movements and compare with schedule	X	
g)	Ensure any crust build up does not interfere with any control equipment/alarm floats	X	
8.2	**Picket Fence Thickener**	Daily	Weekly
a)	Check fence is rotating & "stop, look, listen," for mechanical issues.	X	
b)	Check weir overflow quality and the surface of the unit. Clear any buildup of debris	X	
c)	Log blanket measurements / pump timers	X	
d)	Sample from discharge pump (run manually if necessary) and assess product quality. Sample, analyse and record % dry solids entering the PFT. Sample, analyse and record % dry solids out (Monday, Wednesday, Friday)	X	
e)	Check control system is operating normally	X	
f)	Log any changes to settings or duty	X	
g)	Log sludge flows in (where meters fitted) and out	X	
h)	Visually assess the dry solids & flow entering the PFT	X	
i)	Log hours run meters	X	
j)	Remove buildup of debris on the rake	X	
8.3	**Belt Thickeners**	Daily	Weekly
a)	Check for good floc formation. Check sludge on the top belt and assess the conditioning of the sludge. Check belt drainage and filtrate quality	X	
b)	Check product quality & quantity. Check condition of hopper	X	
c)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	X	
d)	Sample, analyse & record % Dry Solids on feed and sludge/cake (Monday, Wednesday, Friday)	X	
e)	Check sludge feed rate and log	X	
f)	Check poly dosing system. Log polymer usage, note each bag change/delivery. Make adjustments to optimise	X	
g)	Ensure wash water pressure is available at a minimum of 6 bar	X	

ID	Instruction	Daily	Weekly
h)	Clean belt steering paddles and check they are functioning correctly	X	
i)	Clean hopper level probes and check they are functioning correctly	X	
j)	Wash Station - Check formation of spraying fans, rotate internal brush to clean spray nozzles. (Minimum twice daily)	X	
k)	Visual Check - Hydraulic Power Pack - Check oil level and top up using clean equipment and fresh oil as required, maintain as close to full level as possible. Oil level must not be allowed to fall below 3/4 as this will cause serious damage	X	
l)	Jet wash clean the belt filter.	X	
m)	Use low pressure water hose to clean complete machine, frame, rollers and hoppers.	X	
n)	Check condition of Belt Filter for blinding / blockages / good filtration	X	
o)	High pressure steam clean the belt from underside.		X
p)	High pressure steam clean complete machine, frame rollers and hoppers avoiding all electrical and instrumentation equipment		X
q)	Check condition of Belt Filter for wear i.e. Creasing / condition of seam to avoid failure / breakage and damage to other components		X
8.4	**Drum Thickeners**	Daily	Weekly
a)	Check for good floc formation. Check sludge feed rate. Check product thickness (visually). Check filtrate quality	X	
b)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	X	
c)	Sample for % dry solids analysis and record (Monday, Wednesday, Friday)	X	
d)	Check spray bar nozzles to ensure they are clear and spraying correctly. Check spray bar wash water pressure	X	
e)	Clean probes in discharge hopper, hose down and carry out cleaning duties	X	
f)	Log polyelectrolyte used – each drum/bag change	X	
g)	Log sludge inlet flow meter, monitor throughput	X	
h)	Check & clean flocculator tanks		X
i)	Check appearance of mesh, adjust cleaning and cleaning pause intervals if necessary.	X	
j)	Clean dry solids monitors sensors		X
k)	Clean foot valves on washwater suction lines		X

ID	Instruction	Daily	Weekly
l)	Clean mechanical filter on washwater booster set		X
m)	Clean washwater booster secondary screen in channel		X
n)	Jet/remove fat deposits from thickened sludge discharge pipework		X
o)	Log hours run		X
9	**Odour Control**	**Daily**	**Weekly**
	Tasks for all Odour Control Units		
a)	Check covers, hatches and doors are closed	X	
b)	Confirm duty fan running and standby fan availability	X	
c)	Check damper position to ensure they have not been tampered with	X	
d)	Check ductwork for any signs of damage or leaks	X	
	Specific tasks for Biofilter OCU		
e)	Check the spray pattern from the irrigation nozzles and clean nozzles where required. (If possible)	X	
f)	Check for free discharge of effluent water to drain	X	
g)	Check for free discharge on any condensate removal points	X	
	Specific tasks for Chemical Scrubber OCU		
h)	Check water softener availability, check salt reservoir level, and top up if required.	X	
i)	Check stocks in bulk chemical tanks and reorder if required – tanker delivery	X	
j)	Check that the Redox and pH are within the agreed range – on dosing skid	X	
k)	Check duty and standby dosing pumps are available for each bulk chemical	X	
l)	Check the duty scrubber liquor recirculation pump is running and the standby is available in auto	X	
m)	Check that there is free drainage of scrubber blow-down liquor to drain	X	
n)	Check differential pressure gauges are within design range (if fitted)	X	
o)	General check for leaks in the scrubber liquor recirculation and dosing system – raise follow on work if any defects are identified	X	
	Specific tasks for Carbon OCU		

ID	Instruction	Daily	Weekly
p)	Examine ductwork for any signs of damage or leaks and check trapped condensate drains are free flowing. If a manual drain valve is provided, operate the valve until the flow of condensate ceases and leave valve in closed position.	X	
q)	Check differential pressure gauge for over-pressure (if provided) – indicates media fouling	X	
10	**On Site Pumping**	Daily	Weekly
a)	Pumping System(s) (Drainage, Interstage, Washwater, Recirculation, Return Liquors etc.) operating correctly?	X	
b)	Check Ammeter reading - too high could indicate a blockage. Too low could indicate an air lock or impeller damage.	X	
c)	Check the well level is within the normal operating limits - taking into account the flow conditions at the time. If level is too low or high, this could indicate control issues or pumping issues.		
d)	Check condition of the wet well- does it have more than the usual scum or debris floating on top that will indicate the need for a wet well clean?		
e)	Check fault light(s) are not on	X	
f)	Check flow rate (where meter is fitted); is it within the normal operating range?	X	
g)	Check for undue pump noise and vibration by safely touching the lifting chain or guide rail.	X	
h)	Check non-return valve. Non return valves prevent water from flowing back through the pump when it is not in operation. If a weighted arm is fitted, is it at the usual angle? If it is low and chattering it could indicate the pump is blocked	X	
i)	Check operation of the ultrasonic level gauge. Is it reading correctly? Compare the well level with the normal readout from the display.	X	
j)	Check pumps, pipelines and couplings for leaks. Check for visible leaks.	X	
k)	Start the cleaning cycle manually where required	X	
l)	Pumps - Log hours run	X	
m)	Pumps - Log kWhrs	X	
n)	Check hard wired control floats - are floats weighed down with rag or debris preventing them from lifting if the water level rises.	X	
o)	**Washwater Pumping** - Check the pipe line pressure from a gauge (where installed) on the pressure vessel or the pipe line manifold. Possible indication of strainer blockage	X	

ID	Instruction	Daily	Weekly
p)	**Washwater Pumping** - Check operation of surge vessels (where installed).	X	
q)	**Washwater Pumping** - Check the strainers. If necessary, put automatic strainers in manual clean and inspect the manual strainers where local conditions allow.	X	
r)	**Washwater Pumping** - Check automatic filters are operating correctly	X	
11	**Distribution Chambers**	Daily	Weekly
a)	Inspect all weirs and brush clean. Remove any debris, scum, algal growth, blanket weed, grit, etc. from the chamber. Check flow split is correct.	X	
b)	Ensure any rag is removed, especially from around the penstocks, gate valves and their spindles. Ensure none of this passes over the weir.	X	
c)	Check that all valve, penstock and weir operating positions are correctly set.	X	
d)	Check chamber for any visible leaks	X	

Appendix 6. Sludge Rounds

	Instruction	Daily	Weekly
1	**Liquid Sludge Import Facilities**	Daily	Weekly
a)	Check sludge logger device is fully operational	**X**	
b)	Check that the pattern of imports is in line with site requirements/agreement with tanker operators.	**X**	
c)	Check general area is clean and tidy	**X**	
d)	Check reception tank for rag/grit build up		**X**
2	**Sludge Screen**	Daily	Weekly
a)	Check sludge screen operation	**X**	
b)	Check screened sludge quality	**X**	
c)	Check / clean moisture sensor	**X**	
d)	Visually check unit and its associated equipment for the following: Safety & security with all panels locked & guards secure and in good condition. Excessive noise or vibration Overheating External damage, leaks, missing fixings	**X**	
e)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action to replace them if needed. Inspect grease pots and fill them when level is below the standard. Use grease nipples to lubricate required parts of screen.	**X**	
f)	Carry out checks on cold weather operation systems before frost sets in	**X**	
g)	Check screenings quality & quantity		**X**
h)	Check general area is clean and tidy		**X**
i)	Check washwater is operating correctly during period of sludge discharge Ensure wash water pressure of spray bar is correct. Check the inline filter is present, clean and feeding the spray bars (where applicable). Check the spray bar pattern and clean the spray bar nozzles as required.		**X**
j)	Clean steel probes on rotamat screen		**X**

	Instruction	Daily	Weekly
3	**Sludge Buffer & Blending Tanks** "Sludge Blending Tank" refers to a tank, into which more than one type of sludge is fed, requiring mixing: normally immediately prior to sludge digestion or dewatering. It may on some sites be referred to as a sludge holding tank or digester feed tank.	Daily	Weekly
a)	Check that mixer is operating correctly. Mixers are normally inhibited if the sludge level falls below a set level to protect the impellor, pump or blower.	X	
b)	Check for signs of stratification or poor mixing and rectify where necessary	X	
c)	Check pH and if less than 5 attempt to reduce septicity and freshen sludge	X	
d)	Check for ragging and blockages and clear or remove (where safe access is possible)	X	
e)	Check amps on mixer motor		X
f)	Check tank control system		X
4	**Sludge Treatment Inter Process Pumping**	Daily	Weekly
a)	Check Ammeter reading, Too high could indicate a blockage. Too low could indicate an air lock or impeller damage. Where reading is unusual ensure appropriate action is taken.	X	
b)	Check flow rate (where meter is fitted); Is it within the normal operating range?	X	
c)	Check the well level is within the normal operating limits taking into account the flow conditions at the time. If level is too low or high, this could indicate control issues or pumping issues.	X	
d)	Check operation of the ultrasonic level gauge. Is it reading correctly? Compare the well level with the normal readout from the display.	X	
e)	Listen for undue pump noise and check for undue vibration by safely touching the lifting chain or guide rail.	X	
f)	Check pumps, pipelines and couplings for visible leaks	X	
g)	Check non-return valve is operating correctly Non return valves prevent water from flowing back through the pump when it is not in operation.	X	

	Instruction	Daily	Weekly
	If a weighted arm is fitted is it at the usual angle? If it is low and chattering it could indicate the pump is blocked.		
5	**Pasteurisation**	Daily	Weekly
a)	Check batch rates according to sludge levels	**X**	
b)	Check digester temperatures in relation to pasteurisation plant	**X**	
c)	Check hmi panel	**X**	
d)	Check operation of biotherm reactor aeration blower package.	**X**	
e)	Check heat exchanger performance	**X**	
f)	Check digested sludge buffer tanks	**X**	
g)	Check blended sludge buffer tanks	**X**	
h)	Check operation of biotherm reactor mixer	**X**	
i)	Check operation of heat exchanger mixer	**X**	
j)	Check operation of scum cutter	**X**	
k)	Check pump and valve operation	**X**	
l)	Log and record flows, pressures and temperatures	**X**	
m)	Check % ds of feed sludge to pasteurisation plant (Monday, Wednesday, Friday)	**X**	
n)	Check, remove and clean temperature probe		**X**
6	**Primary Sludge Digestion**	Daily	Weekly
a)	Check sludge discharge to limpet chambers, where installed. Clear any blockages	**X**	
b)	Check digester feed system is working Clear any blockages	**X**	
c)	Check digester heating system is working & temperatures are within HACCP range.	**X**	
d)	Check digester mixing system is operating correctly	**X**	
e)	Log digester temperatures (HACCP) Log inlet and outlet temperatures of each boiler Log inlet and outlet temperatures of sludge and water in heat exchangers	**X**	
f)	Log sludge feed volumes into each digester and establish the retention time (HACCP)	**X**	
g)	Check operation of sludge and water recirculation pumps	**X**	

	Instruction	Daily	Weekly
	Check pumps, pipelines and couplings for leaks where possible.		
h)	Monitor water supply where glycol is not used to heat exchanges that are exposed to elements, Ensure water is drained when heat exchanges are not in use.	X	
i)	Log use of secondary fuel within boilers.	X	
j)	Sample sludge into and out of digester. Analyse and record % dry solids. (Monday, Wednesday, Friday.) Analyse and record % volatile matter. (3 times a week Monday – Thursday)	X	
k)	Check digesters for foaming on the top.		X
l)	Remove grit from base of digester if facility is provided. **Do not** leave grit removal operation unattended and ensure valve is fully closed before leaving task.		X
m)	Sample, measure and record pH of digested sludge		X
7	**Secondary Sludge Digestion**	Daily	Weekly
a)	Check mixing system, for short-circuiting or separation, Mix before transfer to the next process, where facilities exist	X	
b)	Decant supernatant liquor when required	X	
c)	Log status of each tank	X	
d)	Record number of day's storage	X	
8	**Biogas Handling, Storage, & Utilisation.**	Daily	Weekly
a)	Check all condensate traps manually and drain or top up if necessary. This check is required **twice daily** in prolonged periods of warm weather. Check automatic u-tubes visually, to ensure that there are no gas leaks or freezing Check automatic drain traps working correctly. Use manual drains if automatic drains not working, report defects	X	
b)	Check glycol pressure relief valve and ensure liquid level visible in sight glass	X	
c)	Check pressure/vacuum relief (whessoe) valves are not passing biogas. Listen for gas passing, note any unusual smell, visual check of valve.	X	
d)	Check for genuine operation of flare stack / waste gas burner, e.g. chp is at full power and there is excessive gas make	X	

	Instruction	Daily	Weekly
e)	Check and record dehumidifier temperature	X	
f)	Log gas volumes: produced, flared, to chp, to boilers	X	
g)	Sample, monitor & record methane composition of biogas	X	
h)	Manually check gas isolation valve handle operation by closing & opening valve.		X
9	**CHP & Biogas Power Management**	Daily	Weekly
a)	Check automatic drain traps working correctly. Use manual drains if automatic drains not working, report defects	X	
b)	Check for genuine operation of flare stack / waste gas burner, e.g. CHP is at full power and there is excessive gas make	X	
c)	Check glycol pressure relief valve and ensure liquid level visible in sight glass	X	
d)	Check & log hours run	X	
e)	Check & log kwh exported (where relevant)	X	
f)	Check & log kwh generated	X	
g)	Check & log kwh used on site	X	
h)	Check & log use of secondary fuel	X	
i)	Check & log gas used	X	
j)	Check & log heat liberated from engine, heat dumped, heat liberated from boilers	X	
k)	Check & log engine temperatures and pressures, by exception	X	
l)	Check & log gas stream for methane composition		X
m)	Check automatic u-tubes to ensure that there are no gas leaks or freezing		X
n)	Check pressure/vacuum relief (whessoe) valves are not passing biogas. Listen for gas passing, note any unusual smell, visual check of valve.	X	
10	**Liquor Treatment**	Daily	Weekly
a)	Check return liquors and return rate	X	
11	**Chemical Dosing**	Daily	Weekly
a)	Check that chemical is discharging, not just dosing pump running (any nozzles blocked?)	X	
b)	Check chemical storage tank level - reorder as required	X	

	Instruction	Daily	Weekly
c)	Check for excessive vibration in the dosing pump	X	
d)	Check the level in the internal bund and empty as required	X	
e)	Check for leaks on visible chemical lines	X	
f)	Check the trace heating system	X	
g)	Check external storage tank bund for rainwater and/or chemical. Empty as appropriate.		X
h)	Check the correct amount of chemical is being delivered for the conditions		X
i)	Check storage tank can take delivery before delivering		X
12	**Sludge Dewatering – Belt Press**	Daily	Weekly
a)	Check poly dosing system, Log polymer usage, note each bag change/delivery, Make adjustments to optimize	X	-
b)	Check sludge feed rate and log	X	
c)	Check sludge on the top belt and assess the conditioning of the sludge, Check belt drainage and filtrate quality	X	
d)	Check product quality & quantity, Check condition of stockpile	X	
e)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	X	
f)	Ensure wash water pressure is available at a minimum of 6 bar	X	
g)	Clean belt steering paddles and check they are functioning correctly	X	
h)	Clean hopper level probes and check they are functioning correctly	X	
i)	Wash station - check formation of spraying fans, rotate internal brush to clean spray nozzles. (minimum twice daily)	X	
j)	Visual Check - Hydraulic power pack - check oil level top up using clean equipment and fresh oil as required, maintain as close to full level as possible. Oil level must not be allowed to fall below 3/4 as this will cause serious damage	X	
k)	Jet wash clean the belt filter.	X	
l)	Use low pressure water hose to clean complete machine, frame, rollers and hoppers.	X	
m)	Check condition of belt filter for blinding / blockages / good filtration	X	

	Instruction	Daily	Weekly
n)	Steering flaps - check condition and correct operation for activation of the hydraulic steering mechanism and check for wear and replace as required	X	
o)	Sample, analyse & record % dry solids on feed and cake, (Monday, Wednesday, Friday)	X	
p)	High pressure steam clean the belt from underside.		X
q)	High pressure steam clean complete machine, frame rollers and hoppers avoiding all electrical and instrumentation equipment		X
r)	Check condition of belt filter for wear i.e. Creasing / condition of seam to avoid failure / breakage and damage to other components		X
13	**Sludge Dewatering – Centrifuge**	Daily	Weekly
a)	Check condition of stockpile, Check quality of product	X	
b)	Check kwh, amps and hours run	X	
c)	Check poly dosing system	X	
d)	Check quality of centrate	X	
e)	Check sludge feed rate, Check quality of product in feed	X	
f)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	X	
g)	Log hours run	X	
h)	Log kwh hours run	X	
i)	Log polymer usage, note each bag change/delivery	X	
j)	Log sludge flow rate	X	
k)	Log volume of cake produced	X	
l)	Make adjustments to get optimum throughput, product quality and poly dosing	X	
m)	Sample, analyse & record % dry solids on feed and cake (Monday, Wednesday, Friday)	X	
14	**Poly Make Up, Storage, & Dosing – Liquid**	Daily	Weekly
a)	Poly make up storage & dosing – liquid - check supply of polymer held in IBC; Top up, replace, order as appropriate	X	
b)	Liquid - check dosing pumps & settings	X	
c)	Liquid - check dilution water is available	X	

	Instruction	Daily	Weekly
d)	Liquid - clean up any spillages of liquid	X	
e)	Liquid - log usage of polymer i.e. IBCs level	X	
f)	Liquid - log settings of dosing pumps	X	
g)	Liquid - log type of polymer	X	
h)	Liquid - check polymer flowmeter pressure – if above 3 bar clean filter and mixer		X
i)	Liquid - check made up solution appears ok	X	
j)	Liquid - check bunded area for spillages	X	
15	**Poly Make Up, Storage, & Dosing – Powder**	Daily	Weekly
a)	Dry powder - check dosing pumps & settings	X	
b)	Dry powder - check supply of polymer held in silo; Top up, replace, order as appropriate	X	
c)	Dry powder - check bunded area for spillages	X	
d)	Dry powder - check dilution water	X	
e)	Dry powder - check dry room / silo is heated, dry and doors are closed	X	
f)	Dry powder - check made up solution appears ok	X	
g)	Dry powder - check polymer is dry and flowing, look at screw drive and discharge to wetted head – "JETWET"	X	
h)	Dry powder - clean up any spillages	X	
i)	Dry powder - log settings of dosing pumps	X	
j)	Dry powder - log type of polymer, check using correct polymer.	X	
k)	Dry powder - log usage of polymer i.e. bags used	X	
l)	Dry powder - check polymer flowmeter pressure – if above 3 bar clean filter and mixer		X
16	**Sludge Cake Transfer**	Daily	Weekly
a)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	X	
b)	Check conveyor rollers & keep clear	X	
c)	Check drive bearings for wear & operation	X	
d)	Check electric trip wire emergency stop wire	X	
e)	Keep general area clean. Clear up any spillages	X	

	Instruction	Daily	Weekly
f)	Check belt condition	X	
17	**Sludge Cake Storage**	Daily	Weekly
a)	Ensure silo not filled above 70% capacity. Inform Bio-recycling of any changes to sludge production.	X	
b)	Keep general area clean to minimise odour	X	
c)	Log & record each storage pad bay activity and status if applicable	X	
d)	Check wheel wash is operational	X	

Appendix 7. OCU Site Round

STK: OCU – Site Round – Odour Control	Date: 10/01/2017

The objective of this Site Round is to ensure that treatment processes are checked for effective operation as per the Site Operating Manual.

Any of the following checks that result in performance of the process outside of the limits defined in the SOM or a fault being detected will require an Operative to change the process to bring the plant back into acceptable limits or the fault needs to be logged and reported for follow up maintenance/repair.

ID	Instruction	Op
1	Comply with task list **IEMT000** general instructions	X
2	Check that any alarm indicators such as traffic lights are not in alarm condition.	X
	Tasks for all Odour Control Units	X
3	Check covers, hatches and doors are closed	X
4	Check ductwork for any signs of damage or leaks	X
5	Check damper position to ensure they have not been tampered with	X
6	Confirm duty fan running and standby fan availability	X
7	Check fan drive belt integrity, where practical. Or check for air movement by opening sample point checking for suction	X
	Specific tasks for Biofilter OCU	
8	Check the spray pattern from the irrigation nozzles and clean nozzles where required. (If possible)	X
9	Check for free discharge of effluent water to drain	X
10	Check for free discharge on any condensate removal points	X

	Specific tasks for Chemical Scrubber OCU	
11	Check water softener availability, check salt reservoir level, and top up if required.	X
12	Check stocks in bulk chemical tanks and reorder if required – tanker delivery	X
13	Check that the Redox and pH are within the agreed range – on dosing skid	X
14	Check duty and standby dosing pumps are available for each bulk chemical	X
15	Check the duty scrubber liquor recirculation pump is running and the standby is available in auto	X
16	Check that there is free drainage of scrubber blow-down liquor to drain	X
17	Check differential pressure gauges are within design range (if fitted)	X
18	General check for leaks in the scrubber liquor recirculation and dosing system – raise follow on work if any defects are identified	X
	Specific tasks for Carbon OCU	
19	Examine ductwork for any signs of damage or leaks and check trapped condensate drains are free flowing. If a manual drain valve is provided, operate the valve until the flow of condensate ceases and leave valve in closed position.	X
20	Check differential pressure gauge for over-pressure (if provided) – indicates media fouling	X
21	Complete site log book, any on site run charts and report any defects to line manager	X
	End of Document	

Appendix 8: Odour sniff testing protocol:

Purpose

Sniff testing is conducted to assist in managing odours to prevent or minimise the risk of adverse odour impact offsite.

Frequency

The procedure is to be undertaken in response to complaints or if a risk of odour nuisance at sensitive receptors is expected and/or has been substantiated.

Pre-requisites for the assessor

The assessment is undertaken by a member of staff trained in the procedure. The assessment in response to complaints will normally be carried out by someone not based on site. The member of staff will normally be office based rather than operations based. This means that their senses are less likely to become affected by any site odours.

Assessors must comply with the following:

- They should not consume strongly flavoured food or drink (this includes coffee) at least half an hour before conducting the assessment.
- They should not smoke at least half an hour before conducting the assessment.
- They should not consume confectionary or soft drinks must be avoided for the duration of the assessment.
- Scented toiletries including perfume, deodorant or aftershave should not be applied less than an hour before conducting the assessment.
- If the assessment requires travelling between locations in a vehicle, this vehicle must not contain deodorises / air fresheners.
- If the assessor has a cold, sore throat, or sinus trouble they should not conduct the assessment.

Prior to the commencement of the inspection, the operator shall check the weather data including the wind direction, wind speed, temperature and rainfall.

Odour complaint investigation

Where possible, odour complaints will be actively investigated by an assessor. Timely receipt of a complaint is essential if such investigations are to have any value.

At each location the following procedure is undertaken:

a. The assessor will stand facing the wind and breathe deeply, for a period of 3-5 minutes.
b. The following information is recorded using the odour monitoring form.
    i. Time, wind speed and direction, temperature, precipitation.
    ii. The type of any odour(s) detected.
    iii. The intensity of any odours detected on a scale of 0 to 6.
    iv. The persistence of the any odours detected i.e. constant or intermittent.
    v. The likely source of any odours detected (e.g. a specified onsite IED source, a specified non IED sources, offsite odour source, etc).
    vi. Any abnormal conditions on site that may account for the odour e.g. broken duct, open door, unusual operation, spillage etc.

The pre-requisites for assessors and monitoring approach are as defined in the sniff testing procedure with the following exceptions:

- The first assessment should be conducted at the complainant's location.
- If site odours are detected, the assessor shall move back towards the site, assessing potential odour sources within the Urban Waste Water Treatment (UWWT) and Sludge Treatment Centre (STC) processes and attempt to trace the odour to its source.
- On site operations shall also be reviewed to identify any abnormal site operations or activities that could be responsible for elevated odour levels.
- The sensitivity of the offsite location to odours should be recorded as a comment.

The findings of the investigation should be reported back to the Thames Customer Services Centre so that feed-back can be provided to the complainant.

Odour monitoring form

Date: _____ Assessor name: _____

Time	Location	Receptor sensitivity (off site locations only)	Wind speed & direction	Temperature (degrees)	Rainfall (y/n)	Odours detected (description)	Intensity (0 – 6)	Persistence (intermittent / constant)	Perceived source	Other comments

Intensity			**Receptor Sensitivity**
1 Very faint odour	3 Distinct odour	5 Very strong odour	Low (e.g. footpath, road)
2 Faint odour	4 Strong odour	6 Extremely strong odour	Medium (e.g. industrial or commercial workplace)
			High (e.g. housing, pub/hotel etc.)

---- End of OMP ----