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Asset Management
Asset Standard
Odour Management Plan

Beckton STW

BECKS1ZZ

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0 Document Control & Procedures

0.1 Contents

Figures and Tables:

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For further information/advice, please e-mail: am.standards@thameswater.co.uk.

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.

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1	First Edition-update	Steve Seddon	Becky Hind	April 2004
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2.0	For Submission (Planning Conditions)	Mohanlal Peiris	Alison Williams	Jan 2012

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6.0	Review and update of OMP	[redacted]	[redacted]	August 2017
7.0	Review and update of OMP	[redacted]	[redacted]	December 2020
8.0	IED Permit Application	[redacted]	[redacted]	January 2022
8.1	IED AD Permit Application Resubmission	[redacted]	[redacted]	December 2023

0.4 Sign Off

Area Operations Manager	[redacted]	Date: December 2023
Site Manager THP & SPG	[redacted]	Date: December 2023
Operations Manager Beckon	[redacted]	Date: December 2023

0.5 Glossary of Terms

TERM	DESCRIPTION
AD	Anaerobic Digestion
ASP	Activated Sludge Plant
BOP	Best Operating Practice
CHP	Combined Heat and Power
CSM	Customer and Stakeholder manager
DEFRA	Department for Environment, Food and Rural Affairs
DS	Dry Solids
EA	Environment Agency
EDF	Enhanced Digestion Facilities
EHO	Environmental Health Officer
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2016
FFT	Flow to Full Treatment
FST	Final Settlement Tank
H4	Environment Agency - How to comply with your permit – H4 Odour Management, March 2011
ICA	Instrumentation Control & Automation
IED	Industrial Emissions Directive
LBN	London Borough of Newham
NOS	Northern Outfall Sewer
OCU	Odour Control Unit
OMC	Operational Management Centre
OMP	Odour Management Plan
PFT	Picket Fence Thickener
PS	Pumping Station
PST	Primary Settlement Tank
RAS	Return Activated Sludge
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	SAP is the Thames Water IT system for all finance and HR electronic processes
SAS	Surplus Activated Sludge
SCADA	Supervisory Control And Data Acquisition
SOM	Site Operating Manual

TERM	DESCRIPTION
AD	Anaerobic Digestion
SPG	Sludge Powered Generator
STC	Sludge Treatment Centre
STW	Sewage Treatment Works
TCM	Technically Competent Manager
TDS	Tonnes of Dry Solids
THP	Thermal Hydrolysis Process
TM	Team Manager
TW	Thames Water
UWWTD	Urban Waste Water Treatment Directive

1 Introduction

This Odour Management Plan (OMP) forms part of the Beckton STW Best Operating Practice and is a constituent part of the Environmental Management System (EMS). Key related document are the Site Operating Manuals (SOM) – this document can be found as a hard copy in the Beckton 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 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 sources of odour from Beckton 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 2021 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 is stored electronically on SharePoint within the EMS page. 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.

2 Site Information

2.1 Location and Receptors

Site Address:

Beckton STW
Jenkins Lane
Barking
London
IG11 0AD
EPR Permit number: EPR/PB3238RK/V003
What 3 words: level.clubs.angle

Beckton STW is situated in East London in the London Borough of Newham on the north bank of the River Thames. The works serves the population of North London, including the London Boroughs of Hammersmith, Hampstead, Ealing, Hackney, Islington and Westminster. The catchment area serves a population equivalent of over 3.5 million people. In 1998 a sludge powered generator (SPG) plant was added to the site, which burns the sludge and uses the heat to generate electricity for the site.

(For Site Location Map see Appendix 4.)

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 have the potential to be affected by odour.

Until recently the area around the site has been industrial. However, the area has been regenerated over recent years, with retail parks, trading estates and business centres and new residential areas constructed and planned. The distance of some receptors from the site boundary is summarised in Table 2.1 below:

Table 2.1 - Location of potentially sensitive odour receptors.

Receptor Number	Receptor Address	Receptor type	Approximate distance to the nearest site boundary (m)	Direction from the site.	Receptor Sensitivity
1	Beckton Creekside Nature Reserve	Nature reserve	At boundary	North East	Low
2	East Beckton Nature Reserve	Nature Reserve	At boundary	North west	Low
3	Barking Creek Barrier	Historical landmark	On boundary	South East	Low
4	River Roding	River	On Boundary	East	Low
5	River Thames	River	On Boundary	South	Low
6	Gallions Reach shopping park	Commercial	100	South West	Medium
7	Gemini Business Park	Commercial	100	South	Medium
8	Jenkins Lane	Waste management and industrial	100	North West	Medium
9	River Road	Industrial and commercial	150	East and South East	Medium

10	The discovery centre	Events Centre	200	North West	Medium
11	Gateway retail park	Commercial	200	West	Medium
12	Power league Newham	Recreational	250	North West	Medium
13	Beckton Triangle Park	Commercial	250	West	Medium
14	Greenway walking trail	Walking trail	275	West and South west	Low
15	Strawberry Fields Day Nursery	School	300	North West	High
16	Beckton Gas Works	Industrial	400	South West	Medium
17	London industrial park	Industrial	400	South West	Medium
18	Travelodge London	Commercial	450	North	High
19	Thames Road	Industrial and commercial	450	East	Medium
20	Greatfields Park	Recreational	500	North East	Medium
21	Residential area surrounding A213	Residential and commercial	500	North and North West	High
22	Goosely playing fields	Recreational	530	West	Medium

23	Residential area surrounding Bastable Avenue	Residential and commercial	550	North East and East	High
24	Docklands Light Railway Ltd	Transport/Commercial	600	South West	Medium
25	Residential Areas surrounding Woolwich Manor Way	Residential and commercial	600	South West	High
26	Residential area surrounding Galleons drive	Residential	650	East	High
27	Old Pillbox	Historical landmark	700	South	Low
28	Greatfields School	School	750	North	High
29	Gallions Primary School	School	800	South West	High
30	Jenkins lane Sewage Works	Utilities	800	North West	Medium
31	Beckton Retail Park	Commercial	850	South West	Medium
32	East Ham Nature Reserve	Nature reserve	900	West	Low

33	Jenkins Lane Civic centre amenity site	Waste management	900	North West	Medium
34	Thames view playing fields	Recreational	900	East	Medium
35	Thames Path – Thamesmead	Walking area	1000	South	Low
36	Residential area surrounding High street South	Residential and commercial	1000	West and North West	High
37	Langdon Academy	School	1000	North West	High
38	Thames View Junior and Infant school	School	1000	East	High
39	Premier Inn London Beckton	Commercial	1100	South West	High
40	Beckton Light Rail Station	Transport	1100	South West	Medium
41	North Beckton Primary school	School	1100	South West	High
42	Gallions Reach Light Rail station	Transport	1150	South West	Medium

43	Cannon Retail Park	Commerical	1150	South East	Medium
44	Flanders playing fields	Recreational	1150	North West	Medium
45	Atlantis Avenue	Residential and Commercial	1200	South west	High
46	Ibis London and Premier Inn London Barking	Commercial	1200	North	High
47	The Ripple Nature Reserve	Nature resrve	1200	North East	Low
48	Asda Beckton	Supermarket	1250	South West	Medium
49	Windsor Primary School	School	1300	South West	High
50	Thamesmere Leisure Center	Commercial	1300	South East	Medium
51	Gallions Reach Park	Open Space	1300	South	Low
52	Thamesmead	Residential and commercial	1300	South and South West	High
53	Industrial estates surrouding Alfreds Way	Industrial	1300	East	Medium
54	Vicarage Field Shopping Centre	Commercial	1350	North	Medium
55	East London Gymnastic Centre	Recreational	1400	South West	Medium

56	Cyprus Light Rail Station	Transport	1400	South West	Medium
57	University of East London	University	1400	South West	High
58	Woolwich Polytechnic Schools (For Boys and For Girls)	Schools	1400	South East	High
59	East Ham Jewish Cemetery	Cemetery	1400	West	Low
60	Asda Barking Superstore	Commercial	1400	North	Medium
61	Royal Falcons FC	Recreational	1450	South West	Medium
62	Central park	Recreational	1450	North West	Medium
63	National Grid Substation - Barking	Utilities	1450	East	Medium
64	Linton Mead primary School	School	1500	South East	High
65	Tesco superstore	Commercial	1500	North	Medium
66	Eastbury primary school	School	1500	North East	High

67	Discovery Primary School	School	1550	South	High
78	Barking station	Transport	1550	North	Medium
69	Barking Road Recreation Ground	Recreational	1600	North West	Medium
70	Miers Close Wildlife Area	Wildlife area	1600	North West	Low
71	Eastbury community school	School	1600	North East	High
72	Rippleside cemetery	Cemetery	1600	North East	Low
73	Barking Hospital	Hospital	1650	North East	High
74	Beckton Park	Recreational	1700	South West	Medium
75	Hawksmoor School	School	1700	South East	High
76	Hertford Road	Commercial and industrial	1700	North	Medium
77	Riverside School	School	1700	East	High
78	Beckton Park Light Rail Station	Transport	1800	South west	Medium
79	Royal Albert Dock	Commercial	1800	South west	Medium
80	Newham college	College	1800	North West	High

81	Upney Station	Transport	1800	North east	Medium
82	Residential area surrounding High Street North	Residential and commercial	1850	North West	High
83	Brampton primary school – east ham and Brampton Park	School	1900	West	High
84	Barking Park	Recreational	1900	North	Medium
85	Altmore infant school	School	1950	North West	High
86	London City Airport	Transport	2000	South west	Medium
87	Mayesbrook Park	Open Space	2000	North East	Low

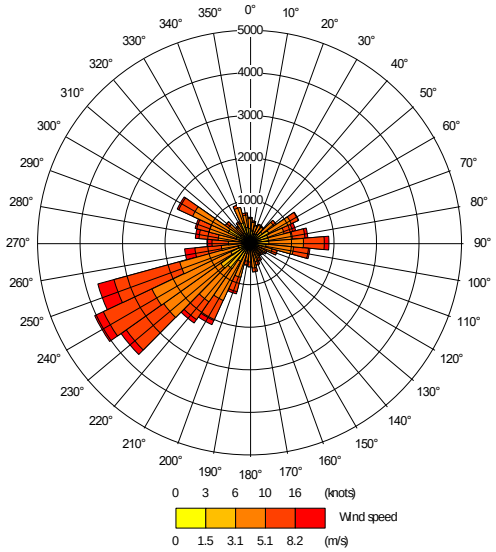
2.2 Off-site sources of odour

There is waste management and recycling centres in the area to the North West of the sewage treatment works. This off-site industrial activity has the potential to generate odour.

2.3 Wind Rose and Weather Monitoring

London/City Airport meteorological station (approximate location NGR E 543189 N 180444) is located approximately 2.5 km southwest 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.

Figure 2.31 London City Airport Wind Rose, 2016-2020



There is no on-site weather station at Beckton. Weather on site can be reviewed if complaints are received or during periods of abnormal operations. The internal ‘Weather’ SharePoint 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 Overview of Site Processes

2.5.0 UWWTD activities

Preliminary Treatment

The sewage that arrives at Beckton is mainly domestic, the remainder being made up of rainwater run off and a small proportion of industrial effluent. Sewage flows to Beckton STW through five (5No), 3.5m diameter sewers. The STC comprises offloading points for permitted imported waste close to the works inlet of the sewage treatment works.

The new effluent consent which comes into force in 2014 is for a maximum daily flow to treatment of 2,336,000 m^3/d (27m^3/s). The inlet works consists of 6 coarse screens that serve the adjacent 6 detritus channels. There is a minimum requirement for 3 detritus channels to be in use at any one time. 3 grit scraper bridges serve the detritus channels discharging to 3 enclosed Grit classifiers though a common feed arrangement. Screenings and grit discharged to bays are loaded on to skips for removal.

Flow for full treatment then passes to the fine screens. The existing inlet channels, grit channels and channels upstream of the fine screens are covered and odour controlled (March 2014).

At present, in the event of very high flows or an emergency situation flows in excess of the consented maximum flow to full treatment are diverted to three (3No) storm culverts known as storm barrels. The storm barrels are effectively an extension of the northern outfall sewer (NOS) to the River Thames and are separated from the storm overflow chamber by means of 3 no. storm overflow penstocks. An automatic control system controls the penstock opening subject to operator confirmation. The storm overflow chamber is covered and odour controlled.

Under normal circumstances the storm barrels are not used, but if required the storm barrels can also be used to provide limited storage of flows. This provides protection against on-site flooding prior to the screen house and/or surcharging of the NOS in the event of the fine screens failing during storm flows. Stored sewage is subsequently returned to treatment via the storm return Pumping Station (PS). Storm sewage may discharge to the River Thames via storm screens.

There are 3 no. 6mm screens for the storm sewage. Each screen can be isolated from the storm barrels by a penstock mounted just before the screen.

There are 8 operational fine screens for the main flow of sewage. The existing screens have been replaced with 6mm perforated plate escalator screens with a screenings washing system, compaction and automatic skip loading. Odour emissions are minimised by the use of this enclosed skip loading arrangement. Screens 7 and 8 can be bypassed in case of emergency to prevent flooding. There is a minimum requirement of 3 fine screens to be in service at any one time.

Storm flows stored within the Lee Tunnel storm storage system will be discharged to the inlet works from the Lee Tunnel pumping station, which is covered and odour controlled.

The Lee Tunnel also has an overflow shaft (located east of the existing digesters) and a submerged outfall to the Thames – to allow bypass of excess high flows to discharge to the River. The overflow shaft is covered and odour controlled. It should be noted that flows are fine screened before entering the Lee Tunnel at Abbey Mills.

Primary Treatment

Screened sewage is distributed to 16 no. conventional primary sedimentation tanks (PSTs). All 16 PSTs and the settled sewage channels from the PSTs to the Activated Sludge Plants (ASP) 2 & 3 have been covered and odour controlled under the PST Odour Control Project. The PST inlet feed channels from downstream of the fine screens process to the PSTs are covered and odour controlled under a separate project.

Secondary Treatment

Settled sewage discharges to the activated sludge plant (ASP) which is split into 3 areas: ASP2, ASP3 and ASP4. ASP2 has 6 no. aeration tanks and each tank consists of 8 lanes. ASP3 consists of 8 no. aeration tanks. ASP4 will have 6 no. aeration tanks consisting of 3 lanes with flows fed by a covered pumping station.

There will be a total of 88 no. circular final settlement tanks (FST), which are designed for the removal of solids from the effluent. The FSTs' have a slight conical base with a scraper, which constantly revolves and assists movement of the sludge to a central hopper. Settled activated sludge in some of the tanks is removed by air lift pumps. A proportion of this sludge (RAS) is recycled back to the aeration tanks in order to maintain optimum mixed liquor solids concentration. Surplus activated sludge is either a) pumped to the SAS thickening building for thickening and subsequent dewatering and incineration on site, b),pumped to the THP plant at Riverside, c) transferred to the onsite Enhanced Digestion Facilities.

Final effluent flows from the FSTs into the effluent channel, with flows from ASP4 discharging via a final effluent tunnel and separate channel into the effluent channel, before discharge to the River Thames, or Barking Creek (River Roding). Airlift pumps used at times of high tide.

2.5.1 Sludge Treatment Centre Permit Activities

The STC application includes treatment of both indigenous and imported sludges where Indigenous sludge are generated from the incoming flow to the STW which passes through the aerobic treatment process under the UWWTD and Imports of sludge from other works are delivered to a sludge offloading point into the THP High Energy Blending Tank. All such imports subject to appropriate waste pre-

acceptance and acceptance checks, prior to acceptance. Imported and indigenous sludges combine in the THP High Energy Blending Tank.
The STC comprises an offloading point for permitted imported tankered wastes to two import points near the Works Inlet where it combines with other sewer derived materials and is 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 points, which are both impermeable surfaced areas, equipped with sealed drainage.

Indigenous primary sludges derived from the main flow are transferred to the two Primary Sludge Buffer Tanks (which are outside of the scope of this permit) prior to transfer to The Primary Sludge Thickening Plant or Picket Fence Thickeners. Indigenous Surplus Activated Sludge (SAS) is pumped to a SAS Buffer Tanks (which are outside of the scope of this permit) before the sludge is thickened within the SAS Thickening Plant. Liquors are all returned to the Works Inlet via the site drainage system and Liquor Return Pumping Stations.

Thickened sludges are separately pumped to the Thickened Primary Sludge Buffer Tanks or the SAS Blending Tank prior to transfer to the Primary Sludge Blending Tanks where the sludge and SAS is blended prior to treatment. Sludge can also be transferred between the Primary Sludge Blending Tank and six Sludge Buffer Tanks, as required.

There are three routes for sludge treatment. Primarily thickened, blended sludge is subject to pre-treatment within a Thermal Hydrolysis Plant (THP) Process with the application of temperature and pressure, used to enhance the digestion of the sludge, in an enclosed and odour abated system. Sludges from the. Thickened Primary Sludge Buffer Tanks and the SAS Blending Tank are pumped via a series of tanks, via Sludge Screens and Pre THP Dewatering Plant to a THP Feed Silo. Sludge is then subject to the THP Process. From the THP Process, sludge is transferred through the THP Cooler to one of the six Primary Digester Tanks at the site. The Primary Digester Tanks are of concrete construction with membrane Biogas Storage holders in the headspace of each digester.

Following treatment over an appropriate number of days within the Primary Digester Tanks, digested sludge is transferred to two Digested Sludge Buffer Tanks. From these Digested Sludge Buffer Tanks, sludge is dewatered by Digested Sludge Dewatering Plant presses, before the dewatered sludge falls to the Cake Barn below. The Cake Barn, which is fully enclosed and subject to air extraction, stores the cake prior to removal from the site under the Sludge Use in Agriculture Regulations 1989 (SUiAR), and in accordance with the Biosolids Assurance Scheme (BAS). Liquor from the Digested Sludge Dewatering Presses gravitates to the Liquor Return Pumping Station 5 and is returned to the Works Inlet.

The second treatment route for thickened, blended sludge is via Beckton Sludge Powered Generator (SPG) at Beckton STW. Sludge is pumped from the Primary Sludge Blending Tank to the SPG. ~~This~~ operation is outside of the scope of the current permit variation application and operations are covered by a separate Environmental Permit, EPR/ZP3833BK~~.~~ The SPG is geographically and physically separated from the main AD processes on site.
~~t~~thickened, blended sludge can also be sent offsite via a rising sludge main. Thickened primary sludge or thickened SAS are removed from the Primary Sludge Blending Tank or SAS Blending Tank and subject to additional screening, prior to transfer to the Undigested Sludge Transfer Blending Tank and Undigested Sludge Transfer Buffer Tanks before being pumped offsite to the Riverside STC for treatment.

Biogas from the Primary Digester Tanks is captured and stored within roof mounted double membrane Biogas Storage holders in the headspace of each Primary Digester Tank. Biogas is used on site within the CHP engines, boilers or a waste gas burner (emergency flare). The biogas lines are fitted with condensate pots which captures entrained moisture for discharge to the site drainage. The Biogas

Storage holders are fitted with Pressure Release Valves (PRVs) as a safety precaution in the event of over pressurising the system.

Biogas is combusted within one of three CHP engines on site, generating electricity for use within the site, and heat is used within the THP boilers. These combustion assets are regulated under Environmental Permit EPR/PB3238RK/V003 as a s1.1A1 listed combustion plant activity due to their thermal input exceeding 50MWth. In the event that additional heating is required for the THP, this is provided by the two dual fuelled boilers. In the event there is excess biogas there is a ground mounted Emergency Flare, which is used during periods of essential maintenance and emergency use. This is utilised under 10% of the year or less than 876 hours per year.

3 Site Management Responsibilities and Procedures

3.1 Site Roles

Figure 3.1 - Site Roles

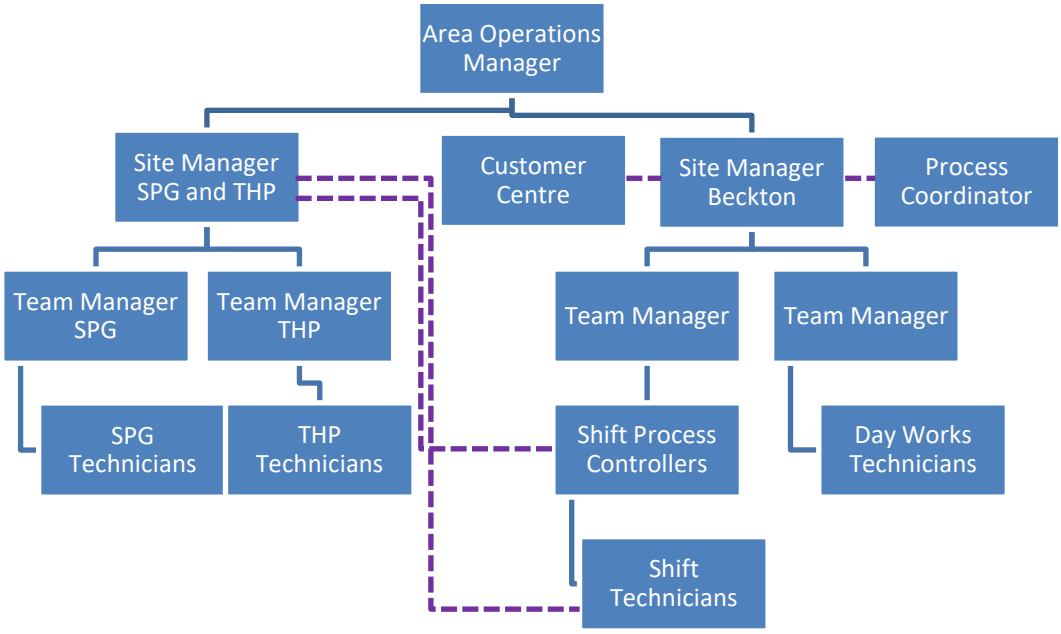


Table 3.1 - Tasks and Responsibilities

Role	Tasks and Responsibilities
Area Operations Manager	Responsible for Overall performance of Areas STW, SPG and EDF (including odour control and management). Coach and develop a Management team and provide a strategic approach to short, medium and long term planning.
Process Coordinator	Process monitoring, improvement and troubleshooting sewage treatment works.

Role	Tasks and Responsibilities
Performance Manager Beckton	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
Performance Manager Beckton SPG	Responsible for day-to-day operation of the Sludge Powered Generator.
Performance Manager Beckton THP	Responsible for day-to-day operation of the Enhanced Digestion Facility.
Technically Competent Manager	Hold the required WAMITAB qualification to support the activities on site under EPR, ensuring permit conditions are complied with.
Team Managers	Responsible for day-to-day operation and improvement of STW and SPG respectively.
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.
Shift Process Controllers	Responsible for day-to-day Process operation of STW.
Shift, SPG and THP Technicians	Day to day duties include maintaining and operating process equipment.
Day Works Technicians	Monitoring and recording of site data and operating Process plant.
Customer Contact Centre	Main contact for customer complaints, local Environmental Health Officers and Consumer Council for Water issues in Operational Area. Receives, records and passes complaints to the site team.

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

3.2 Key Contacts

Thames Water Website – www.thameswater.co.uk

Role	Name	Email address	Phone Number
Area Operations Manager	[redacted]	[redacted]	[redacted]

Role	Name	Email address	Phone Number
Operations Manager Beckton	[redacted]	[redacted]	[redacted]
Performance Manager THP & SPG	[redacted]	[redacted]	[redacted]
Customer Centre	Beckton STW	customer.feedback@thameswater.co.uk	0800 316 9800
Technically Competent Manager	[redacted]	[redacted]	[redacted]

3.3 Operator Training

All Technicians/operators have received training appropriate to their grade including Introduction to Sludge Processes which includes an element of training and assessment in the 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 where they are accessible by the site Performance Manager and individual members of staff.

4 Odour Critical Plant Operation, Monitoring and Management Procedures

Odour prevention and reduction is achieved at Beckton 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

Beckton has had 1 odour complaint in 2018, 2 complaints in 2019, 0 complaints in 2020 and 1 complaint in 2021, 1 formally recorded complaint 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 Tables 4.3-4.8.

4.2 Identification of Odour Critical Plant

Odour prevention and reduction is achieved at Beckton through at least an annual review of the Odour Risk Assessment, Odour Management plan and Odour improvement 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.

4.2.0 Odour Risk Assessment

The Odour Risk Assessment is not a 'one-off' exercise but an ongoing process, due to changes, both operational and capital, in the treatment plant. The Odour Risk Assessment is reviewed whenever the site undergoes an operational or capital change, which could 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 odour impact 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 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. No improvements are required under current operation at Riverside STW.
- The need for operational mitigation, improvement plans 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 Plant, 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 Beckton STW is included in Appendix 2.

4.2.1 Potential Odour sources

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

- Incoming sewers
- Works inlet pumping stations
- Pumped flows from lee tunnel
- Screenings
- Skips/wheelie bins
- Storm overflow Storm Barrels/Storm screens
- Cess Import Points
- Grit Removal Plant
- Primary Settlement Tanks
- Raw sludge pumps
- PST drainage pumping stations
- RAS and SAS pumping
- SAS buffer tank
- ASP Plant
- OCUs
- Final Settlement Tanks

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

- Sludge import
- Cess import
- Picket Fence Thickeners
- Raw sludge thickening building
- SAS Thickening Building
- Sludge blending
- Return liquors
- Thermal Hydrolysis Plant
- Primary Digestion
- Cake Barn
- Decommissioned digesters
- Buffer Tanks
- Odour Control Units
- SPG

4.2.2 Odour Critical Plant

The following list of odour critical plant has been identified during the risk assessment with current projects in progress:

- Cess imports
- Sludge imports
- PFTs
- Raw sludge thickening
- SAS buffer tank
- Sludge blending
- OCU failures

4.2.3 Waste Storage for Sludge Treatment Centre Permit

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.

Table 4.0 Sludge Treatment Centre Permit Tank Inventory

Tank Purpose	Number	Operational Volume (m^3)	Material	Average retention time (where applicable)
Picket Fence Thickeners	4	4,750	Concrete	2.5 days
Thickened Primary Sludge Buffer Tanks	2	200	Steel	3 days
Primary Sludge Blending Tank	1	3,500	Concrete	1 day
SAS Blending tank	1	3,500	Concrete	2.5 days
Sludge Buffer Tanks	6	4,750	Concrete	6 days
High Energy Blending Tank	1	30	Steel	<1 hour
THP High Energy Blending Tank	1	30	Steel	<1 hour
THP Sludge Blending Tanks	2	235	Steel	4.5 hours
Pre THP Dewatering Feed Tanks	2	183	Steel	3.5 hours
THP Feed Silo	2	85	Steel	7 hours
THP Process Tanks				
THP Pulper Tank	2	80	Steel	6. hours
THP Reactor Tank	6	40	Steel	5 hours
THP Flash Tank	2	80	Steel	3.5 hours
Primary Digester Tanks	6	3,965	Concrete	22 days
Digested Sludge Buffer Tanks	2	250	Steel	12 hours
Undigested Sludge Transfer Blending Tank	1	40	Steel	<1 hour
Undigested Sludge Transfer Buffer Tanks	2	250	Steel	4.5 hours
Drum Thickeners Polymer silo	1	20	Steel	NA
THP Centrifuge Polymer silo	1	30	Steel	NA

Filter Press Polymer silo	1	30	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	Cake Barn	1500	45 days	19 06 06	Point Source	Low
Biogas	See emissions point plan	Continuous operation	Continuous operation	N/A	Point Source	Low
Liquor	Site drainage	Continuously pumped to head of works	Continuously pumped to head of works	16 10 02	Diffuse	Low
Imported Sludge	THP High energy 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	Point Source (see OCU entry)	Medium
Primary Sludge	Primary sludge thickening plant Thickened primary 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	Point Source (see OCU entry)	Medium
Surplus Activated Sludge	SAS thickening plant SAS 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	Medium
Sludge screenings	Sludge screens within IED Boundary	-	-	19 08 01	Diffuse	Medium
Odour Control Units	See section 5	See section 5	See section 5	-	Point Source	Low/Medium

Table 4.2 Odorous raw materials for Sludge Treatment Centre Permit

Raw Material	Odorous	Storage	Mitigation	Odour Risk
1. Flopam FO4698SSH 2. Flopam FO5465AF 3. Flopam FO4700SH 4. Flopam FO4808XXR	Not odorous	1.19 tonnes stored in a bunded silo 2.10 tonnes stored in a bunded silo 3.25 tonnes stored in a bunded silo 4.25 tonnes stored in a bunded silo	Fully contained	Low
Flofoam 681F	Mild odour	5 tonnes stored within bunded IBCs	Fully contained	Low
Ferric chloride solution 40%	Not odorous	33 tonnes stored in a bunded silo	Fully contained	Low
WP white diesel	Petroleum	360,340 litres stored within a number of double skinned tanks	Fully contained	Low
Chevron HDAX 6500 LFG - SAE40	Oil	Clean 2,500L Dirty 2,500L Stored in bunded oil tanks or bunded IBCs	Fully contained	Low
Texaco Delo XLC Antifreeze/Coolant - Premixed 40/60	Solvent	300L in bunded I BCs	Fully contained	Low
Nalco 77211	Sulphurous	300L in bunded tanks	Fully contained	Low
Nexguard 22310	Ammoniacal	300L in bunded tanks	Fully contained	Low
Nalco 77224	Not odorous	300L in bunded tanks	Fully contained	Low
Soft Sel Plus	Not odorous	6 tonnes stored within 25Kg bags	Within a building	Low
Brenntag Caustic Soda	Not odorous	2,000L stored within bunded IBCs	Fully contained	Low
Brenntag hydrogen peroxide	Not odorous	2,000L stored within bunded IBCs	Fully contained	Low
Brenntag Phosphoric Acid solution	Not odorous	2,000L stored within bunded IBCs	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.

4.3.0 Odour control Units

Beckton STW has the following odour control units (OCUs) and ventilation system:
All odour control units are designed to achieve no more than 1000 ouE/m3 at the design outlet.

- **STC** Raw sludge thickening Picket fence thickeners and Sludge blending tank OCU - OCU 3 (A28): The odour control system extracts air from beneath covered areas in PFTS 1-4, Nos.1 & 2 blending tanks and Nos.1 – 6 buffer tanks, sludge thickening plant, and Riverside pumping station to a 3 stage process, liquor return well, x7 drum thickeners. The process removes hydrogen sulphide (H_2S) and other odorous compounds and then exhausts treated air via a dispersion stack at 14.5m. Dampers are set at commissioning to ensure the correct air extraction from all elements. The (first) biofilter stage has four units, whilst the carbon stage (third) has two units to allow maintenance. The design allows for full treatment in the event that the chemical scrubber (second) stage needs to be shutdown for maintenance. *An additional source will be added into this OCU, sludge screens prior to the primary sludge buffer tanks (UWWTD)*

- UWWTD Inlet Works Area, Storm chamber area, PST feed channel area OCUs (3 no.); These are 2 stage biofilter and activated carbon processes. The odour control systems extract air from beneath covered areas in the respective areas. The OCU removes hydrogen sulphide (H_2S) and other odorous compounds and then exhausts treated air via a dispersion stack at (12m). The design has dual streams which allows for full treatment in the event that part of the process needs to be shutdown for maintenance.

- UWWTD PST's, Raw Sludge Pumping Station Wet Well and Settled Sewage Channel OCUs (2nos. North & South): These are 2 stage biofilter and activated carbon processes. The OCUs remove hydrogen sulphide (H_2S) and other odorous compounds and then exhausts treated air via the 15m high dispersion stack. The biofilter and carbon units have 3 separate compartments which allows for full treatment in the event that part of the process needs to be shutdown for maintenance.

- **STC** (A29) Enhanced Digestion Facilities OCU 4: This is a 2-stage biological treatment system; a lava rock bio-trickling filter stage followed by 2No carbon filters installed in parallel. Each of the carbon filters shall be designed for 100% of the design flow rate. Isolation dampers shall be provided on each carbon filter to enable isolation of an individual filter whist the other is in operation. The odour control system shall extract malodorous air from the respective areas. The OCU shall remove hydrogen sulphide (H_2S) and other odorous compounds and then exhausts the treated air via a 15m-dispersion stack.

- **STC (**A30) EDF Sludge Cake Building ventilation: There will be extraction fans which continuously extract malodorous air through a ventilation stack. The design allows a ventilation rate of 3 air changes per hour during normal operation. This automatically increases to 4 air changes per hour if the concentration of ammonia, hydrogen sulphide, carbon dioxide or carbon monoxide exceeds the short term trigger levels.

Note *There is also 2 OCUs on site at Beckton for the Lee Tunnel connection chamber and Overflow shaft OCUs (2 no.): These will be activated carbon units. The odour control system extracts foul air from respective areas. The OCU removes hydrogen sulphide (H_2S) and other odorous compounds and then exhausts treated air via dispersion stacks (at a height of 8 m). The design has multiple streams which allows for full treatment in the event that part of the process needs to be shutdown for maintenance. The activated carbon will be impregnated with*

caustic soda to abate H_2S. These are under the responsibility of the Tideway team not Beckton STW.

4.3.1 Site Specific Measures and abnormal events

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 Beckton STW are summarised in the tables below.

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

Problems, exceptions and failures are recorded by the Process Control Engineer on the daily log.

The SAP maintenance schedule is operated to ensure that planned preventative maintenance is undertaken on all odour critical plant. Normal operation of 'odour critical' processes is described further below:

Primary sedimentation tanks

The situation described below represents the position to date and the SOM will be updated on a 6 monthly basis.

PSTs have 3 sets of bottom longitudinal sludge scrapers per half tank to move the sludge to the hopper end. They also have 2 cross collector sludge scrapers to scrape the sludge into the hopper. The surface of these tanks are kept clear by two surface scrapers per half tank which deposits scum into a hopper at the inlet end tank which is then pumped away to the scum chamber from where it flows by gravity into the raw sludge pumping station wet well.

Odours from the primary tanks are exacerbated by excessive retention of sludge in the tanks. The operational target is to hold less than 12000m3 of sludge in the PSTs1-16 as a total. The PSTs are desludged automatically to set points entered by the operator. A time for each tank is entered into SCADA in response to the measured depth of sludge in each PST sludge dips and is usually 5 min. per foot of sludge (plus a 5 min addition if sludge %DS>1.5%) with one, two or four tanks desludging simultaneously.

PSTs are drained and cleaned as required for maintenance or repair of the scraper mechanisms. Due to the size of the tanks, drain down, repair and refill can take up to three weeks.

The tanks have operational settings developed during the commissioning phase of the PST Odour Control Project and will be further refined following the commissioning and SCADA integration of the New Raw Sludge Pumping Station and Sludge Handling Plant.

Each PST has a bypass and a scope valve which can be used for removing sludge from the central tank hopper. Raw sludge is periodically withdrawn from each tank and drains by gravity to the Raw Sludge Pumping Station Wet Well. Surface scum is deposited into a scum collection hopper which spans the width of the tank and this is then pumped to the scum chambers on the side of each tank. This scum chamber is connected to the same gravity main which conveys sludge to the raw sludge pumping station.

Primary sludge is currently pumped via one of four Raw Sludge Pumps to a pair of buffer tanks before being fed to the four Picket Fence Thickeners (PFT's) and/or the new drum thickeners. Raw Sludge Pumps can be operated in manual mode only, either locally or remotely from the Control Room.

Operation and maintenance procedures for covered and odour controlled PSTs will be developed during commissioning of the PST odour project (March 2015) and reflected in the updated Odour Management Plan.

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 timescale
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.
		Ensure that areas of work are left clean and tidy after process/ maintenance activities	Site Tech 1s	Visual Inspection	Daily	Spillage identified	cleaned up no later than the end of the day
		Site odour acceptability. As a routine, all 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 All TW personnel and all contractors	Qualitative assessment	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
Works inlet Linked tasks specified in appendix 12 section 2.2	Sewage (Low/Medium)	Covered with OCU	Site Tech 1s	Visual Inspection	Daily	Spillage identified	cleaned up no later than the end of the day
Pumped flow from Lee Tunnel	Sewage (Low)	Within a sealed shaft	Site Tech 1s	Visual Inspection	Daily	Spillage identified	cleaned up 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 timescale
Coarse Screens Linked tasks specified in appendix 12 section 2.3	Crude sewage low	Area shall be maintained clean and free from blockages. Skips shall be monitored and emptied as required	Process Controller/Tech1	Visual	Daily	Blockage identified	Blockage to be cleared by the end of the working day or on call-out (OOH)
Screens Linked tasks specified in appendix 12 section 2.3	Crude sewage low	drainage area shall be maintained clean and free from blockages. Screenings skips shall be monitored and emptied as required	Process Controller/Tech1	Visual	Daily	Blockage identified	Blockage to be cleared by the end of the working day or on call-out (OOH)
Skips/wheelie bins Linked tasks specified in appendix 12 section 2.4	Screenings medium	The number of skips /bins kept to minimum, where possible kept closed. Bins shall not be overfilled. Collection on routine and frequent basis.	Process Controller	Visual	Daily	Bins overfilled	Arrange clean up and bin collection/restock by the end of the day.
Cess Import Points Linked tasks specified in appendix 12 section 2.1	Crude sewage low	After discharge the delivery driver should wash down the area, and leave the place in satisfactory condition. Ensure tankers are coupled correctly	Contractors/Team Manager/Shift Tech1	Visual	Daily	Spillage	Clean up 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 timescale
Grit Removal Plant Linked tasks specified in appendix 12 section 2.5	Sewage low/medium	Ensure grit is clean and free from other debris. Grit shall be loaded from the grit bays into skips ASAP and the storage time minimised. Skips collection on regular basis.	Team Manager / Tech 1	Visual	Daily	Failure of Tele-Porter for grit movements	A new Tele-Porter is to be sourced on-hire as soon as reasonably practicable
Primary Settlement Tanks Linked tasks specified in appendix 12 section 3	Sewage/ low	Ensure scum removal system is working correctly. Monitor the sludge blanket depth-shall be kept at 1ft or less. Any tank taken out of service shall be washed down ASAP (see sludge depth monitoring protocol). Roof Inspection hatches should remain closed.	Process Controller/Tech1	Visual SCADA	Daily Continuous	Sludge blanker above 1ft	Manual scope value to be dropped continuously until the tank has been harvested for sludge
ASP Plant Linked tasks specified in appendix 12 section 4.1	Sewage low	Keep clear the settled sewage channel and surrounding area. Action any significant air leaks and any deteriorations in performance of aeration domes	Tech1	Visual	Daily	Air leak	Resolve air leak within 1 week.
Final Settlement Tanks Linked tasks specified in appendix 12 section 5	Effluent low	Make sure the launder channels are kept clear. Ammonia should be monitored on daily basis. If taken out of service, the tank must be drained and wash down.	Tech1	Visual	Daily	Debris in launder	Clear debris found in the launder by 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 timescale
Odour Control Units Linked tasks specified in appendix 12 section 9	H2S (L)	Regular inspections by contractor and daily site rounds	Contractor Tech 1		Monthly daily	OCU failure	Raise a high priority job for the M&E Team to fault find and return the OCU to service. Escalate to the service contract provider if required. To be complete as soon as reasonably practicable.
Raw sludge pumping Linked tasks specified in appendix 12 section 10	Raw sludge low	In deep enclosed dry well	Tech1	Visual	Daily		
Raw sludge wet well	Raw sludge low	Covered	Tech1	Visual	Daily		
RAS Pump Houses Linked tasks specified in appendix 12 section 10	Sludge low	The chambers are to be kept clear. H2S levels need to be monitored at least once per month.	Tech1	Visual	Daily	Blocked chamber	Chamber to be unblocked by the end of the day

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 timescale
Odour Control Units Linked tasks specified in appendix 12 section 9		The OCUs shall be checked in accordance with the O & M manual at least once per week to ensure that the irrigation system and ventilation fans are working. The duty fan should be alternated on a weekly basis. H_2S will be measured, on a weekly basis between the penultimate stage (scrubber or biofilter) and any carbon filter or other final stage absorbents (with a measurement technique with a sensitivity of no more than 0.1ppm) to identify any operational problems with the upstream scrubbers and/or biofilter and prevent premature saturation of carbon filters. Plant failure alarms are linked to SCADA. The plant shall be maintained as per the maintenance schedule. Outlet H_2S emissions are continuously monitored in accordance with the Hydrogen Sulphide Monitoring and Odour Emissions Protocol. If the outlet H_2S concentration significantly increases, measurements of the H_2S at the inlet and outlet of all stages of the OCU shall be taken to determine the removal efficiency - this would be escalated up the management / supervisory chain. If the removal efficiency is unsatisfactory. The OCU shall be inspected for mal-performance and remedied as appropriate. If the trend is still evident the Team Manager should arrange for a specialist assessment of the OCU.	Tech1	SCADA	Weekly Continuous	Alarms show on SCADA or the local HMI	Investigate alarms by the end of the day. If unable to resolve a job is to be raised with the M&E Team or with the service contractor provider. To be resolved as soon as reasonably practicable.
Cake Barn Linked tasks specified in appendix 13 section 16 and 17	Sludge low	All shutter doors to the building shall be kept closed at all times except for vehicular access (only one vehicular access door can be opened at any one time). Cake in storage forms a crust after a day or two reducing risk of odour. No additional turning or handling during cake storage.	Tech1	Visual	Daily	Open door	To be closed immediately

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timescale
Blending / Buffer Tanks Linked tasks specified in appendix 13 section 3	Sludge low	Keep area tidy. The area shall forms part of monthly site audit by Plant Manager. Access hatches to be kept shut.	Tech1	Visual	Daily	Access hatch found open	To be closed immediately
Sludge Import Linked tasks specified in appendix 13 section 1	Sludge (Medium)	Ensure tankers coupled correctly	Tech 1	Visual	Daily	Spillage identified	cleaned up 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 timescale
Cess Import Points Linked tasks specified in appendix 12 section 2.1		After discharge the delivery driver should wash down the area, and leave the place in satisfactory condition. Ensure tankers coupled correctly	Contractors/Team Manager/Shift Tech1		Daily	Area left in poor condition	The domestic waste team will personally call the driver before they leave site to return and clean up the area. If this is not possible a Tech 1 will clean up the area before the end of the day.
Picket Fence Thickeners Linked tasks specified in appendix 12 section 8.2	Sludge Low	Weirs/Launder channels should be kept clear. Drainage area must be kept clear from blockages. Sludge levels must be monitored on daily basis. Cover hatches to be kept shut except for cleaning purposes. The amount of sludge retained in PFTs 1-4 depends partly upon incinerator demand and also on sludge blanket levels in both the PFTs and PSTs. The normal operating target is to keep the blanket levels between 8 and 10 meters from the top to provide optimum sludge thickening.	Tech1	Visual	Daily	Blocked weir	Blocked to be cleared by 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 timescale
Raw sludge pumping & thickening building Linked tasks specified in appendix 12 section 8	Sludge low	All shutter doors to the building shall be kept closed at all times except for vehicular access (only one vehicular access door can be opened at any one time).	Tech 1	Visual	Daily	Door open	To be closed immediately
SAS Thickening Building Linked tasks specified in appendix 12 section 8	Sludge low	Keep the building clean. If belt taken of service make sure the sludge is drained and the belt washed. Ensure ventilation system is maintained as per SAP schedule.	Tech1/Shift Tech1	Visual	Daily	Ventilation system not working	To be resolved by the M&E team within 2 days.
THP	Sludge low	Pressure relief valves - Valve protected from unnecessary emissions with bursting disk and pressure switch, connected to SCADA	Tech 1	Visual SCADA	Daily Continuous	Spillage identified	cleaned up no later than the end of the day
Primary Digestion Linked tasks specified in appendix 12 section 6	Sludge Low	Site rounds completed	Tech 1	Visual SCADA	Daily Continuous	Parameters outside of optimum range	Contact process scientist

Table 4.5 Summary of routine odour mitigation tasks for SPG

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action and timescale
Incinerator Building	Low	All shutter doors to the SPG shall be kept closed at all times except for deliveries or maintenance activities.	SPG Process Controller/ SPG Tech1	Visual	Daily	Door open	Close door immediately
Sludge Processing	Blended sludge / Pressed cake / Filtrate / Ash Low	In enclosed SPG building with forced draft ventilation.	Tech1	Visual	Daily	Ventilation system not working	To be resolved by the M&E team within 2 days.

Table 4.6: Intermittent, abnormal, and emergency events for assets under UWWTD

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Incoming sewers	Sewer inspection	Ab	Flush the sewer before inspection	An event will need to be raised with the WOCC and a local event team put in place depending on the severity of the event.	Low
	Failure of single barrel due to blockage or collapse		Drain down and clean out		
	Septic sewage from low flows or sewer cleaning		Ensure odour control unit is fully operational		
	Large spillage due to combination of power failure and loss of emergency generation		Lift the screen and reinstate power		
Pumped flow from lee tunnel	Pump failure/power supply lost.	Ab	Use shaft drainage pump	Standby generators will start to allow continuous operation	Low
Screening/skips	Skips not changed over for a number of days	Ab	Manually transfer with telehandler to open skips in skip handling building. Area shall be maintained clean and free from blockages. Skips shall be monitored and emptied as required	Escalation via our skip and haulage service contract provider.	Low/medium
	Screen out for maintenance		Flush out		

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
	Spillage		Clean up ASAP		
Primary Treatment	OCU failure	Ab	Find cause and resolve	Escalation via our maintenance team	Low
Site services - interceptor sewer	Failure of liquor pumping station	Ab	Sewer covered		Medium
Cess Imports	OCU failure Spillage	Ab	Find cause and resolve Covered and OCU, clean up ASAP	Escalation via our operations team	Low
Grit Channels	Grit channel shutdown to remove compacted grit	Ab	Flush and hose down lane	Escalation via our operations team	Low
Primary Settlement Tanks	OCU failure	ab/P	Find cause and resolve	Escalation via our maintenance team and OCU service contract provider	Low/Medium
	Tanks drained down		Covered and odour controlled to empty – flush out tank		
	Hot weather		Covered and odour controlled		
	High sludge levels		Covered and odour controlled		
	Failure or maintenance of scrapers and hydraulic RAMs		Covered and odour controlled / Tank empty and cleaned before maintenance activity		
	Normal operation with one failure Zickert bottom scraper causing rising sludge		Covered and odour controlled		
	Scum on surface		Covered and odour controlled		

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
	Maintenance and cleaning of instrumentsof PST feed channels		Do one side at a time and do as quickly as possible / leave covers closed when no works carried out		
Aeration	OCU failure	Ab/P	Find cause and resolve	Escalation via our maintenance team and intervention via our process scientist	Low/medium
	Floating crust/fat or foam on surface		Review process settings		
	High ammonia in lanes		Increase aeration blowers		
	High turbulence		Turn air down to that zone until drain down		
	Maintenance of air valves/repairs		remove tank out of service / flush out tank		
	Hot weather		Increase aeration blowers		
Final Settlement	Scraper fails (sewage goes septic)	Ab/P	Drain down, flush out and repair as quickly as possible	Escalation via our maintenance team	Low/Medium
	Inlet penstock failed		8 Nos tank – reduce flow to ASP2 and stop mix liquor flow pumping to ASP1 16 Nos tank – isolate using air bag on inlet pipework 48 Nos tank – bank of 6 FSTs drained down for works being carried out 16 Nos tank – fit isolation stops logs		
	High ammonia in tanks		Increase aeration bowers		
	sludge air lift fails		Take off stream and repair		
	Tank drained down for maintenance		Flush out tank		
	Scum on surface		Check operational mallard pump and drain down if required		

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Sludge transfer to Riverside	Pumping station or pipeline failure. Build up of sludge in system and consequent increase in odours	Ab	SPG and centrifuge provide sufficient capacity for short term loss of the transfer to Riverside Note: Transfer to Riverside and AD /recycling is considered a more sustainable disposal route. Covered trailers remove sludge daily, reducing delay on removing sludge from site	An event will need to be raised with the WOCC and a local event team put in place depending on the severity of the event.	Low
Raw sludge wet well	Wet well drained down for maintenance requiring to use other uncovered wet well (PSTs 1-8 drainage pumping station)	Int	Flush well and drain it down / Minimise outage time	Escalation via our operations team	Medium
Raw sludge pumps	Pump out for maintenance	P	Use standby plant and wash down facility	Escalation via our operations team	
PST 1-8 drainage pumping station	Used as a raw sludge back up pumping station	Ab	Minimise operational time / Flush pump after use	Escalation via our operations team	Low
PST 1-8 drainage pumping station	Draining PSTs 1-8	Int	Flush tank after draining	Escalation via our operations team	Low
OCU	Failure	Ab		Contact our service contract provider after diagnosis from out	

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
				maintenance team	
SAS transfer – SAS buffer tank	Tank failure Lauder blocked	Ab	Clear up spillage. Control level below lauder and clean up spillage	Escalation via our operations team	Medium
Detritus lanes	Failure. Odour release during drainage and cleaning of detritus lane		Lanes are covered and odour controlled. Empty lanes are cleaned of debris on drainage. Prior to cleaning a small flow is maintained to minimise septicity.	Escalation via our operations team6 lanes are available, with at least two in use. It is routine operation to rotate operation of the lanes from operation at times of low flow and to rotate operation of lanes.	Low
RAS transfer	Hot weather	Ab	Increase aeration blowers	Approval to be granted via a CPAC and the process scientist	Low

Table 4.7: Intermittent, abnormal, and emergency events for assets under Sludge Treatment Centre Permit

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
©THAMES WATER		Asset Management			
Internal – Company and Partners		Asset Standards		Escalation via our maintenance team and service contract provider	High
Sludge imports	OCU failure Spillage	Ab	Find cause and resolve Covered and OCU, clean up ASAP		
PFT	Weir cleaning / Maintenance	Int	Minimise operational time and covers opened at any one time	Escalation via our operations team	Medium
PFT	Blocked launders	Ab	Minimise operational time and covers opened at any one time	Escalation via our operations team	Medium
PFT	Failed scraper	Ab	Drain down and clean tank using tanker	Escalation via our operations team	Medium
PFT	Pump failed	Ab	Use stand by plant and wash down facility	Escalation via our operations team	Medium
PFT	Pump out for maintenance	Int	Use stand by plant and wash down facility	Escalation via our operations team	Medium
PFT	Higher than normal solids concentration from PSTs	Ab	Ensure all odour control unit stages are fully operational and use drum thickeners	Escalation via our operations team	Medium
PFT	Maintenance which requires stopping flow, but not draining tank	Ab	Open one cover at a time and perform task as quickly as possible	Escalation via our operations team	Medium

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
PFT	Normal operation but with particularly hot weather	Ab	Ensure all odour control unit stages are fully operational and use drum thickeners	Escalation via our operations team	Medium
PFT	Multiple tanks failure	Ab	Ensure all odour control unit stages are fully operational and use drum thickeners to maximum capacity	Escalation via our operations team	Medium
PFT	Sludge spillage	Ab	Hose down area	Escalation via our operations team	Medium
PFT	Failure of odour control unit to PFTs	Ab	Use drum thickeners to maximum capacity and reduce raw sludge content	Escalation via our operations team	High
Sludge pumping	Pump failed	Ab	Use stand by pumps and wash down facility	Escalation via our operations team	Medium
Sludge pumping	Pump out for maintenance	Int	Use stand by pumps and wash down facility	Escalation via our operations team	Medium
Drum thickeners	Spillage / Leakage	Ab	Clear spillage, wash down and repair	Escalation via our operations team	Medium

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Sludge blending	Sludge spillage / Overfill	Ab	Stop pumping to tank overflowing and clear up spillage	Escalation via our operations team	Medium
Aquabelts	Spillage	Ab	Clear up spillage repair any fault	Escalation via our operations team	Low
Sludge blending	Failure of odour control unit	Ab	Odour control plant designed to run using two out of three processes / Existing duty and stand by fans / Maintenance team to repair fault	Escalation via our operations team	Medium
Sludge blending	Over pumping (to atmosphere) to temporary centrifuges	Ab	Enclosed centrifuges and pipelines and covered trailers	Escalation via our operations team	Medium
Sludge blending	Failure of mixing pumps	Ab	Use stand by plant, wash down and repair pump	Escalation via our operations team	Medium
Sludge blending	Leakage	Ab	Isolate leak, wash down and repair leak	Escalation via our operations team	Medium
Sludge blending	Empty for maintenance	Int	Use stand by plant and wash down as soon as possible	Escalation via our operations team	Medium

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Sludge blending	OCU failure	Ab	Find cause and resolve	Escalation via our operations team	High
Sludge blending	Hatched left open	Ab	Close	Escalation via our operations team	Medium
Sludge Powered generator	Emptying and tankering of a press hopper	Int	Minimise time, spillages and carry out daily wash downs	Escalation via our operations team	Medium
Sludge powered generator	Dewatering are shutter doors left open	Ab		Escalation via our operations team	Medium
Sludge Powered generator	Long term stream outage	Int	Use alternative treatment (THP and temporary centrifuges)	Sludge strategy meeting to be organised and a plan to be put in place involving other outlets	Medium
Sludge powered generator	Medium to long term outage of whole facility	Ab	Use alternative treatment (THP and temporary centrifuges)	Sludge strategy meeting to	Medium

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
				be organised and a plan to be put in place involving other outlets	
Sludge Processing	Drainage back up	Ab	Clear / Flush drains and check pumps	Escalation via our operations team	Medium
Thermal Hydrolysis Plant	OCU failure	Ab	Planned maintenance and monitoring. Find cause and resolve	Escalation via our operations team	High
Decomissioned digesters	Use for event buffer storage	Ab	10 Nos tanks to be drained down and cleaned	Major mechanical and electrical intervention is required to make this possible	Mediumow
Odour Control Units	Loss of washwater	Ab	Use alternative washwater supply / Carbon filter available	Escalation via our operations team	Low/medium
Odour Control Units	Carbon failure	Ab	Ensure biofilter is fully operational and replace carbon	Escalation via our	Low/medium

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
				operations team	
THP	Short term failure. Odour release from the foul gas skid	Ab	Routine maintenance	Escalation via the local management team	Low
	Outages due to maintenance	Ab	There shall be odo7ur connection to all sludge buffer tanks; and all ductworks shall be sufficiently sized.	During maintenance of sludge buffer tanks (ie. THP Blended Sludge Tanks, Centrifuge Feed Tanks, THP Feed Silos, Post Digestion Storage Tanks). There shall be 2No tanks operating in parallel, of which when 1No tank is taken out of service, the	Low

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
				other tank shall be used.	
Cake Barn	Ventilation Failure. Odour release from sludge cake storage area may cause short term trigger levels for CO, CO_2, H_2S, and NH_3.	Ab	Arrangements should be in place to ensure the replacement of a failed ventilation fan within 1 week assuming that the standby unit is available. If no standby is available, repairs should be made immediately, or within 24 hours.	Escalation via the local management team, engagement of service contractor provider to fix there shall be a standby fan with allowance for maintenance during operation.	Medium

Table 4.8: 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	An event will need to be	Low/Medium

				raised with the WOCC and a local event team put in place depending on the severity of the event.	
Severe weather	Transport of sludge from site inhibited	E	Event unlikely. There is provision for 21 days storage on site plus additional storage in the existing sludge holding tanks	An event will need to be raised with the WOCC and a local event team put in place depending on the severity of the event.	Low
Flooding	Flooding causing process or equipment problems	E	Flood risk assessment has been carried out at Beckton and there is work towards updating flood management plans. Site incident procedures would be followed.	An event will need to be raised with the WOCC and a local event team put in place depending on the severity of the event.	Low
Illness/absence of key staff	Accumulation of sludge/loss of odour control etc.	E	Task allocation is independent of individual staff.	Escalation via the local management team	Low
Power cuts	Loss of power to fans leading to loss of odour control	E	Emergency power generation for critical activities until power restored.	Escalation via the local management team	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 7 days storage on site plus additional storage in the existing sludge holding tanks. Transport to other STWs if necessary	An event will need to be raised with the WOCC and a local event team put in place depending on the severity of the event.	Low

4.3.3 Spillages

Spillages causing significant odorous emissions shall be cleared as soon as they are discovered and any other spillages within 24 hours if assessed as an odour risk. The person discovering the spillage informs site management who will utilise resources as required to clear it.

The site has its own water tanker and jetting units, which are available at all times to clear spillages as necessary.

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 inspections rounds, which apply to Thames Water large STW sites, and have been included in Appendices 6 and 7, 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 THP digestion site such as Beckton the processes is maintained around pH 8 but within the range 7.5-8.6 (this is % dry solids and digester load dependant) for healthy operation.
- alkalinity: Levels dependant on feedstock characteristics (primary sludge: surplus activated sludge (SAS) ratio). Advanced digestion (THP) typically, 5,000 - 10,000mg/litre (target range from 6,000-8,000 mg/litre) but is dependent on % dry solids and digester load.
- temperature: minimum target of 40°C for advanced digestion. This is maintained within the range 36-45°C for THP AD.

- 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. Beckton fits into the fourth row of the table.
- Dry solids feed: see table above, Beckton has a target of 10%DS, but this can vary between 8-14%DS and impacts the HRT.

Type of Digestion	0%- 35% SAS[x]	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 Primary Digester Tanks. The typical range for VFAs in a Primary Digester Tanks 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 but not based on single parameter.

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 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 14 of the OMP.

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

4.4.0 Performance Checks and Testing

- **Odour Protocols**

The following protocols have been drawn up in accordance with the Planning Conditions imposed under the Planning Consent for the Lee Tunnel and Beckton STW Extension Works Project (application ref; 10-02061-LTGVAR-LBNM).

- Hydrogen Sulphide Monitoring and Odour Emissions Protocol which shall include the matters set out in Condition 8 and Condition 9.
- Olfactometric Testing and Performance Protocol which shall include the matters set out in Condition 10.
- Displaced Air Protocol which shall include the matters set out in Condition 15.
- Sludge Depth Monitoring Protocol which shall include the matters set out in Condition 16.

Condition 4 states that the development shall be operated in accordance with the approved Protocols which shall not be changed without the prior written approval of the Local Planning Authority. In the event of a conflict between the OMP and any Protocol the provisions of the Protocol shall prevail.

The above Protocols, excluding the Displaced Air protocol, are attached as Appendices (5-8) to this OMP. The Displaced Air Protocol will be added when the OMP is updated for the Lee Tunnel works and submitted to LBN for approval.

These protocols have been updated in accordance with the Planning Conditions imposed under the Planning Consent for the Beckton Extensions (application ref; 10-02061-LTGVAR-LBNM) and the Enhanced Sludge Digestion Facility (application ref; 12/01573/FUL).

- Hydrogen Sulphide Monitoring and Odour Emissions Protocol which shall include the matters set out in **Condition 7 and Condition 8**.
- Olfactometric Testing and Performance Protocol which shall include the matters set out in **Condition 9**.
- Sludge Cake Store Ventilation Protocol which shall include the matters set out in **Condition 10**.
- Beckton EDF Sludge Treatment Capacity Protocol which shall include the matters in **Condition 11**.
- Combined Heat and Power Plant Exhaust Emissions Protocol which shall include the matters set out in **Condition 17**.

- **Performance Checks**

In addition to normal operating procedures checks are made and recorded on:

- Level of sludge in the PSTs in accordance with the Sludge Depth Monitoring Protocol (currently at least 5 times each week).
- Monitoring for effective operation of the Odour Control Units (OCU) is carried out on a weekly basis
- Performance of the OCUs, including inlet, outlet and interstage performance. Monitoring for effective operation of the Odour Control Units (OCUs) is carried out on a weekly basis, using a gold film hydrogen sulphide analyser (Jerome). The results are recorded and stored. These results shall be monitored in accordance with the specified operating performance criteria as per the agreed protocols and O & M manuals.
- We are investigating Monitoring of hydrogen sulphide levels across the site, including at the site boundary near the inlet channels.

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 routine inspection results, skips record and sludge blanket checks are stored on file held in the Control Room for a minimum of 24 months.

Monthly Odour Management Audit, Odour (H_2S) Survey / OCU testing records are held on Shared Area /EL Process/ Odour Management/Beckton. The records are stored for a minimum of 2 years.

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 database SpheraCloud (https://sphera.com) and monitored by Thames Water's Health, Safety & Environment team.

Power failure is a very unlikely event due to the site having three feeders from Barking Hub distribution. In the event of power failure, some critical plant will be run on backup generators. However, as this doesn't include the odour control units there is a potential temporary risk of odour until power is restored.

Operational problems and some maintenance procedures may lead to periods of additional odour release. Problems may result at the critical process stage or in downstream processes, leading for example to accumulation of sludges in storage and primary tanks.

Absence of key staff does not affect the running of Beckton 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 4.6. - 4.8. The purpose of Tables 4.3 - 4.8 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 agentsand 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 4.6, 4.7 & 4.8 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).

5 Maintenance and Inspection of Plant and Processes

5.1 Routine Maintenance

5.1.0 General Requirements

Site staff has 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 is captured on the corporate system SAP, which generates job tickets and records completion for the various activities.

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.

5.1.1 OCU Selection and Performance

STC OCUs

OCU 3 STC Raw Sludge Thickening OCU

Biofilter – x4

Media Type	Lava Rock
Design Air flow rate	9,736 m3/hr each

Design Inlet H2S	50 ppm (average) 100ppm (max)
Design temp	20 C
Design removal efficiency	98%
Duty Standby Fan	Present

Scrubbing tower

Chemical	NAOCl
Design Air flow rate	38,947 m3/hr each
Design Inlet H2S	10 ppm (average) 5 ppm (max)
Design removal efficiency	99%
Duty Standby Fan	Present

Carbon filters x 4

Media Type	Lava Rock
Design Air flow rate	9,736 m3/hr each
Design Inlet H2S	5 ppm (average) 1 ppm (max)
Design removal efficiency	99%
Duty Standby Fan	Present

nominal design criteria back calculated by ERG

For continuous operational monitoring, system incorporates:

- Visibility of fans on SCADA, with alarms, for loss of extraction from odorous sources

- Continuous H2S monitoring with alarms
- Scrubber drain PS alarm, Scrubber drain PS pump failed
- Biofilter liquor PS sump pump failed,Biofilter liquor PS failed
- Final effluent valve failed alarms, Final effluent differential pressure switch failed
- Potable water and Final effluent booster pump failed alarms and low pressure alarms
- Biofilter vale failed alarms
- Sodium hydroxide and sodium hydrochlorite bund sump pump failed alarms and dosing pump failed alarms
- Scrubber pH alarms
- Chemical tank level alarms
- Scrubber reciriculation failed alarms
- Water softerner valve failed
- Mains 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 ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG 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.

OCU 4 Enhanced Digestion Facilities (THP) OCU

Biofilter

Media Type	Lava Rock
Cells	1
Design Air flow rate	5,725 m3/hr
Design Inlet H2S	1 ppm (average) 5 ppm (max)
Design temp	20 C
Design removal efficiency	98%

Duty Standby Fan	Present

Carbon filters x2

Design Air flow rate	5,725 m3/hr
Design Inlet H2S	1 ppm (average) 5 ppm (max)
Design removal efficiency	99%
Duty Standby Fan	Present

nominal design criteria back calculated by ERG

For continuous operational monitoring, system incorporates:

- Visibility of fans on SCADA, with alarms, for loss of extraction from odorous sources
- water flow alarm for bioscrubber.

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 ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG 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.

UWWTD OCUs

Inlet Works

Biofilter

Manufacturer	Osil
Media Type	Lava Rock
Cells	1

Design Air flow rate	28,275m3/hr
Design Inlet H2S	5 ppm (average) 10 ppm (max)
Design temp	20 C
Design removal efficiency	98%
Duty Standby Fan	Present

Carbon filter

Manufacturer	Osil
Design Air flow rate	28,275m3/hr
Design Inlet H2S	1 ppm (average) 5 ppm (max)
Design removal efficiency	99%
Duty Standby Fan	Present

nominal design criteria back calculated by ERG

For continuous operational monitoring, inlet works, storm overflow and PST feed channel OCUs (x3 OCUs) system incorporates:

- Visibility of fans on SCADA, with alarms, for loss of extraction from odorous sources
- Continuous inlet and outlet H2S monitoring capability and alarms
- Low air flow 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 ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG 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.

PSTs, Raw Sludge Pumping Station Wet Well and Settled Sewage Channel OCUs x2

For continuous operational monitoring, system incorporates:

- Visibility of fans on SCADA, with alarms, for loss of extraction from odorous sources
- Continuous inlet and outlet H2S monitoring capability and alarms
- Low air flow alarm

For period 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 ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG 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.

Lee tunnel Overflow chamber and shaft OCUs x2

For continuous operational monitoring, system incorporates:

- Visibility of fans on SCADA, with alarms, for loss of extraction from odorous sources
- Inlet and outlet pressure switch alarm
- H2S monitoring cabability

For period 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 ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG 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

5.1.2 Maintenance of Odour Control Units

Operation and maintenance of OCUs is delivered in accordance with the Company's Asset Standards and Equipment Maintenance Standards. This is either delivered in house by Operations or outsourced to a contractor. Refer to the Odour Control Unit Asset Standard and Site Operating Manual for more information.

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) Typically systems work around 0.5 kPA	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 as high priority. Check for blockages, poor FFE quality/check if media is of a type susceptible to biodegradation.	Monthly	X	X	X
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 durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	X	X
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 OCUs at Beckton STW are 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 OCUs are 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 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 a biofilter to achieve a minimum of 95%, removal efficiency. A minimum of 2-3 seconds retention time for a carbon filter is stipulated.

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 3 parts per million or greater on the discharge from the biofilter (before the carbon filter) and 0.5 parts per million off the subsequent carbon filter. There is a relationship between increases in discharge efficiency from the biofilter since if this rises it will start to exhaust the carbon filter defining the red action. Contextual knowledge must inform any triggers for action; rather than focusing on a single value. If it is a single stage OCU then we would raise an action if it was 0.5 ppm detected coming off regardless of its removal efficiency.

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 12 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, 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%. Carbon units should be set at <70%.

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).

pH of a wet scrubber will be slightly variable depending on the H2S that is there from the condensing air stream contributing to SO2 formation. pH of the system will be monitored continuously online, with the desired value 9.2

ORP of a wet scrubber is monitored continuously with the desired value being 700-730 mV

Figure 5.1 Monhtly Health Checks

Monthly Health Checks

Biofilter

Please enter any comments you may have in the yellow comments boxes

Number	Task	Comments
1	Examine ductwork for any signs of damage or leaks and check condensate drains are free flowing	
2	Visually inspect the Odour control system will be made and any defects or deterioration of the housings will be reported.	
3	Check the airflow through the system and any anomalies investigated.	
4	Measure the pressure drop across the system by measuring the inlet and outlet pressure. Record any abnormalities	
5	Measure the contaminate levels (primarily H2S) at the inlet and at the stack	
6	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	
7	Examine the irrigation system to ensure correct operation including spray pattern, clean the strainer and unblock nozzles or replace as deemed necessary.	
8	Take a sample of the drainage water and measure the pH value and compare to target pH value (this is not pH 7 for modern biotech)	
9	Check all hatches and doors for integrity and ensure they are closed	

Chemical Scrubber

Please enter any comments you may have in the yellow comments boxes

Number	Task	Comments
1	Examine ductwork for any signs of damage or leaks and check condensate drains are free flowing	
2	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	
3	Visually inspect the Odour control system will be made and any defects or deterioration of the housings will be reported.	
4	Check the airflow through the system and any anomalies investigated.	
5	Measure the pressure drop across the system by measuring the inlet and outlet pressure. Record any abnormalities	
6	Measure the contaminate levels (primarily H2S) at the inlet and at the stack	
7	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	
8	Examine the recirculation pumps and distribution pipework to ensure correct operation, clean the strainer and check trough / distributor.	
9	Carry out a functional check of the dosing system ensuring target pH and Redox are achieved, and validate the probe calibration using a handheld unit	
10	Calibrate if necessary	
11	Visually check the seals of all hatches note any leaks.	
12	Visually check the wet scrubber housing, note any significant deterioration	
13	Scrubber dosing cabinet - Check chemical dosing pumps for leaks	
14	Scrubber dosing cabinet - Check that dosing rates are correct	
15	Scrubber dosing cabinet - Check all valves, instruments and pipe-work for leaks	
16	Scrubber dosing cabinet - Check inside of cabinet for chemical residue and dirt and wash if necessary	
17	Scrubber dosing cabinet - After wash down check catch-pot high level alarm is working before draining	

Carbon Adsorber

Please enter any comments you may have in the yellow comments boxes

Number	Task	Comments
1	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.	
2	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	
3	Visually inspect the Odour control system will be made and any defects or deterioration of the housings will be reported.	
4	Check the airflow through the system and any anomalies investigated.	
5	Measure the pressure drop across the system by measuring the inlet and outlet pressure. Record any abnormalities. Read off Delta-P gauge if fitted or using a portable manometer	
6	Measure the contaminate levels (primarily H2S) at the inlet and at the stack	
7	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	

5.1.3 Records

Maintenance history records are kept in the company's asset register SAP.

5.2 Fault Reporting

Faults identified during routine inspections are reported to the Process Controller who assesses criticality before entering the task into the job scheduling system for allocation to an appropriate person and to a timescale appropriate to the criticality.

5.3 Emergency Repairs

24-hour maintenance cover is available at the discretion of the Process Controller 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 Beckton STW will be made via the Customer Services Centre, Operations will investigate and take appropriate action. Complaints may also be received from the local council and Environment Agency.

Customers / residents are encouraged to communicate with local Thames Water Operations via the Customer Centre to report if they are noticing odour from Chertsey STW, to ensure that all contacts are recorded and actioned. Customers have 3 main options to report complaints to Thames Water:

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

Thames Water Customer Services
Telephone: 0800 316 9800

Thames Water Website – www.thameswater.co.uk

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

If a complaint is received locally, they will be redirected to the Beddington STW site management and/or the Communications Advisor (for Thames Water's Southern area) with details of any operational issues. They will then respond to the customer and copy in Thames Water's customer centre to ensure all contacts are recorded and actioned.

If the customer / resident would prefer to contact the London Borough of Newham (LBN), the London Borough of Barking and Dagenham or the Environment Agency instead, their contact details are as follows:

London Borough of Newham (LBN)
Email: pollution.inquiry@newham.gov.uk

London Borough of Barking and Dagenham (LBBD)
Phone: 020 8215 3000
Fax: 020 8227 5184
Email: 3000direct@lbbd.gov.uk

Environment Agency
Incident hotline: 0800 80 70 60
Email: incident_communications_service@environment-agency.gov.uk

Environment Agency Local Officer details (EPR permit) can be obtained from:
AirandWaste.Permitting@thameswater.co.uk

Customer contacts regarding Beckton 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 Beckton 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, un-stable and emergency site operation. Details of the different communications routes are also summarised in Appendix 3.

There are two known resident associations: Barking Resident association and Rainham Resident association.

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.

To determine whether the odour is coming from the Thames Water Site the performance manager will review all activities currently taking place on site, including any maintenance, cleaning, and non-standard activities to identify to 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 tables 4.4 – 4.7 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 Community Working Group

This is a group comprising Managers from Beckton and Riverside STWs, EHOs from Barking and Dagenham, Newham and Havering, and local councillors and resident representatives who are neighbours to Beckton STW or Riverside STW and have an interest in activities at these sites. Meetings will be held as required.

6.5 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 the London Borough of Newham (LBN) or the London Borough of Barking and Dagenham will be contacted directly if there are risks of odour generation (e.g. digester cleaning, tank cleaning or process issues).

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 Beckton STW

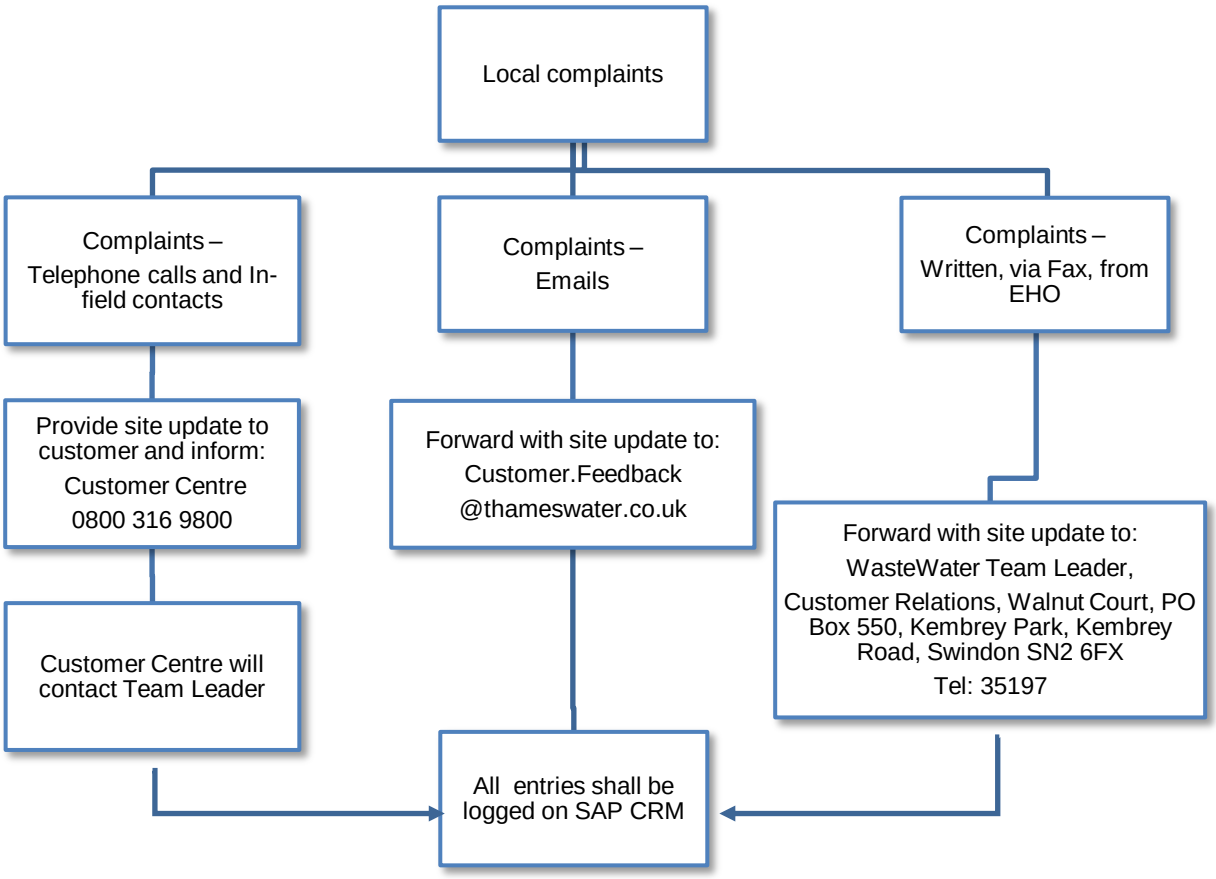
Review Date Nov-23

Process Stage	Owner	Plan	Action	Expected difficulties	Measures to mitigate	Timeframe
Odour Control Packages	Luke Parkinson	Sludge Thickening OCU replacement	Complete replacement of Odour Control Unit needed. Significant work undertaken to scope and understand all options. Risk raised. circa 3 million	Funding	Best practice for management of sources to existing OCU	AMP8
OCU	Luke Parkinson	Action recommendations laid out by monthly health checks	Action recommendations laid out by monthly health checks	Funding		Ongoing
Sniff testing	Odour Specialist	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	Site Round, Monthly health checks	6 months from permit issues

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: Miles Evans Telephone: 0774 764 7304

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**
Newham Council Environmental Health Department	As required but at least quarterly	Telephone / email / meeting	Update on operational activity on site	Performance Manager
Barking & Dagenham Council Environmental Health Department	As required but at least quarterly	Telephone / email / meeting	Update on operational activity on site	Performance Manager
Local residents associations (if applicable)	As required but at least quarterly	Telephone / email / meeting	Update on operational activity on site	Performance Manager
Environment Agency	As required	Telephone / email / meeting	Update on operational activity on site	Performance Manager or Air and Waste Permitting team
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**
Newham Council Environmental Health Department	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager
Barking & Dagenham Council Environmental Health Department	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager
Local residents associations (if applicable)	As required	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager
Environment Agency	Potential for notification procedure	As required as per notification procedure	As required as per notification procedure	Pollution desk or Performance 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).	Performance Manager
Customer Centre (Swindon)	Immediately then weekly	Telephone / email	To enable the Customer Centre to deal with queries from the press (reactive only).	Performance Manager
Other areas/stakeholders outside Beckton STW potentially impacted				
Stakeholder	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**

Level 2	Unstable operations: • Non-compliant with Operational Asset Standards on one or more sub-processes leading to increased odour risk.			
Local businesses	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance 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**
Newham Council Environmental Health Department	Immediately then weekly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5/4 Manager
Barking & Dagenham Council Environmental Health Department	Immediately then weekly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5/4 Manager
Local residents associations (if applicable)	Immediately then monthly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5/4 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 5/4 Manager or Level 5/4 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 5/4 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 / Level 5/4 Manager

Level 3	Emergency • Temporary or transient activities not deemed to be compliant with Operational Asset Standards. High risk of odour emitting plant.			
Customer Centre (Swindon)	Immediately then daily	Telephone / email	To enable the Customer Centre to deal with queries from customers (reactive only)	Duty Manager / Level 5/4 Manager
Other areas/stakeholders outside Beckton STW potentially impacted				
Stakeholder	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Local businesses	Immediately then weekly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5/4 Manager
Hevering Council Environmental Health Department	Immediately then weekly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5/4 Manager

Appendix 4. Site Drawings

Figure A - Site Location Map with sensitive receptors marked as per Table 2.1

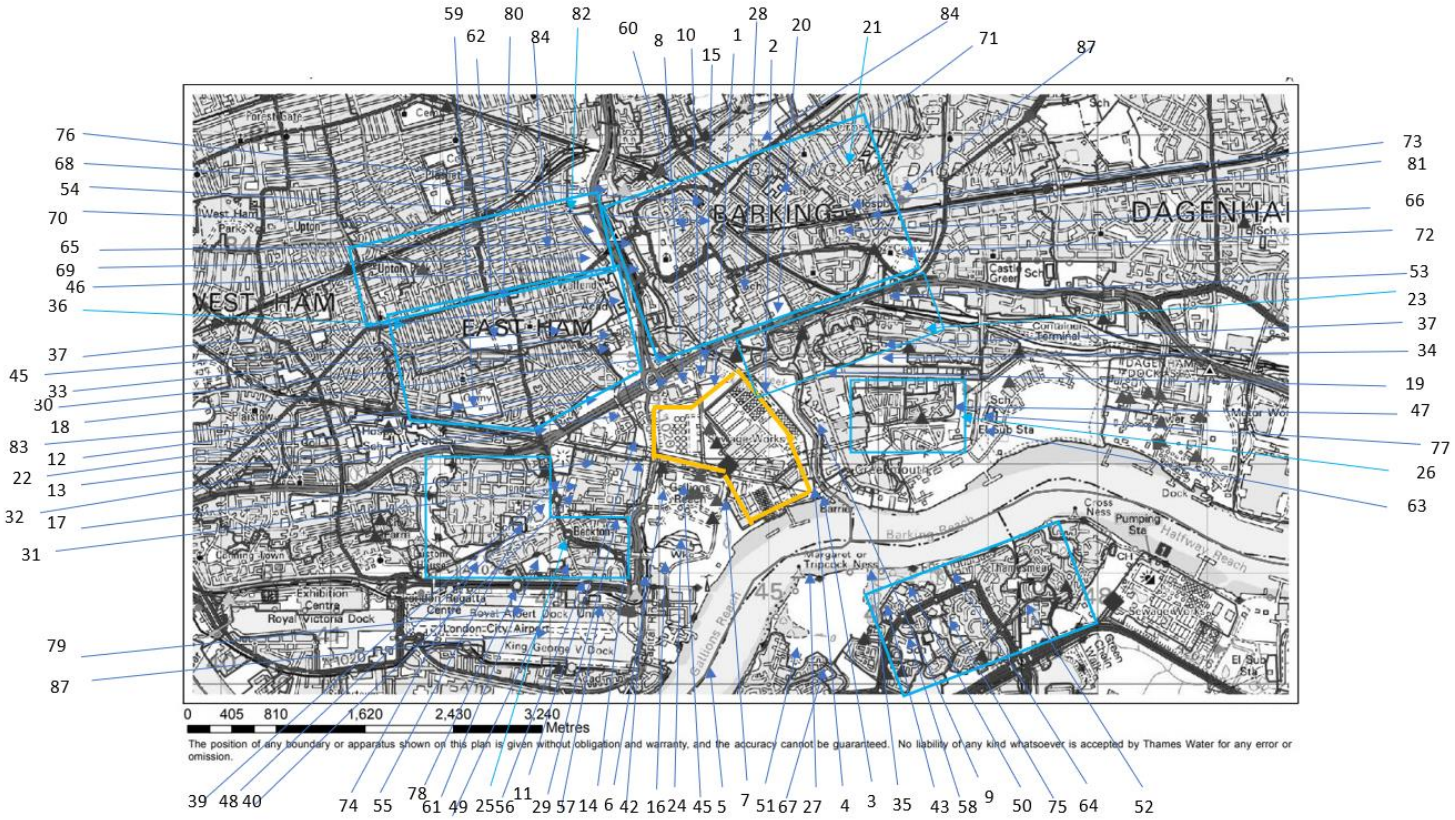


Figure B - Site Plans

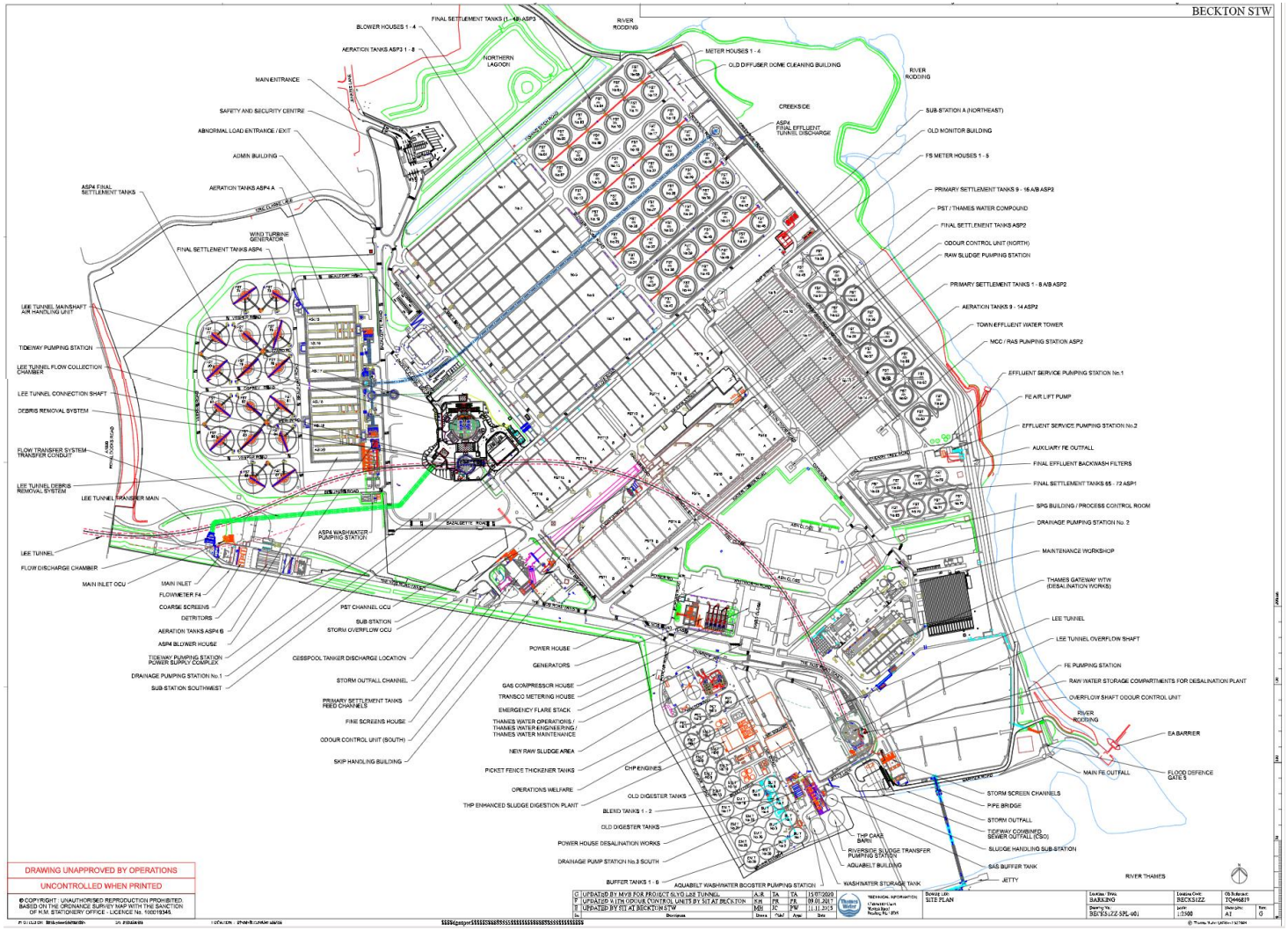


Figure C - Site Plan Showing Area of Permitted Sludge Treatment Activities

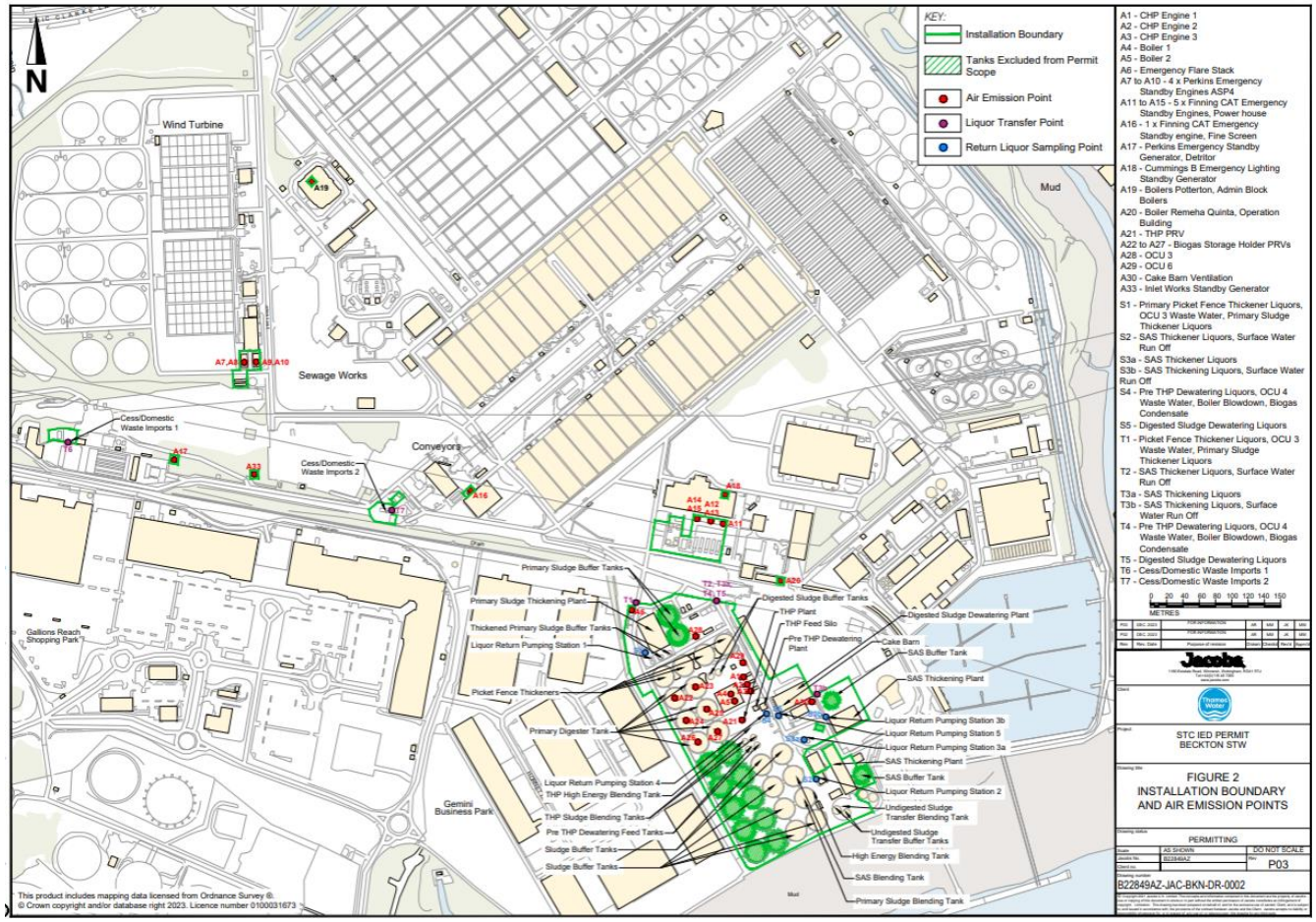


Figure D - Main STW Process Flow Diagram

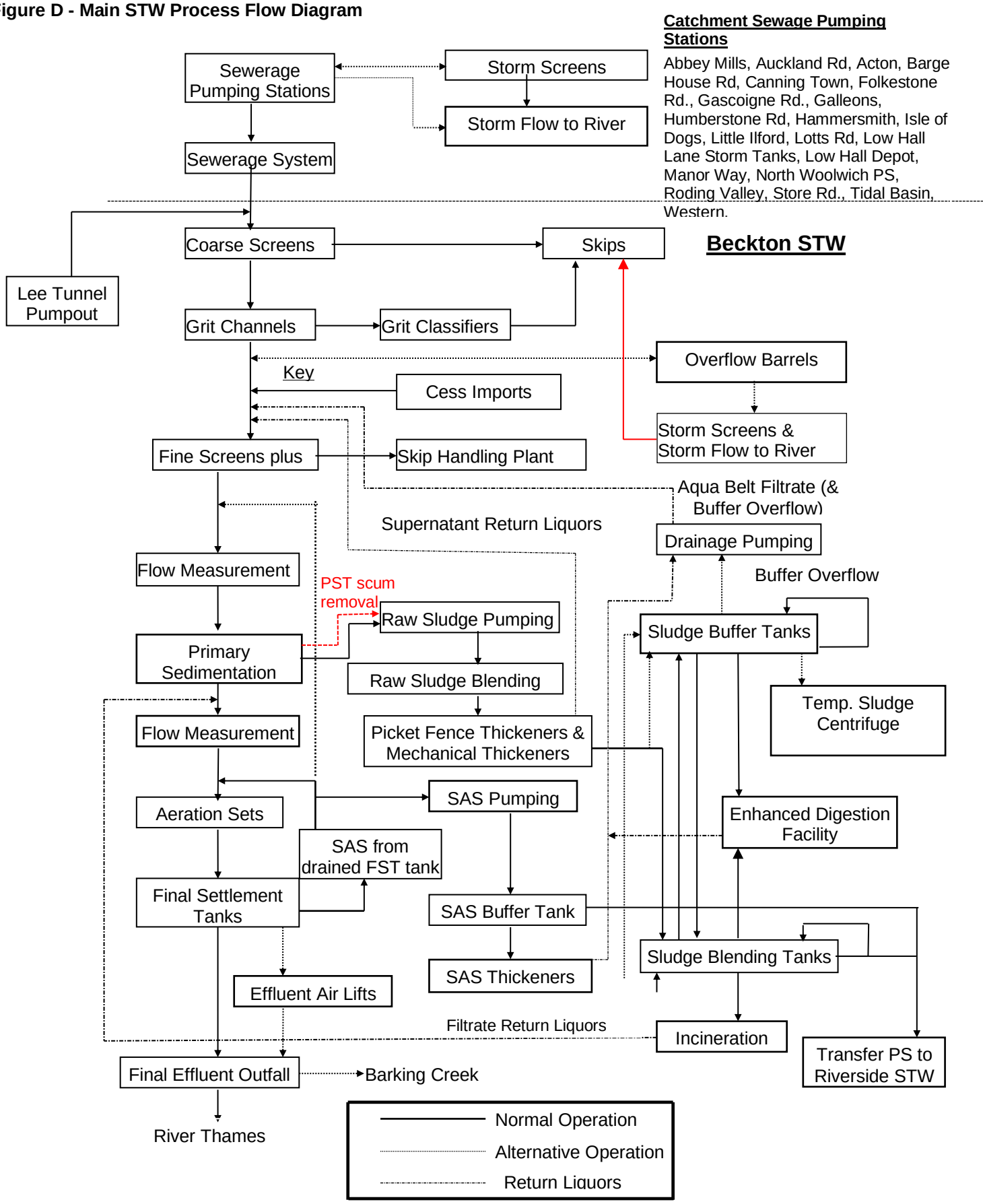
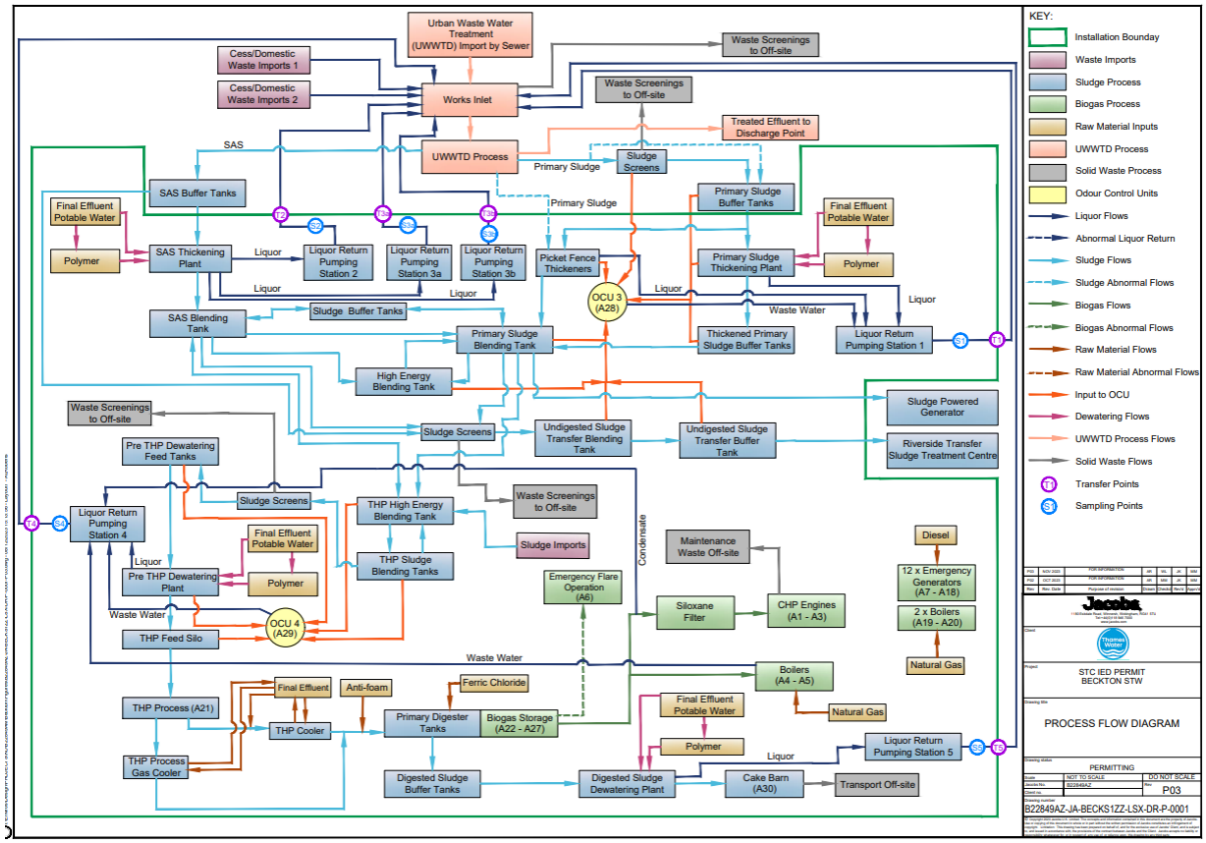


Figure E - Sludge Process Flow Diagram



Appendix 5. Hydrogen Sulphide Monitoring and Odour Emissions Protocol

File located within SharePoint – 1 PDF document.

Appendix 6. Olfactometric Testing and Performance Protocol

Files located within Asset Doc – 2 PDF documents: 6a. Annual Olfactometric Testing and Performance Protocol and 6b. Odour Control Equipment.

Appendix 7. Performance Testing and Monitoring Protocol *as required by planning condition 12 of permission reference 10/02061/LTGVAR/LBNM*

File located within SharePoint – 1 PDF document.

Appendix 8. Sludge Depth Monitoring Protocol *as required by planning condition 16 of permission reference 10/02061/LTGVAR/LBNM*

File located within SharePoint – 1 PDF document.

Appendix 9. Sludge Cake Store Ventilation Protocol *as required by planning condition 10 EDF application ref: 12/01573/FUL*

File located within SharePoint – 1 PDF document.

Appendix 10. Combined Heat and Power Plant Exhaust Emissions Protocol *as required by planning condition 17 EDF application ref: 12/01573/FUL*

File located within SharePoint – 1 PDF document.

Appendix 11 – EDF Sludge Treatment Facility Capacity Protocol *as required by planning condition 11 EDF application ref: 12/01573/FUL*

File located within SharePoint – 1 PDF document.

Appendix 12. 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**	
i)	Check washdown equipment is operating correctly	**X**	

ID	Instruction	Daily	Weekly
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
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.	**X**	

ID	Instruction	Daily	Weekly
	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		
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. Clean the brushes as required. Ensure the brushes are in correct contact with the screen and that screenings are being removed.	**X**	
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.	**X**	

ID	Instruction	Daily	Weekly
	Jumping amps indicates a blockage.		
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**	
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**	

ID	Instruction	Daily	Weekly
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**
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**	

ID	Instruction	Daily	Weekly
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	
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	

ID	Instruction	Daily	Weekly
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	
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

ID	Instruction	Daily	Weekly
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	
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

ID	Instruction	Daily	Weekly
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	
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	

ID	Instruction	Daily	Weekly
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**	
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

ID	Instruction	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
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	

ID	Instruction	Daily	Weekly
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		
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**	

ID	Instruction	Daily	Weekly
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**	
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 13. 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. 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**	

	Instruction	Daily	Weekly
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 Check pumps, pipelines and couplings for leaks where possible.	**X**	
h)	Monitor water supply where glycol is not used to heat exchanges that are exposed to elements,	**X**	

	Instruction	Daily	Weekly
	Ensure water is drained when heat exchanges are not in use.		
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**	
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**

	Instruction	Daily	Weekly
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**	
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**

	Instruction	Daily	Weekly
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**	
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**

	Instruction	Daily	Weekly
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**	
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**	

	Instruction	Daily	Weekly
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**	
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 14 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 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 ---