Asset Management
Asset Standard
Odour Management Plan

Maple Lodge STW

MAPLS1ZZ

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0 Document Control & Procedures

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

Revision No	Reason for Revision	Prepared by	Approved by	Date
1	Update to New Format	[redacted]		May 2014
2.1	Change of Management	[redacted]		March 2018
3.0	Review and update	[redacted]	[redacted]	December 2018
4.0	Updated alongside AD permit application	[redacted]	[redacted]	June 21

4.1	Updated for Sludge Treatment Centre permit application following EA feedback	[redacted]	[redacted]	July 2022
4.2	Updated for Sludge Treatment Centre permit application following EA feedback	[redacted]	[redacted]	June 2023
4.3	Schedule 5 Response	[redacted]	[redacted]	August 2023

0.3 Sign Off

Operations Area Manager	[redacted]	Date: August 2023
Performance Manager	[redacted]	Date: August 2023

0.4 Glossary of Terms

TERM	DESCRIPTION
AD	Anaerobic Digestion
CHP	Combined Heat and Power
CSM	Customer and Stakeholder Manager
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2016
FFT	Flow to Full Treatment
H4	Environment Agency - How to comply with your permit – H4 Odour Management, March 2011
ICA	Instrumentation Control & Automation
IED	Industrial Emissions Directive
OCU	Odour Control Unit
OMC	Operational Management Centre
OMP	Odour Management Plan
PFT	Picket Fence Thickener
PM	Performance Manager
PS	Pumping Station
PST	Primary Settlement Tank

Receptors	Sensitive receptors are any fixed buildings or installations where odour annoyance may occur, such as residential homes, schools, hospital, offices, shops or garden centres. Open areas such as playgrounds and public footpaths should also be listed where these are known to have been affected by odour.
SAS	Surplus Activated Sludge
SCADA	Supervisory Control And Data Acquisition
SOM	Site Operating Manual
SPS	Sewage Pumping Station
STC	Sludge Treatment Centre
STW	Sewage Treatment Works
TCM	Technically Competent Manager
TM	Team Manager
UWWTD	Urban Waste Water Treatment Directive
WOCC	Waste Operations Control Centre

1 Introduction

This Odour Management Plan (OMP) forms part of Maple Lodge STW Best Operating Practice and is a constituent part of the Environmental Management System (EMS). A key related document is the Site Operating Manual (SOM) – this document can be found as a hard copy in the Maple Lodge STW administration building and on Thames Water's database SharePoint, within the EMS pages.

The purpose of this OMP is to define how the potential and actual generation of odour from Maple Lodge 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.

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 at least annually or sooner if any of the following occur:

- If the site in question acquires any other permitted activity with the potential to increase the risk of odour off site.
- When significant changes are made to the site which may affect odour, e.g. capital spend, changes to permitted activities.
- 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 management 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

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

This OMP was updated in 2022 to incorporate appropriate odour control measures for activities that will be newly regulated under an Environmental Permit issued under the Environmental Permitting (England and Wales) Regulations 2016 (EPR), following the principles transposed through the Industrial Emissions Directive.

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 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 pages and a hard copy is kept on site within the Site Operating Manual.

1.1 Relevant Guidance

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 following guidance has been used to inform the contents of the OMP where it relates to activities regulated under EPR through 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)
- Environment Agency, Appropriate measures for the biological treatment of waste, Consultation draft July 2020.

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

2 Site Information

2.1 Location and Receptors

Site Address:

Maple Lodge STW
Denham Way
Rickmansworth
Hertfordshire
WD3 9SQ
What3Words:///Shaky.puts.skips
EPR Permit number to be included when issued

Maple Lodge STW is located in the village of Maple Cross near Rickmansworth, close to junction 17 of the M25. Access is by turning down Maple Cross Close at the traffic lights on Denham Lane. It is a large works with sludge treatment, and an out-fall to the Grand Union Canal and the River Colne.

The site currently provides wastewater treatment for a population equivalent to 488,000 and receives sewage flows from much of West Hertfordshire, from Redbourn through St Albans, Hemel Hempstead, Borehamwood, Potters Bar, Watford, Great Missenden, Chorleywood, Amersham and Rickmansworth to Maple Cross. Full treatment is provided for incoming sewage flows of up to 300MLd per day.

The catchment receives sludge pumped from Blackbirds STW and from Chesham STW.

Receptors

The nearest receptors are given in Table 2.1 and have been marked on site location map in Figure A:

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	Maple Lodge Nature Reserve	Open Space / Footpath	Adjacent	West	Low
2	Springwell Reedbed	Open Space	Adjacent	North	Low
3	Springwell Lane	Residential	425	East / Northeast / Southeast	High
4	Springwell Barn	B&B	360	North	High
5	Grand Union Canal	Recreational / Residential	50	East	High

6	Residential area surrounding Maple Lodge Close	Residential	220 - 650	Northwest	High
7	Residential area surrounding Longcroft Road	Residential	740 - 1300	West	High
8	Hornhill Play Area	Recreational	780	West	High
9	Maple Cross & West Hyde Community Centre	Recreational	750	West	High
10	Maple Cross JMI & Nursery School	School	700	West	High
11	M25	Passing traffic	1600	West	Low
12	Rivers Office Park	Commercial	600	Northwest	Medium
13	Skanska	Commercial	570	Northwest	Medium
14	Hughberry Vehicles and surrounding area	Industrial	430	North	Medium
15	Lynsters Lake	Open space	75 - 780	South / Southwest	Low
16	Area surrounding Canal Way	Residential / Commercial	310	Southeast	High
17	The Fisheries Inn Angling Society	Recreational	540	South	High
18	Saint Thomas of Canterbury Church of England	Church	720	Southwest	High
19	Area surrounding Old Uxbridge Road	Residential / Pub / Open space	580 - 1500	West / Southwest	High
20	Pynesfield Lake	Open space	620	South	Low
21	ALIGN JV	Industrial	1000	Southwest	Medium
22	A412 (North Orbital Road, Denham Way)	Passing traffic	570 - 2000	West / Northwest / Southwest	Low
23	The Marble & Granite Centre and surrounding area	Commercial / Industrial	1500	South	Medium
24	Rickmansworth Sailing Club	Recreational	1350	South	High
25	Residential area surrounding Barrington Drive and Park Lane	Residential	550 - 1800	South / Southeast	High

26	Old Park Wood Nature Reserve	Open Space	600	Southeast	Low
27	Harefield	Residential	1500	Southeast	High
28	Harefield Hospital	Hospital	1400	Southeast	High
29	Harefield Infant School & Children's Centre and Harefield Junior School	Schools	1700	Southeast	High
30	The Harefield Academy	School	2000	Southeast	High
31	Hill End	Residential	850	Southeast / East	High
32	The Harefield Care Home	Residential	870	Southeast	High
33	Hep Oils Ltd	Industrial	550	Southeast	Medium
33	Steve Dent Ltd fieldways farm	Farm	1400	Northeast	Medium
34	Area surrounding Woodcock Hill	Residential / B&B / Pub	1900	East	High
35	Woodcock Hill Industrial Estate	Industrial	1800	Northeast	Medium
36	Woodcock Hill Cemetery	Cemetery	1700	Northeast	Medium
37	Andrews Ley Farm B&B	B&B	1850	Northeast	High
38	Saint Mary's Church of England Primary School	School	1900	Northeast	High
39	Stockers Farm	Farm	1500	Northeast	Medium
40	Stocker's Lake Nature Reserve	Open Space	930 - 1700	Northeast	Low
41	The Reach Free School	School	1000	North	High
42	Residential area surrounding Springwell Avenue	Residential	1400	North	High
43	William Penn Leisure Centre	Recreational	2000	North	High
44	St John’s Catholic Primary School & St Peters C of E Primary School &	Schools	1700 - 1900	North	High

	Shepard Primary School				
45	Springwell Lake	Open Space	100 - 930	North	Low
46	Cripps House Farm	Farm	760	East	Medium
47	Pearsons Wood	Open Space	1900	East	Low

2.2 Off-site sources of odour

There have been no off-site sources identified with the potential to generate odour.

2.3 Other site sources of odour

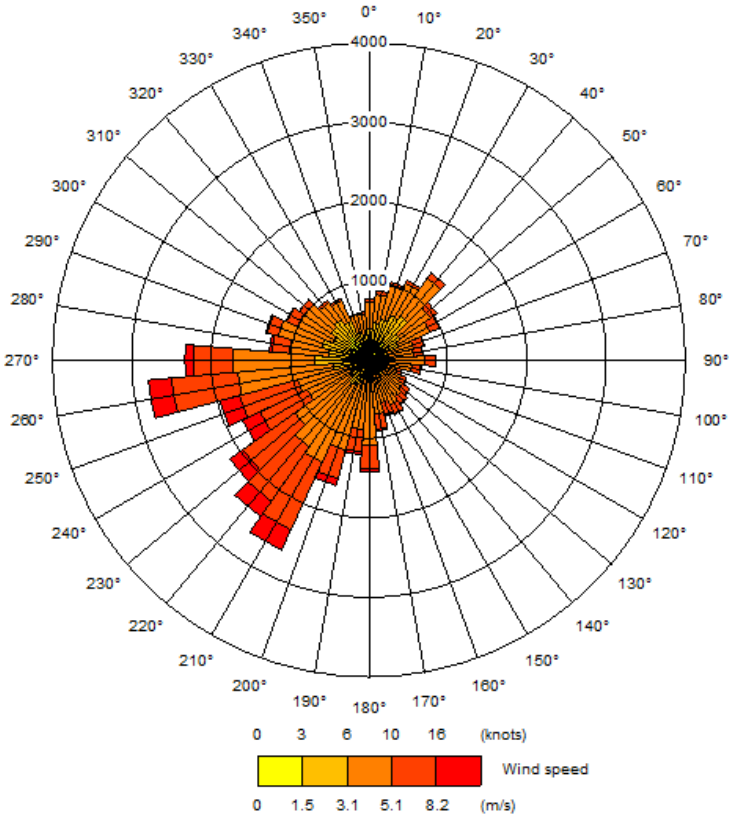
A Biffa Waste Treatment Plant operation is located on site, it is not a Thames Water owned operation, but could have potential to generate odour. Any risks to the STW should be covered by the terms and conditions of the trading agreement. Any serious odour generation from imported waste or resulting from waste processing would result in the Biffa operation being closed down until resolved as this would break the terms and conditions of the contract.

There is no history of such incidents.

2.4 Wind Rose and Weather Monitoring

Heathrow Airport meteorological station (approximate location NGR E 506952 N 176574) is located approximately 15.9 km east-southeast 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 2015 – 2019. The figure illustrates the predominant wind direction to be west-southwesterly / southwesterly, which means receptors northeast of the site would have the highest probability of experiencing potential increases in odour emissions.

Figure 2.31: Heathrow Wind Rose, 2015- 2019



There is no on-site weather station at Maple Lodge STW, rainfall is monitored. 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.

2.5 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.

Process Description

2.5.1 UWWTD activities

Raw sewage enters the works from 3no. Terminal pumping stations. Maple Cross pumping station is located on site. The consented maximum flow to treatment is 300Ml/day and surplus flows are diverted to the storm tanks via the storm weir. Dirty wash water from the tertiary treatment plant is returned upstream of the screens. Storm water return and works sewer flows are pumped back upstream of the storm weir. Liquor from sludge thickening and Centrate return from the centrifuges is pumped downstream of the storm weir. The inlet works has 4no. 'Longwoods band inclined escalator plus screens and the option by the Operator of engaging either a 'Washpactor' screenings handling plant or 'Launder' plant which includes a conditioning tank, macerators and Lisep unit. Grit is then removed by 2no. Dorr Detritors and Ferric Sulphate is dosed just after the flow to treatment flume to both aid settlement in the primary tanks and to remove Phosphorus

There are 4no. Rectangular storm tanks numbered 7-10. Tank no.7 can be used as either a PST (Primary Sedimentation Tank) or storm tank. Tank no.10 fills first, and overflows to the tank no.9 and this continues in sequence to tank no.7. When the tanks are full further flows overspill to the River Colne via the storm out fall located next to no.1&2 Secondary Digesters. Copasacs are fitted to the outlets of tanks no. 8&9. Tank no.10 has no outlet. The storm tanks are normally emptied when the flow to treatment falls below the maximum via the storm return pumps. Amajet units in tanks no. 8, 9 and 10 agitate the flow in the tank to prevent solids build up. No 7 tank has a bridge scraper to clean the floor of the tank from solids build up.

There are 6no. Rectangular scraped PSTs (Primary Sedimentation Tanks). Tank no.7 can operate as either a PST or storm tank. The bridges of the tanks operate in pairs. Sludge is scraped to the end of each tank (nearest to the aeration plant) where there are 3 hoppers per tank. There is a positive displacement mono sludge per tank that empties the hoppers. The sludge pumps are controlled by SCADA and the tanks are emptied in sequence. The pump draws from each hopper in turn through a manifold and actuated valve, during a pumping cycle. The flows from the PST sludge hoppers are transferred to the PFTs (Picket Fence Thickeners) or can be diverted directly to the sludge-blending tank. Scum from the PSTs is pushed to the inlet end of the tank by a blade attached to the scraper bridge. Scum is collected in a trough and is manually removed using a mobile suction tanker connected to an existing manifold. The scum is removed to the blending tank.

Secondary treatment is by a diffused air activated sludge plant followed by final settlement. The aeration lanes have been configured to give a BNR (Biological Nutrient Removal) process for 'P' (phosphorus) removal. Phosphorus can also be removed by dosing Ferrous Sulphate, which is dosed in the anoxic zone. It is a management decision whether 'P' removal is by chemical dosing or the BNR process. The aeration lanes have been configured into 2no. Banks known as A & B. Bank A consists of lanes 3-12 arranged in double pass formation, and Bank B comprises lanes 13-23 in a single pass arrangement. The mixed liquor travels through an anoxic zone, which is a converted double pass aeration lane. Flygt mixers are used to keep the mixed liquor in suspension in this zone. Ferrous Sulphate is dosed mid-way along the anoxic zone for 'P' removal. There are 2no. DO (Dissolved Oxygen) probes per lane in zone 3&5. The DO is controlled in individual lanes by an actuated control valve.

For Tertiary Treatment, the effluent from the FSTs (Final Settlement Tanks) passes along a channel where it terminates at the tertiary treatment plant. An actuated gate valve controlled by SCADA determines the amount of effluent that enters the treatment plant. The remainder flows over a weir where it enters the final effluent channel. The tertiary treatment plant is a 'Degremont' low head loss, automatic backwash sand filter system. Screw pumps lift the filtered effluent and it is mixed with the unfiltered bypassed effluent, then enters the final effluent channel.

The final effluent outfall is to the Grand Union Canal, with an overflow to the River Colne.

2.5.2 Biffa Waste Treatment Plant

Biffa operates a Waste Treatment Plant located at the North East corner of the site, close to the inlet. This receives industrial wastes, which are treated prior to discharge to the works inlet. There are strict terms and conditions associated with the nature of waste materials processed on site and discharges from this plant to the STW. Any risks to the STW should be covered by this agreement.

2.5.3 Sludge Treatment Centre Permit Activities

Sludge Treatment comprises an offloading point for permitted imported wastes at the entrance to the wider STW on land owned by Thames Water. This material passes to the sewer network and is pumped to the inlet where along with other sewer derived urban waste waters, it is screened and de-gritted, then passed to the primary settlement tanks and through the aerobic treatment process under the UWWTD. Indigenous sludges derived from the main flow are then subject to thickening processes and transferred to the sludge blending tank, via a sludge reception tank and screens. Surplus Activated Sludge (SAS) from elsewhere in the sewage treatment works is also discharged into the blending tank following thickening.

Imported sludge from other works is imported to the site via a dedicated sludge logger, into the sludge reception tank before it is screened and discharged into the sludge blending tank.

Thickened blended sludge is then transferred to one of the eight primary digesters at the site. The digester tanks are of concrete construction with floating roofs that captures biogas given off by the digestion process. Following treatment over an appropriate number of days within the primary digester, sludge is pumped to one of the concrete secondary digester tanks. Sludge is held in these tanks for an appropriate retention time to ensure that the required level of pathogen kill is achieved in order to comply with the digested sludge cake output quality requirements.

Digested sludge is then pumped to the site conveyors where the digested sludge is dewatered and transferred by conveyor to the adjacent cake pad for storage, prior to removal from the site under the Sludge Use in Agriculture Regulations 1989, and in accordance with the Biosolids Assurance Scheme (BAS). Centrate drains to the site drainage system and is returned to the works inlet.

Biogas from each floating roof joins a common biogas line, is pressurised and transferred for use on site within the CHP engines or boilers. The biogas lines are fitted with foam traps and condensate pots which captures entrained foam and moisture for discharge to the site drainage. The biogas can be flared in emergency. The floating roof biogas holders are fitted with pressure relief valves as a safety precaution in the event of over pressurising of the system.

Biogas is combusted within one of the two CHP engines at the site, generated electricity is used within the site and exported to the National Grid. Heat generated by the CHP engines is used to maintain primary digester temperatures via heat exchange with auxiliary boilers available to provide additional heating as required. Boilers are dual fuelled by both biogas and fuel oil. CHP engines are classified as ‘existing’ combustion plant under the Medium Combustion Plant Directive. In the event there is excess biogas, i.e., more than the CHP engines or boilers can utilise, or in the event that the CHP engines or boilers are unavailable, the biogas is flared.

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

Cake will be offloaded into a bay, and visually checked. The waste stream is the same as that arising from the treatment of sludge within the Maple Lodge STC with the same characteristics, composition and eventual end use - application to land.

All imported cake will be stored on an impermeable cake pad, for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank

3 Site Management Responsibilities and Procedures

3.1 Site Roles

Figure 3.1 - Site Roles

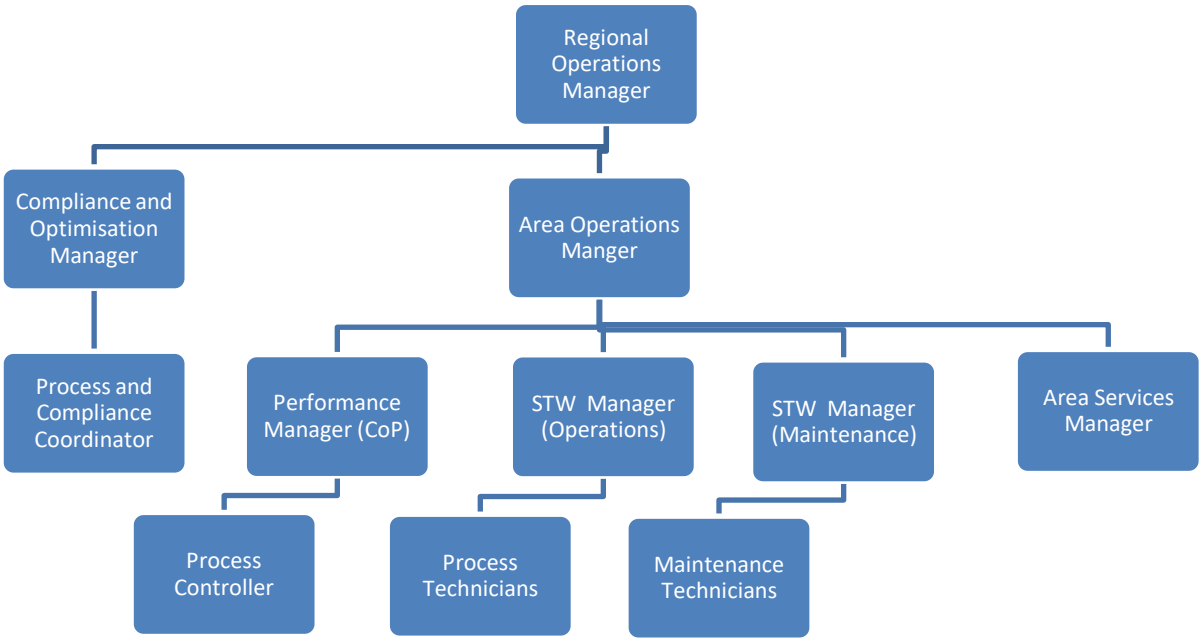


Table **3.1** - Tasks and Responsibilities

Role	Tasks and Responsibilities
Regional Operations Manager	Responsible for the overall performance of STW in this region.
Area Operations Manager	Responsible for overall performance of the STW in the area, including assessing the scope of, and updating the OMP as it is implemented.
Performance/Site Manager	Responsible for overall performance of the STW and will be responsible for • odour control and management at the site • day to day implementation of the OMP • assessing the scope of, and updating, the OMP as it is implemented. • dealing with customer complaints • day-to-day operation of the STW • Ensuring Thames Water staff undergo appropriate training
Technically Competent Manager	Hold the required WAMITAB qualification to support the activities on site under EPR, ensuring permit conditions are complied with.
Maintenance and Process Technicians	Day to day duties include maintaining and operating process equipment.

Customer and Stakeholder Manager (CSM)	Responsible for managing liaison with all external customers and stakeholders in liaison with customer centre, escalation team, local govt. liaison team etc.
Compliance and Optimisation Manager	Responsible for process investigations and technical assistance.
Process Compliance Coordinator	Reports to Compliance and Optimisation Manager. Responsible for process monitoring, improvement and troubleshooting.
Duty Manager	The duty manager is centrally based (off-site) and is responsible for event management across the business.
Customer Centre	Responsible for receiving all customer calls, logging them and passing them to the appropriate operational departments.

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

3.2 Key Contacts

See also Thames Water Website – www.thameswater.co.uk

Role	**Name**	**Email address**	**Phone Number**
Operations Area Manager	[redacted]	[redacted]	[redacted]
Process Manager	[redacted]	[redacted]	[redacted]
Technically Competent Manager	[redacted]	[redacted]	[redacted]
Customer Centre	Maple Lodge STW	customer.feedback@thameswater.co.uk	0800 316 9800

3.3 Operator Training

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. In addition, Site Tech 1's undergo a specific programme of training which covers management of activities on site.

The Sludge Treatment Centre permit requires that a Technically Competent Manager holding a relevant WAMITAB qualification is in place at the site, and meets a weekly site attendance requirement.

All records of staff training are held on the company HR training database in Learning on Tap or within the local LOAD document.

4 Odour Critical Plant Operation, Monitoring and Management Procedures

4.1 Odour Sources, Critical Issues and History

There has only been one odour complaint received since July 2018.

West Hyde SPS, a terminal pumping station close to the site entrance where Maple Lodge STW is the receiving works, has received complaints.

An Odour Risk Assessment is included as Appendix 1. (Link to Spreadsheet included)

An Odour Improvement Plan is included (where applicable) as Appendix 2

Critical Odour Issues, Emergency Response and Mitigation Measures are summarised in Tables 4.3 to 4.7.

4.2 Identification of Odour Critical Plant

Odour prevention and reduction is achieved at Maple Lodge 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.

4.2.1 Odour Risk Assessment

An Odour Risk Assessment has been carried out and a copy is included in Appendix 1. The Odour Risk Assessment is not a 'one-off' exercise but an on-going process. It is constructed in the following manner:

- Each part of the treatment process is considered under different operating modes – e.g. normal, failure, abnormal: system overload, summer conditions, maintenance etc.
- The nearest customers to the particular odour source are identified.
- The likely frequency and duration of occurrence for each eventuality is identified.
- A score is assigned to the severity (0 – 5) of odour under each operating mode.
- A score is assigned to the probability (0 – 5) of causing an odour nuisance for each operating mode.
- Multiplying the severity of odour and probability of causing an odour nuisance generates a 'Current Odour Emission Risk' score. Between 0 (zero risk) and 25 (maximum risk), this is used to decide where mitigation should be applied in the short term, and determine where in the longer term enhanced improvement measures are required. Where improvements are identified as necessary (i.e., where suitable mitigation measures are not already in place), entries are made onto the Odour Improvement Plan.
- The need for operational mitigation, enhanced measures and customer communication is stated and brief details given.

Items scored in the Odour Risk Assessment with a risk score greater than 10, are classified as Odour Critical 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 Maple Lodge STW is included in Appendix 2.

4.2.2 Potential Odour Sources

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

- Incoming Sewers & Reception Wet Well
- Cess Reception, Discharge, Wash down & Drainage
- Storm & Balancing Tanks
- Screens & Screening Conditioning, Drainage & Rag Skip Management
- Grit Removal Equipment, Drainage & Grit Skip Management
- Flow & Distribution to Primary Settlement Tanks - Chemical Dosing
- Primary Settlement Tanks
- Fats, Oil & Grease Scum Removal System
- Primary Raw Desludge Pumping
- Activated Sludge Plant Lanes & Zones
- Final Settlement Tanks
- SAS Chambers & Pumping
- Odour Control Unit (OCU)

The following list of potential Sludge Treatment Centre odour sources been identified during the risk assessment:

- Cess Reception, Discharge, Wash down & Drainage
- Sludge Reception, Screening, Wash down & Drainage
- Screening Skip Management
- Primary Raw Sludge Thickening & Pumping
- SAS Thickening & Pumping
- Sludge Blending & Mixing
- Primary Digestion
- Centrate Liquor Return
- Cake Pad & Drainage (including imports)
- Raw materials - antifoam and polymer

4.2.3 Odour Critical Plant

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

- Cess Reception, Discharge, Wash down & Drainage
- Odour Control Unit
- Sludge Blending & Mixing

4.2.1 Waste Storage for Sludge Treatment Centre Permit

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 shown below.

Table 4.0 Sludge Treatment Centre Permit Tank Inventory

Tank Purpose	Number	Operational Volume (m^3)	Construction	Average Retention

				Time (where available)
Primary sludge Picket Fence Thickener	4	430	Steel	1.3 hours
SAS Picket fence thickener	1	525	Concrete	6.1 hours
Import Reception Tank	1	525	Steel	9.42 hours
Sludge Blending Tank	1	1,050	Steel	16.9 hours
Primary Digester Tank	8	3,407	Concrete	21.71 days
Secondary Digester Tank	14	2,200	Concrete	20 Days

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.

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
Raw imported sludge	Sludge Reception 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
Primary Sludge	PFTs, Sludge Reception 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
Thickened sludge import	Sludge Reception Tank	Refer to Table 4.0 Site Tank Inventory	Retention times for each stage of the process are detailed in Table 4.0	19 02 06	Diffuse	Medium
Sludge Screenings	Sludge import area	1 skip	Max 3 days once full.	19 08 01	Diffuse	Low
Cake (including cake imports)	Cake pad	2500 tonnes	60 days	19 06 06	Diffuse	Low

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
Biogas	Primary digester roof space and pipework; PRV;Whessoe valve releases; see emission point plan.	-	Continuous operation	-	Point source	Medium
Liquor	Site drainage.	-	Continuous return of liquors	16 10 02	Diffuse	Low

Table 4.2 Odorous raw materials for Sludge Treatment Centre Permit

Raw Material	Odorous	Storage	Mitigation	Odour Risk
Sludge polymer Flopam EM640HIB Flopam EM640HIB FLopam FO4650VHM	 Not odorous Not odorous Not odorous	6,000L stored in IBCs on portable bunds 6,000L stored in IBCs on portable bunds 28 tonnes stored in bunded silo	Contained with lid	 Low Low Low
Anti-foam Flofam 169 F	Solvent	3,000L stored in IBC on portable bunds	Contained with lid	Low
Anti-struvite chemical FLOSPERSE PX 60 N	Not odorous	2,000L stored in IBCs located on portable bunds	Contained with lid	Low
Diesel: White diesel	Petroleum/ solvent	56,160 L in bunded double skinned fuel tank 86,000L in bunded fuel tank	Contained with lid	Low
Lubricating oils MOBIL DTE 10 EXCEL 46	Oil	4,8000L stsored in separate ,200L clean oil and dirty oil tanks within	Contained with lid	Low

MOBIL SHC 630		each engine, which acts as a bund		
Glycol Coolant Texaco Delo XLC Antifreeze/coolant 40/60	Solvent	2 tonnes in 1,000L IBCs stored on portable bund	Contained with lid	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. Refer to risk assessment in Appendix 1 where these measures are summarised as "Normal Mitigations"

4.3.1 Odour Control Units

UWWTD

Maple Lodge STW has one OCU that treats odours from the pumping station. The OCU is fitted with forced ventilation that removes foul air from beneath the covers of the wet well. Air is filtered through an irrigated lava rock bio-filter using one direct drive fan pre-bio-filter, and then passes up a short stack. Extraction is from the pump station outside the front gate. A sampling point is provided.

The OCU is maintained monthly by a Framework agreed contractor.

4.3.2 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 Maple Lodge STW are summarised in the tables below:

In addition to the information in the tables below, the operations team also undertake daily and/or weekly checks of each part of the process to ensure they are operating correctly. These checks are summarised in Appendix 5 and 6.

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
Incoming Sewers & Reception Wet Well	Septic sewage / M	Check for spills	Site Tech 1s	Visual Inspection	None	Spillage identified	Clean up as soon as possible no later than the end of the day
Cess Reception, Discharge, Wash down & Drainage Linked tasks specified in 2.1 of appendix 6	Septic sewage / M	Spillages cleared as soon as possible.	Site Tech 1s	Daily	Continuous	Spillage identified	Clean ASAP but no later than end of day
Pumping station OCU Linked tasks specified in Section 9 of appendix 5	Septic sewage / M	This unit is regularly checked to ensure that the fans are operational and the covers to the reception well are closed.	Site Tech 1s	Visual Inspection	Daily	Reception well covers open or damaged	Close/ replace covers
		Monthly performance checks by specialist Framework agreed contractors.	Contractors	As described	Monthly	Issues identified in monthly report See section 5.1.3	as per monthly report
Storm & Balancing Tanks Linked tanks specified in site round Section 2.6 in Appendix 5	Sewage / M	The need for cleaning will be reviewed at the beginning of the summer months with the likelihood of higher load influent. Ensure Amajets are operational.	Site Tech 1s	Visual Inspection	As required	Collected debris in storm tank indicating attention to tank clean needed	Review the efficiency of the AMA jets within next 12 months
Screens & Screening Conditioning,	Sewage / M	Containerised skips. There is an extensive arrangement of screens and conveyance chutes feeding the Washpactors. Prompt action is taken to deal with breakdowns and/or blockages, to offset significant	Site Tech 1s	Visual Inspection	As required	Impaired screen action Skip over two thirds full	Attention to blocked screens is

Drainage & Rag Skip Management Linked tasks specified in 2.3 & 2.4 of Appendix 5		disruption caused by the build-up of screenings and associated spin-off problems with odour, rodents etc					immediate/asap on detection since will have significant impact on subsequent process. Timescales of remedial tasks such as repairs to screen brushes would be 2 to 8 hours; full replacement over 6 weeks duration. Screens have a yearly and five yearly service according to wear carried out by framework contractors Full skips aim to be removed within 1 week by Biffa
Grit Removal Equipment, Drainage & Grit Skip Management	Acrid / L	Grit is collected on a drained concrete slab rather than a skip. This is removed at least weekly to avoid odours and rodent nuisance.	N/A	Continuous	Continuous		Skips are on a weekly schedule

Linked tasks specified in 2.4 and 2.5 of Appendix 5							
Flow & Distribution to Primary Settlement Tanks - Chemical Dosing	Sewage / L	Ferric dosing has the benefit of suppressing odour generation in the sludge. The status of the dosing system is checked every shift.	Site Tech 1s	visual inspection	Continuous	Dosing system impaired	Checked daily by the PCE, Maintenance to attend to fault find and try to return back to service if unable a Framework supplier called for immediate attendance (within 24h)
Primary Settlement Linked tasks specified in Section 3 of appendix 5	Sewage / L	The plinth area where the desludging pumps are located has a tendency to collect spilled material. This requires washdown by tankers as required	Site Tech 1s	Visual Inspection	As required	Plinth area collect spilled material	Tanker wash down
		Primary Raw Desludge Pumping	N/A	Continuous	Continuous	Pump failure or blockage	Unblocked, when necessary, by the tech1 normally completed within 2-6 hrs
Fats Oil & Grease Removal System	Foul / L	Site rounds	Site Tech 1s	Visual Inspection	Daily	Blockage/failure	Attended and cleared within 2-6 hrs

Activated Sludge Plant Lanes & Zones Linked tasks specified in Section 4.1 of appendix 5	Earthy / L	Use Vigilance to ensure no crust formation	Site Tech 1s	Visual Inspection	Daily	Crust formation	Depending on location of crust we would check mixers are operational and in the anoxic zone also we would check that the aeration is functional and increase air if required to break it up – within 2-6 hrs if still present removal required via tanker
Final Settlement Tanks Linked tasks specified in Section 5 of appendix 5	Earthy / L	Ensure all bellmouths are kept clear with free flowing FSTs	Site Tech 1s	Visual Inspection	As required	Blockage	Bell mouths are visually checked every day as per site round and cleared if any blockages found within 2 hrs
RAS Chamber and pumping	Earthy / L	Daily checks to be carried out by site ops and cleared using site tanker is required	Site Tech 1s	Visual Inspection	Daily	Blockage/pump failure	Maintain pumps

							– Depending on blockage 6-8 hrs
SAS Chamber and pumping	Earthy / L	Daily checks to be carried out by site ops and cleared using site tanker is required	Site Tech 1s	Visual Inspection	Daily	Blockage/pump failure	Maintain pumps– Depending on blockage 6-8 hrs

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

Odour source	Odour and offensiveness L/M/H	Specific odour management tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for action	Remedial action & timescale	Odour risk if mitigation fails
Cess Reception, Discharge, Wash down & Drainage Linked tasks specified in Section 2.1 of appendix 6	Septic sewage / M	Spillages cleared as soon as possible. Ensure tankers coupled correctly.	Site Tech 1s	Daily	Continuous	Spillage identified	Clean ASAP but no later than end of day	M
Sludge import, Reception, Screening, Wash down & Drainage Linked tasks specified in Section 1 of appendix 6	Sludge / L	If out of service, can be diverted to digester feed tank. Check for spills. Ensure tankers coupled correctly.	Site Tech 1s	Visual Inspection	Daily	Spillage identified	Clean up ASAP. No later than end of day	L
Skip Management	Sludge / M	Replace skips to ensure they are not left too long	Site Tech 1s	Visual Inspection	As required	Skip two thirds full	Skips replaced on weekly schedule	M

Primary Raw Sludge Thickening & Pumping	Sludge / L	Distribution chamber and PFTs uncovered - monitored in the Control Room using the CCTV. PFT desludge volumes and DS content are monitored to ensure performance levels.	Site Tech 1s	CCTV	Continuous			L
SAS Thickening & Pumping	Earthy / L	Belts enclosed in ventilated building.	N/A	N/A	Continuous			L
Sludge Blending & Mixing Linked tasks specified in Section 3 of appendix 6	Sludge / M	This tank feeds all eight digesters and therefore any issues are dealt with immediately.	Site Tech 1s	Visual Inspection	As required			M
Primary Digestion Linked tasks specified in Section 6 of appendix 6	Sulphur Compounds / L	Filling controlled by SCADA. Check for spillage / blockage / vents blowing.	Site Tech 1s	Visual Inspection / SCADA	Daily	Visual observations and/or process diagnostics relating to physical/biological/chemical composition indicating abnormal operation identified by Operational Team and/or by Area Process Scientist.	Monitor feed rates, temperatures and pH on a daily basis. In the event manual check for pH. reduce feed to digesters and export to support. Digester may need re-seeding after consultation with Process Scientist.	M
Secondary Digestion Linked tasks specified in Section 7 of appendix 6	Sulphur Compounds / L	Levels are controlled by ultrasonic probe.	N/A	SCADA	Continuous	Approach as above	Approach as above. . Level of biological action significantly below primary digesters but any leaks/spills to attended to immediately/asap. For all tanks, any potentially significant containment/condition	L

							related issues to the tank/pipework/hard standing to be reported to Performance Manager/Health & Safety Team for risk evaluation (HAZID/HAZOP); APS entry and referral to Snr Mgt Team for action plan completion. Management response similar to anaerobic digesters (above).	
Centrate Liquor Return	Ammoniacal / M	Check lines for blockages	Site Tech 1s	Visual Inspection	Daily	Blockage identified	Jet the line within 4 days	M
Cake Pad & Drainage Linked tasks specified in Section 16 and 17 of appendix 6	Ammoniacal / M	Storage capacity is limited to less than four weeks; therefore movement of sludge cake is almost continuous. Cake in storage forms a crust after a day or two reducing risk of odour.. No additional turning or handling during cake storage. If long-term storage was needed temporary covers would be considered. cake pad is afforded protection by vegetation, which provides a wind barrier.Odour prevent by drop height of less than 2m.	Biorecycling/Site Techs	visual	Continuous	Visual check	Contact LMC to remove cake within a day	M
Cake imports Linked tasks specified in Section 16 and 17 of appendix 6	Ammoniacal / M	Regular collection of cake for removal from site. Cake in storage forms a crust after a day or two reducing risk of odour. No additional turning or handling during cake storage. If long-term storage was needed temporary covers would be considered. cake pad is afforded protection by vegtation, which provides wind barrier. . Pre-	Biorecycling / Site Techs	Visual	Continuous	Visual check	Contact LMC to remove cake within a day	M

		acceptance checks on incoming digested cake. Odour prevented during handling by limited drop heights, tipper trucks deposit sludge onto pad from height of less than 2m						
Vehicle Movements & Wash Down	Ammoniacal / M	Cover wagons. Use diversion and wheelwash.	Site Tech 1s	Visual Inspection	As required	Wheelwash failure	Use contractor to repair within a week	M
CHP Linked tasks specified in Section 9 of appendix 6	Exhaust gases / M	Routine maintenance programme. Raised exhaust flume.	CHP Team	N/A	Continuous	Chattering valves	Use contractor to fix the issue within 2 days	M

Table 4.5: Intermittent (Int), abnormal (Ab), and emergency (E) events for assets under UWWTD

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response to odour under Int/Ab/E events	Odour risk after mitigation
Incoming Sewers & Reception Wet Well	Spills	Ab	Clear up and isolate as per spills procedure in 4.3.3.	(**Int**) OPS to attend within the hour	Medium
Cess Reception, Discharge, Wash down & Drainage	Spills & Blockage	Ab	Clear up ASAP as per spills procedure in 4.3.3.	Stop operation and contact Commercial Waste Team.	Low
Storm & Balancing Tanks	Failure of Amajets, sludge build-up.	Ab	Repair Amajets. implement manual cleaning of the tank, employing the system of valves, or by tanker, to wash the tanks out. This will be carried out as required.	Raise a job for the LMC to organise a tanker	Medium
Screens & Screening Conditioning, Drainage & Rag Skip Management	Screens/ Washpacter block, fail. Washwater failure.	Ab	Repair, Unblock, see SOM for details	Blockages dealt with on identification. **Ab/E:** Loss of 2 (3) of the	Medium

				four screens would be significant	
	Enclosed skip unit failure.	Ab	Replace	**Ab**: Skips only accumulate due to presence of liquids. Ramps and tankering used as appropriate. Coverings used	Medium
Grit Removal Equipment, Drainage & Grit Skip Management	Grit allowed to build up on slab.	Int	Remove	Contact Biffa for replacement skip and OPS to clear area	Medium
Flow & Distribution to Primary Settlement Tanks - Chemical Dosing	Failure of dosing system	Ab	Repair, see SOM, see SOM for details	Call in framework contractor	Medium
Primary Settlement	Scaper Failure	Ab	Taken out of service unless they can be repaired within hours	**Ab** operational response from couplings and motor issues within 2 weeks turnaround. **E** operation would be loss of 2 of the 3 PSTs. Response would be to manually de-sludge with increased export.; 1 to 2 weeks to empty and then contractor	Medium

				support for up to 4 months if complicated repair with use of crane. Scraper failure referenced in Table 4.3.	
	Rising sludge due to failure of desludge	Ab	Desludging is carried out by over-pumping if the desludge system fails or is blocked.		Medium
	Rising sludge due to failure of scum removal	Ab	Scum removal is carried out using a tanker if the descumming system fails or is blocked.		Medium
	Blockage / Bridge failure on Fats, Oil & Grease Scum Removal System	Ab	Tanker to clear. Repair plant, see SOM for details.		Medium
	Blockage / Bridge failure / Pump failure on Primary Raw Desludge Pumping	Ab	Repair. Overpump. Take off line. Unblock. See SOM for details.		Medium
Activated Sludge Plant Lanes & Zones	Blower/ aeration failure.	Ab	Has standby capacity to ensure now distribution during repair.		Low
Final settlement tanks	Empty tanks collets stagnant water scum	Ab	Tank to be drained by OPS and cleaned		Low
SAS chamber and pumping	Scum build up on south side	Ab	Chamber to be cleared using site tanker		Medium
OCU	Failure	Ab	Replace media. Repair fan. See SOM for details. Monhtly performance checks by framework contractor. Order raised via SAP	Int/Ab. Consider temporary odour suppressant sprays for sludge OCU if cannot be re-started.	Medium

Table 4.6: Intermittent (Int), abnormal (Ab), and emergency E events for assets under Sludge Treatment Centre Permit

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response to odour under Int/Ab//E events	Odour risk after mitigation
Cess Reception, Discharge, Wash down & Drainage	Spills & Blockage	Ab	Clear up ASAP as per spills procedure in 4.3.3.	Raise a job for the LMC to organise a tanker to	Low
Sludge reception, screening, wash down & drainage	spillages	Ab	Clear up ASAP	Operations to attend with in the hr	Low
Skip management	Skips not replaced	Ab	Chase contractor to collect skips. Site ops can move skips if required.		Medium
Primary Raw Sludge Thickening & Pumping	Scraper failure. Sludge inversion. Blockage. Pump failure.	Ab	The tank will be emptied and recommissioned.	Failure of the units impacts manually on upstream processes. **Int:** re-set unit. **Ab**: would be operational team re-setting or replacement. If mechanical/electrical part failure, a job raised within next working day to examine. **E:** If extended for more than c. 1 week consider supplementing process through exports. This issue would manifest itself	Low

				in blanket levels which at c. 1m+ of sludge depth consider tankering out. Limited odour risk present from dismantling thickener; more potential for odour from emptying and cleaning tank or if septicity present	
SAS Thickening & Pumping	Plant Failure	Ab	Promptly emptied and fixed. See SOM for details.		Low
Sludge Blending & Mixing	Blockage	Ab	Prompt action to clear, failure to deal with fault would starve digesters.		Medium
Primary Digestion	Spillage due to limpet blockage.	Ab	Unblock	**Ab/E**: pH is key for process mgt control; monitored on daily basis. If pH drops below a trigger of c. 6.6 tank feed would be reduced & supplemented by tankering in instances of backing up. Temperatures are relatively stable (38-43 degrees as digester average) which minimises the definition of an **Int** event. An **Ab** event	Medium

				might constitute over-feeding of the digesters. **E:** risk of odour at below 6.6 pH would be responded to by ceasing feeding and likely need to re-seed.	
Centrate Liquor Return	Line Blockage	Ab	Inhibited. Overpump. Clear lines.		Medium
Cake Pad & Drainage (including cake imports)	Blocked drainage	Ab	Unblock		Medium
	Full Stockpile	Ab	Implement cake removal -	Ab: Should there be reasons for not recycling cake from site, then there could be an odour impact resulting from cake wetting or crusting, weather dependent. Breaking into a stockpile of aged sludge can be more odorous.	Medium

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

Incidents and emergencies	Event	Status	Ops mitigation	Expansion of TWUL operational response to	Odour risk after mitigation

				odour under Int/Ab//E events	
Illness/absence of key staff	Accumulation of sludge/loss of odour control etc.	E	Task allocation is independent of individual staff.		Low
Power cuts	Loss of power to fan leading to loss of odour control	E	Within Thames Water's incident response planning, arrangements are already in place with a supplier for temporary generators. This agreement has a Service Level Agreement for provision within 24 hours.	Greatest risk in persistent inclement weather where temporary external power outages might constitute the most likely externally generated risk. Recourse to temporary generators.	Low
Fire	Reduced treatment capacity, damaged assets.	E	Fire evacuation procedure implemented. Sludge throughput decreased and imports diverted to other sites. Potential to hire in temporary odour suppression units. Follow Thames Water Incident Management Procedures.		Low/Medium
Flood	Reduced treatment capacity / damage to assets.	E	Diversion of imports to other sites. Potential to tanker indigenous sludge to other sites.	Pumps/tankering arranged through LMC.	Low/Medium
Severe Weather	Cake exports inhibited.	E	Stop processing and store digested sludge in secondary digesters. 60 days storage time available on cake pad.		Low
Other incidents	Transport of sludge/cake to land inhibited for other reasons leading to in additional potential odour release	E	Provision for 60days storage on site plus additional storage at other Thames Water sites if necessary		Low

4.3.3 Spillages

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

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

4.4 Routine Monitoring

Overall plant performance is assessed daily as part of the generic Site and Sludge inspections rounds, which apply to Thames Water large STW sites, and have been included in appendices 5 and 6, respectively.

The objective of these are to ensure that treatment processes, including odour control, are checked for effective operation as per the SOM. Any of the checks that result in performance of the process outside of the limits defined in the SOM or a fault being detected will require an Operator to change the process to bring the plant back into acceptable limits or the fault needs to be logged and reported for follow up maintenance/repair.

Where remedial actions are identified from any source these are listed in Tables 4.3 & 4.4 with expected durations accompanying rectification. The timescales given are indicative or illustrative but are informed directly by operational experience. Repairs requiring capital funding will take longer as they are directly informed by complexity and will be bespoke to the issue(s) identified.

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

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

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

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

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

- pH: At a conventional digestion site such as Maple Lodge the processes is maintained around pH 7 but within the range 6.72 – 7.6 (this is % dry solids and digester load dependant) for healthy operation.
- alkalinity: Levels dependant on feedstock characteristics (primary sludge: surplus activated sludge (SAS) ratio). Conventional digestion typically, 3,500 - 5,000mg/litre range.

- temperature: minimum target of 38°C. This is maintained within the range 36-40°C.
- HRT (hydraulic retention time): minimum target is 15-days, there is no upper limit. Retention times shall not be less than 12-days during plant outages to keep the product pathogen kill efficiency control.
- OLR (organic loading rate): see table below - this is dependent on the primary/SAS ratio. Maple Lodge fits into the first row of the table.
- Dry solids feed: see table below, Maple Lodge has a target of 6%DS, but this can vary between 3-8%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 digester. The typical range for VFAs in a primary digester is between 50 and 800 mg/L. When VFA concentrations climb above 1000 mg/L, the digester could be overloaded or experiencing other problems.
- Ammonia - Ammonia concentrations of 50 to 1000 mg/L are beneficial, but ammonia levels of 1500 to 3000 mg/L (pH greater than 7.4) could be inhibitory but not always. An ammonia concentration higher than 3000 mg/L for prolonged period is toxic.
- VFA to Alkalinity ratio: Very important parameter to monitor for digestion process. The VFA to alkalinity ratio of below 0.4 is good and above this threshold value means diminishing alkalinity and low pH i.e. sour digester content. As long as this ratio is maintained higher VFA, and alkalinity digester content can be acceptable, and the digestion process is deemed healthy. Anaerobic digestion process is always controlled based on holistic parameters based but not based on single parameter.

Odour monitoring is carried out following receipt of an odour complaint. See section 6.3 Investigating a complaint for full details. Should an influx of odour complaints be received, the need for proactive monitoring will be assessed.

Sniff testing

Sniff testing has been incorporated into our Odour Improvement Plan (Appendix 2). This is to allow for the time necessary to arrange personnel, not sensitised to smells on site, to undertake the sniff testing.

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 is less sensitised to any odour produced on site.
- Assessing potential odour sources within the Urban Waste Water Treatment (UWWT) and Sludge Treatment Centre (STC) processes and attempt to trace the odour to its source.

- The procedure and recording form which will be used can be found in appendix 8 of the OMP.

We aim to ensure a robust process is in place for investigation of complaints involving non-site based staff (see Section 6 of the OMP). We also ensure regular routine maintenance is undertaken involving site walks to ensure more odorous activity is identified, captured, resolved and logged in the site log book.

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

4.5 Record Keeping

Records of routine monitoring, site and sludge inspection rounds and sludge blanket checks are kept on SAP. Records of skip management, which collect wastes generated from UWWTD activities, and any spillages and remedial actions are held in the ELogbook. 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 and stored on SharePoint.

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.

The mains supply for the site is supplemented by the two CHP engines generating most of the power needs of the site. In the event of a mains supply failure the CHP's will shut down to prevent overload and potential damage to the site power systems and the Power Management System will start the two diesel standby generators to restore power to the site. Once mains power is restored the PMS system will transfer back to the mains supply shut down the diesel generators without interrupting power on site. The diesel generators will power all plant on site.

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

Irrespective of such constraints, 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 (already present in Section 6.2 of OMP to investigate customer complaints).
(b) Targeted use of sniff tests ('calibrated nose')
(c)H2S measurements of stored materials where septicity is either present, or the material is at risk of septicity from continued storage especially in the open air, for example, prior to de-watering where measurements of sulphide & dissolved O2 would inform a condition assessment. Quantities and storage times precipitating a need for such assessments. This recommendation is being raised with the Area Process Scientist.
(d) Inclusion of temporary odour suppressants/misting agents (for example, where use is recommended in Table 4.6) and continued access to process critical spares (odour minimisation by early intervention).
(e) Further expansion of odour risk within site incident planning (this is already referenced in Tables 4.5, 4.6 & 4.7 under relevant Intermittent; Abnormal Operation & Emergency scenarios)
(f) Temperature assessment in secondary digestion tanks on the basis that increased temperatures give greater potential for volatilisation of odours (This connects to the 'Secondary digester' entry in Table 4.6 *but in the context that raw sludges have greater odour potential)*
(g) For PSTs, asset condition (wear/damage) would consider odour risks where assets are taken offline (see entry 'Primary Settlement' in Table 4.5)
(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

5.1.1 General Requirements

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

In addition to the routine operational tasks, planned preventative and defect maintenance of plant is carried out. Plant which may have an impact on odour release is assigned an appropriate criticality rating to ensure effective performance is maintained. Plant assessed to be odour critical is listed in Section 4.2 above.

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

5.1.2 OCU selection and performance validation

UWWTD:

OCU 1 serves the pumping station.

Odorous air is extracted from the pump station and fed via ductwork to the bio-trickling filter. The biotrickling filter pumice stone media is irrigated with water or FFE at the top of the biofilter via 4 spray nozzles, and the flowrate is controlled by timed irrigation of an actuated valve. The motive force for the air is a duty fan located after the biofilter which discharges the treated air to atmosphere via a stack. The media volume has been estimated from site measurements and the media wetting liquor rate has been calculated following the site visit.

Original Manufacturer	Hibernia ETH Ltd
Height x Width x Length	1,200 mm x 2,400 mm x 2,400 mm
Materials of Construction	HDPE

Construction Type	Rectangular
Media Type	Pumice
Design Airflow Rate	283 m3/hr
Design H2S inlet Load	50 ppm (max) 5 ppm (average)
Design inlet temperature	20 C
Design removal efficiency	98%
Duty/Standby Fan	1x Duty
Fan materials	PVC
Stack Dimensions	Ø100 x 2,000 mmH
Stack materials	PVC
Stack discharge velocity	9.5 m/s

Design basis back calculated by ERG

For periodic operational 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 H_2S 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.

The equipment and loadings of OCU1 continue to meet the original design specification with additional headroom for future additional processes, where identified. Unscheduled additions are avoided as these require a process re-evaluation to consider the impact on the OCU. No such changes since the original installs have been undertaken. Evidence of the systems continuing ability to treat the input flow are confirmed by monthly inlet and outlet odorous gas (hydrogen sulphide) concentrations. Examples of such reductions are given in 5.1.3 iii) of the OMP

5.1.3 Maintenance of Odour Control Units

At Maple Lodge STW there is a service contract with a specialist Contractor for the OCU. They carry out monthly inspections of the OCU. The detail below highlights the scope of work required from our OCU Maintenance Contractors through their monthly visits.

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 contractors. Refer to the Odour Control Unit Asset Standard and Site Operating Manual for more information. The scope of this table includes anticipated monitoring requirements of emissions to air from the OCU outlets; TWUL's own site round checks as they pertain to OCUs; followed by a further five key performance indicators reflecting discussion with our specialist OCU inspection contractor as of greatest relevance to Maple Lodge.

Table 5.1 : Performance Monitoring and Maintenance Checks

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

Typically systems work around 0.5 kPA		as high priority. Check for blockages, poor FFE quality/check if media is of a type susceptible to biodegradation.				
pH of discharge irrigation water (2-3pH)	pH paper	Less than 2 increase irrigation.	Monthly	X	-	-
pH of scrubber liquor (9.2 pH)	Calibrated pH probe (calibrated with standard solutions)	Recalibrate pH probe and check dosing and chemical availability	Continuous	-	-	X
Redox potential of scrubber liquor (700-730 mV)	Calibrated redox probe (calibrated with standard solutions)	Recalibrate redox probe and check dosing and chemical availability	Continuous	-	-	X
Gas inlet/outlet concentrations for hydrogen sulphide (50ppb used for media change out)	Drager Tubes/CEN TS 13649 for sampling NIOSH 6013 for analysis OR US EPA M11 *	Check functionality of odour control unit. If repair or replacement media required raise a job on SAP or APS risk and arrange for contractor repair. Timescale Bespoke to root cause/see later entries. Arrange re-test post remedial work. Major repairs up to 6 months depending on complexity	Monthly/ 6 monthly	X	X	X
Gas inlet/outlet concentrations for ammonia (20mg/m3)	Drager Tubes/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	Quarterly/ 6 monthly	X	X	X
Gas inlet/outlet concentrations VOCs and RSH	RSH – Drager tubes VOC – PID as isobutylene		Quarterly	x	x	x
Outlet gas streams TVOCs HCl	 EN 12619 * EN 1911 *	6 monthly IF identified as relevant in wastes gas stream characterisation				
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 on OCU's that fall within the STC permit*

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

The OCU at Maple Lodge is covered by a service and maintenance contract. External contractors inspect the OCU on a monthly and quarterly basis and reports are sent to the Performance Manager. 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. More detailed maintenance procedures are located in the SOM.

The OCU biofilters 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 the OCU is checked to see ***if they can meet 6m/second*** with escalation in monthly contractor inspection reports where this value is not reached. This is a good indicator of functionality, appropriate sizing, and system health.

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

All OCUs, irrespective of media type, *will stipulate a minimum of 30 seconds* ***retention time***, for a biofilter to achieve a minimum of 95% removal efficiency. **Surface area** is the other part of the specification ***where the requirement is to achieve a maximum of 300m^3/hr/per m^2*** (for design purposes). It is surface area, and the ductwork values identified within question (i) above, that are the key informants to an evaluation of OCU performance. If this description of efficiency (across the bed) slips this would be raised for attention in the contractor monthly inspection reports. These values are better described as recognised industry standards rather than trigger points.

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

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

- Daily site rounds by TWUL technicians according to the scope of '9. Odour Control' within 'Appendix 5 – Site Rounds'. These are Psion based checks using SAP Plus for escalations for example, internal MANDAT tickets or identifying a need for contractor support. There is connectivity in the scope of the daily site rounds and monthly contractor inspections reports illustrated by the 'Tasks for all odour units – a:d' (and for a sub-set of the filter entries by type) in the daily checks mirroring the numbered tasks in the contractor 'Monthly Health Checks' given in Figure 5.1.

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 a biofilter,* so this parameter has less relevance. Biofilters post humidification standard being > 90%.

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

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

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

5.1.4 Records

Maintenance history records are stored on SAP or the company's SharePoint system.

Reports from the OCU contractor are sent to the Performance Manager and held on SharePoint.

5.2 Fault Reporting

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

5.3 Emergency Repairs

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

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

6 Customer Communications

6.1 Customer Odour Complaints Process

Customer contacts regarding Maple Lodge 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 Maple Lodge STW, to ensure that all contacts are recorded and actioned. Customers have 3 main options to report complaints to Thames Water:

1. Thames Water Website – “Report A Problem” at https://www.thameswater.co.uk/contact-us/report-a-problem/report-a-problem-online
2. Email - customer.feedback@thameswater.co.uk with the subject ‘Maple Lodge Sewage Treatment Works’
3. Telephone - Customer Services 0800 316 9800

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

Three Rivers District Council – Environmental Services
Telephone: 01923 776611
Email: enquiries@threerivers.gov.uk

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

Customer contacts regarding Maple Lodge 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 Maple Lodge STW site management will investigate and respond the next working day.

6.2 Customer Communication Plan

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

6.3 Investigating a complaint

Customer will contact TW either via a phone call or email.

If this is via phone call, a Vistec activity is sent to the Waste Operations Control Centre WOCC, who forwards the contact via email to Customer and stakeholder manager. We have 24 working hours to respond to the customer. Within these 24 hours, the Customer & Stakeholder Manager will contact the customer to acknowledge the complaint and ask for further details which can help to investigate the source of the reported odours. Customer and stakeholder manager (CSM) will contact the Performance Manager and discuss the required investigation at site to determine the source of the odour and what can be done/actioned. The CSM will update the Customer.

Should the source of the odour be confirmed as coming from the Thames Water operations then the Performance Manager will review all activities currently taking place on site, including any maintenance, cleaning, and non-standard activities to identify to root cause, and ensure appropriate mitigation measures are in place. They will update the OMP if required.

If the performance manager cannot identify the source of the odour, the CSM will contact the customer who made the complaint and obtain further details and explain the site has been checked etc. These details include their address in relation to the site location, the time of occurrence and for how long. If odour problems continue to persist, Thames Water may even ask the customer to keep a detailed odour diary to ensure their issue can be fully addressed.

The root cause investigation may include site walkaround checks, which look for irregularities such as spillages / open doors and hatches, ensuring appropriate measures as detailed in table 4.5 and 4.6. are in place. It may also include off site visits to the customer location.

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 or the CSM, will participate in the walkaround checks.

Contacts made via email, will be investigated in the same way, and updates will be given to the case manager to update the customer etc.

Following investigations, the customer is updated accordingly.

6.4 Notification of Operations with Potential to Cause an Odour Problem

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

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

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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STW%20SERV%20Od

Appendix 2. Odour Improvement Plan

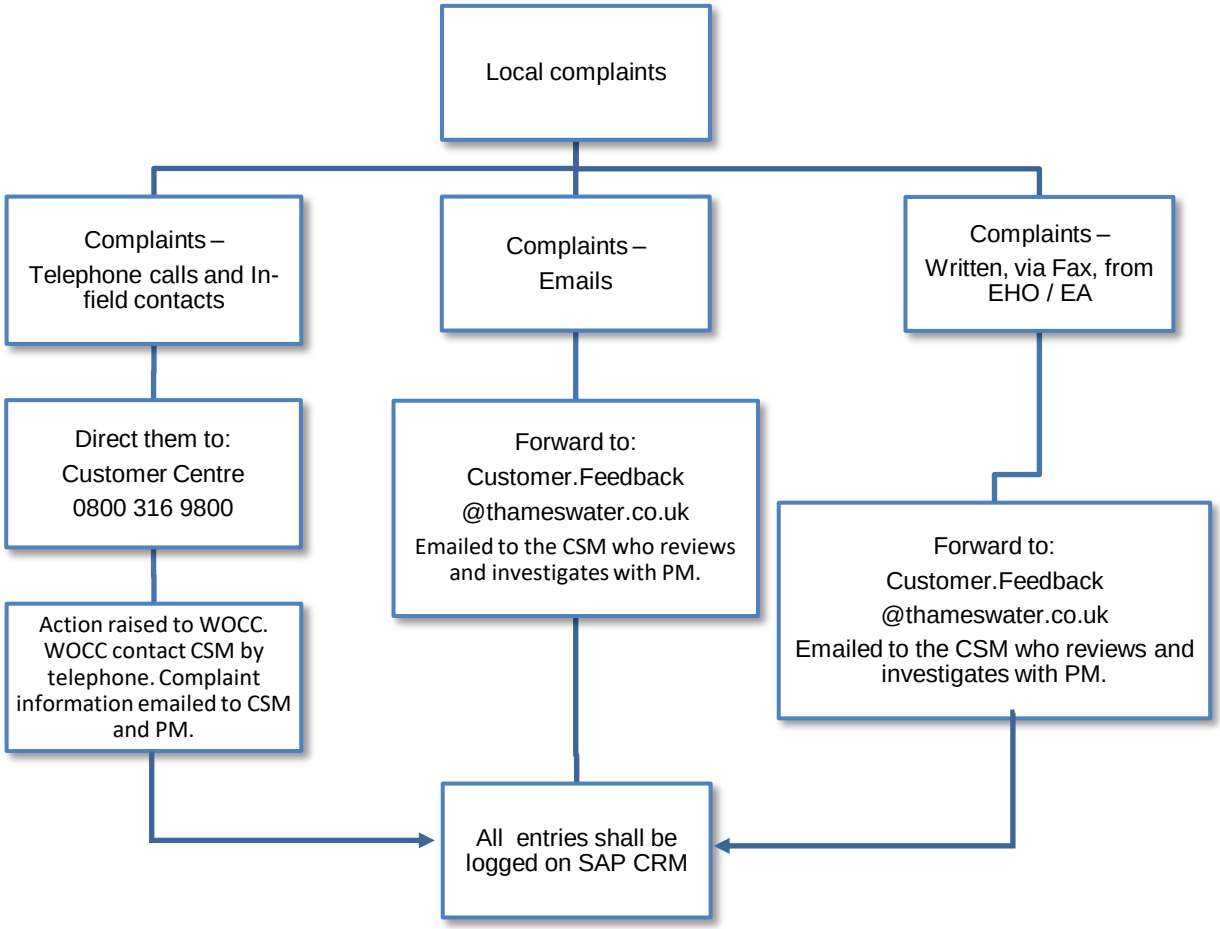
Odour Improvement Plan Maple Lodge STW

Review Date		Aug-23				
Process Stage	**Owner**	**Plan**	**Action**	**Expected difficulties**	**Measures to mitigate**	**Timeframe**
Storm Tanks	James Howells	Ensure effective cleaning following storm	Investigation of amajet performance is now complete. Seek funding for amajet replacment/upgrade.	Funding	Manual clean as required.	AMP 7
OCU	James Howells	Action recommendations laid out by monthly health checks	Action recommendations laid out by monthly health checks	Achieving funding		ongoing
Sniff Testing	Odour Specliast	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	OCU monthly health checks, site rounds	6 month from permit issue

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	Huw Thomas
Telephone:	07747 647304	07747 640011

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**
Three Rivers District Council Environmental Health Department	As required but at least quarterly	Telephone / email / meeting	Update on operational activity on site	Performance/Site Manager
Environment Agency	As required	Telephone / email / meeting	Update on operational activity on site	Performance Manager and Customer & Stakeholder Manager
Local residents assocations *(if applicable)*	As required but at least annually	Telephone / email / meeting	Update on operational activity on site	Performance/Site Manager
Stakeholders Internal	**Frequency of Contact**	**Method & Level of Contact**	**Aim of Contact**	**TW Contact/Level**
Press Office	As required	Report sent out by operations to the business	Update the business on operational activity on site	Duty Manager
Customer Centre (Swindon)	As required	Report sent out by operations to the business	Update the business on operational activity on site	Duty Manager

Level 2	Unstable operations: • Non-compliant with Operational Asset Standards on one or more sub-processes leading to increased odour risk.			
Communications Approach	As Level 1 plus: • Use of Contact Centre Bulletin Boards/Briefing Contact Centre agents/Briefing statement with Q&A prepared for the press office (to use reactively). • Monthly discussions with, and quarterly visits from, the EHO. • Commence proactive communications with other stakeholders.			
Stakeholders External	**Frequency of Contact**	**Method & Level of Contact**	**Aim of Contact**	**TW Contact/Level**
Three Rivers District Council Environmental Health Department	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager and Customer & Stakeholder Manager
Environment Agency	Potential for notification procedure	As required as per notification procedure	As required as per notification procedure	Pollution Desk Performance Manager
Local residents assocations *(if applicable)*	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager and Customer & Stakeholder Manager
Stakeholders Internal	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Press Office	Immediately then weekly	Q&A prepared for press office by Operations	To enable the press office to deal with queries from the press (reactive only).	Duty Manager
Customer Centre (Swindon)	Immediately then weekly	Telephone / email	To enable the Customer Centre to deal with queries from the press (reactive only).	Duty Manager
Other areas/stakeholders outside Maple Lodge STW potentially impacted				
Stakeholder	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Local businesses	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Process/Site 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**
Three Rivers District Council Environmental Health Department	Immediately then weekly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5/4 Manager
Environment Agency	Immediately then weekly as required as per notification procedure	Telephone / email / meeting as required as per notification procedure	Report emergency event with action plan and update with progress as required as per notification procedure	Level 5 Manager (Operations Manager) / Pollution Desk
Local residents associations (if applicable)	Immediately then monthly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Process / Site Manager
Councillors (Include names if Operations have regular contact with them) / MPs for local areas	Immediately then monthly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5/4 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
Customer Centre (Swindon)	Immediately then daily	Telephone / email	To enable the Customer Centre to deal with queries from customers (reactive only)	Duty Manager
Other areas/stakeholders outside Maple Lodge STW potentially impacted				

Stakeholder	Frequency of Contact	Method of Contact	Aim of Contact	TW Contact/Level
Local businesses	Immediately then monthly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Process / Site Manager

Appendix 4 Site Drawings

Figure A - Site Location Map

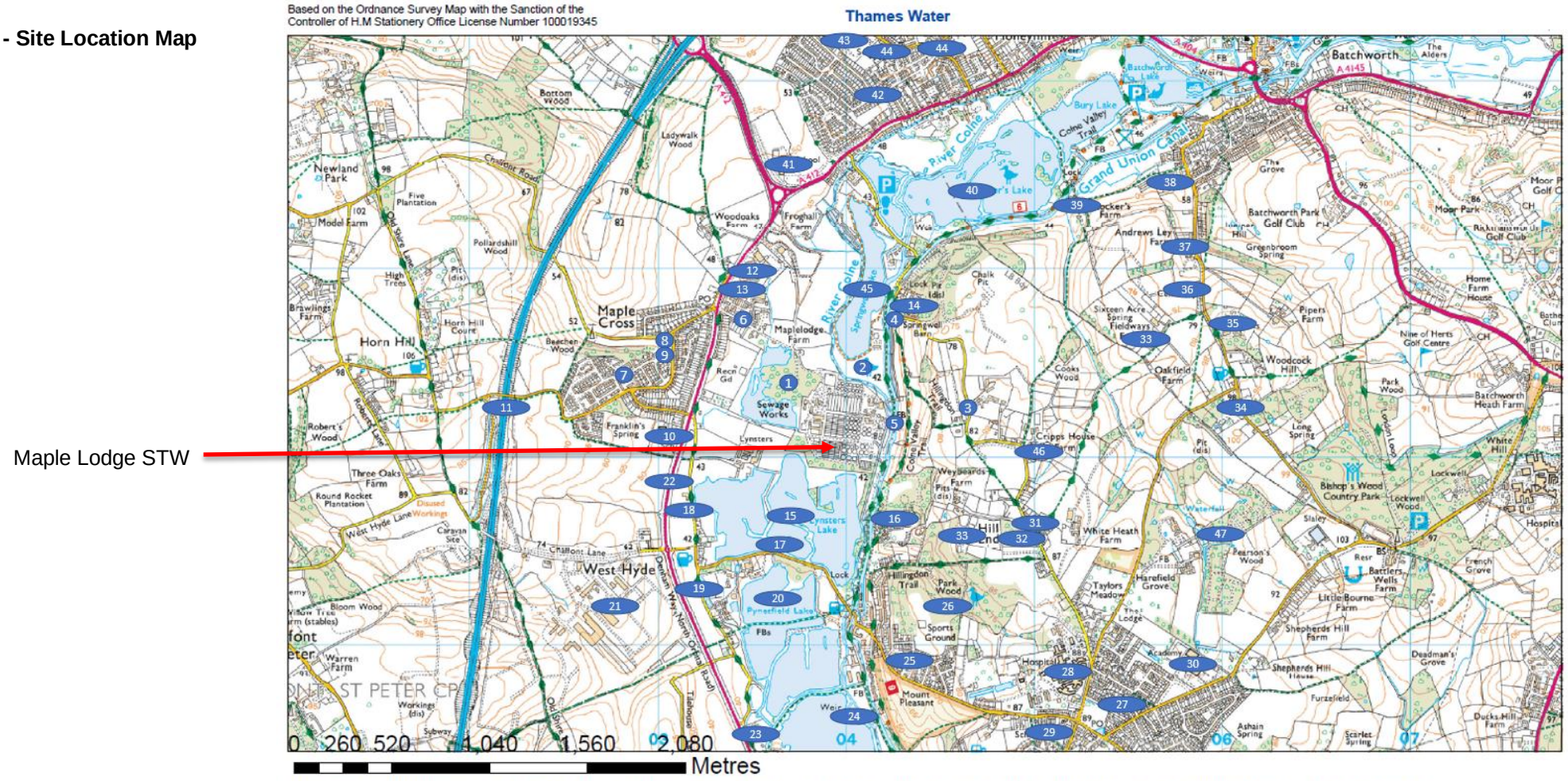


Figure B - Site Plan

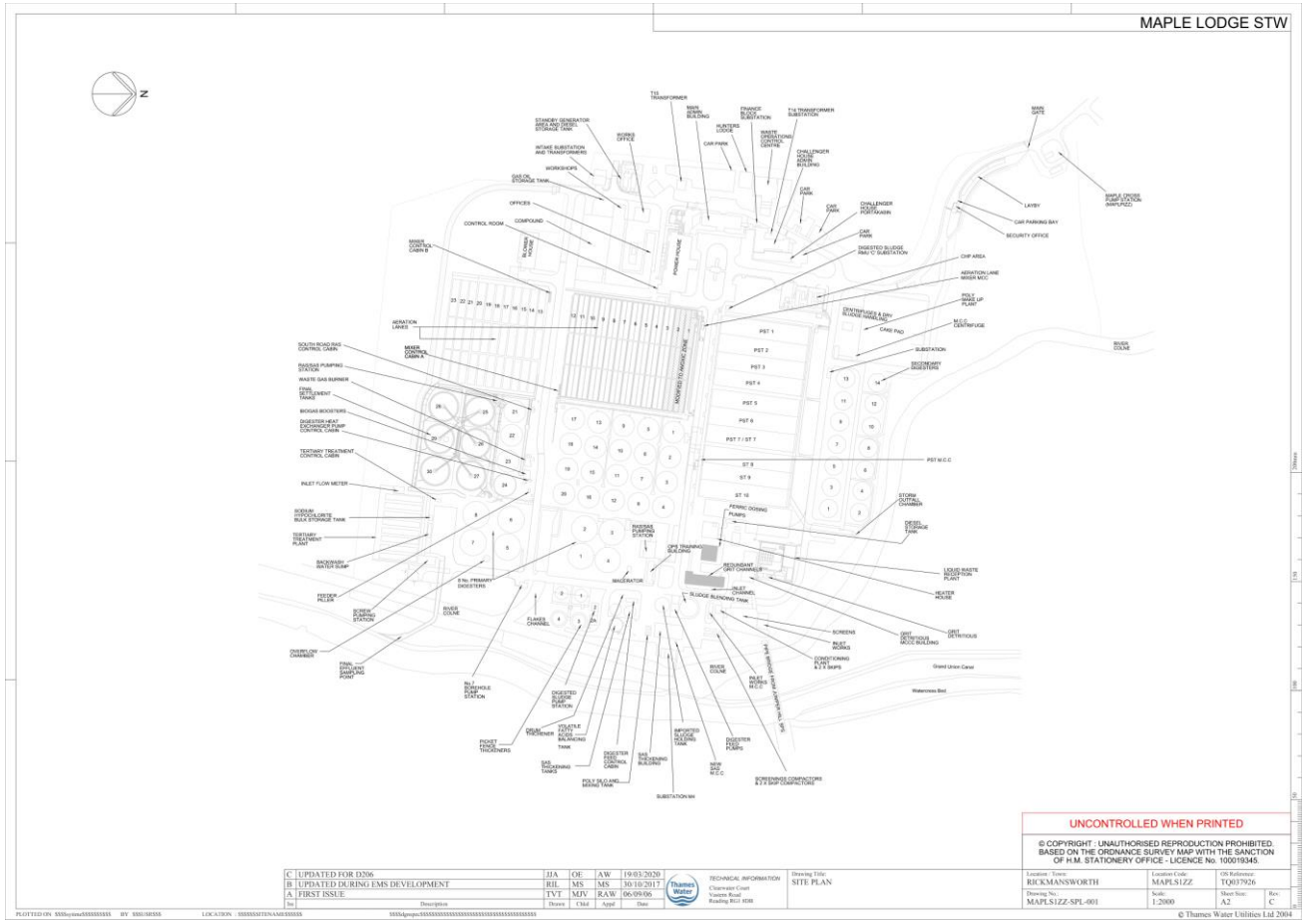


Figure C – Permitted Area

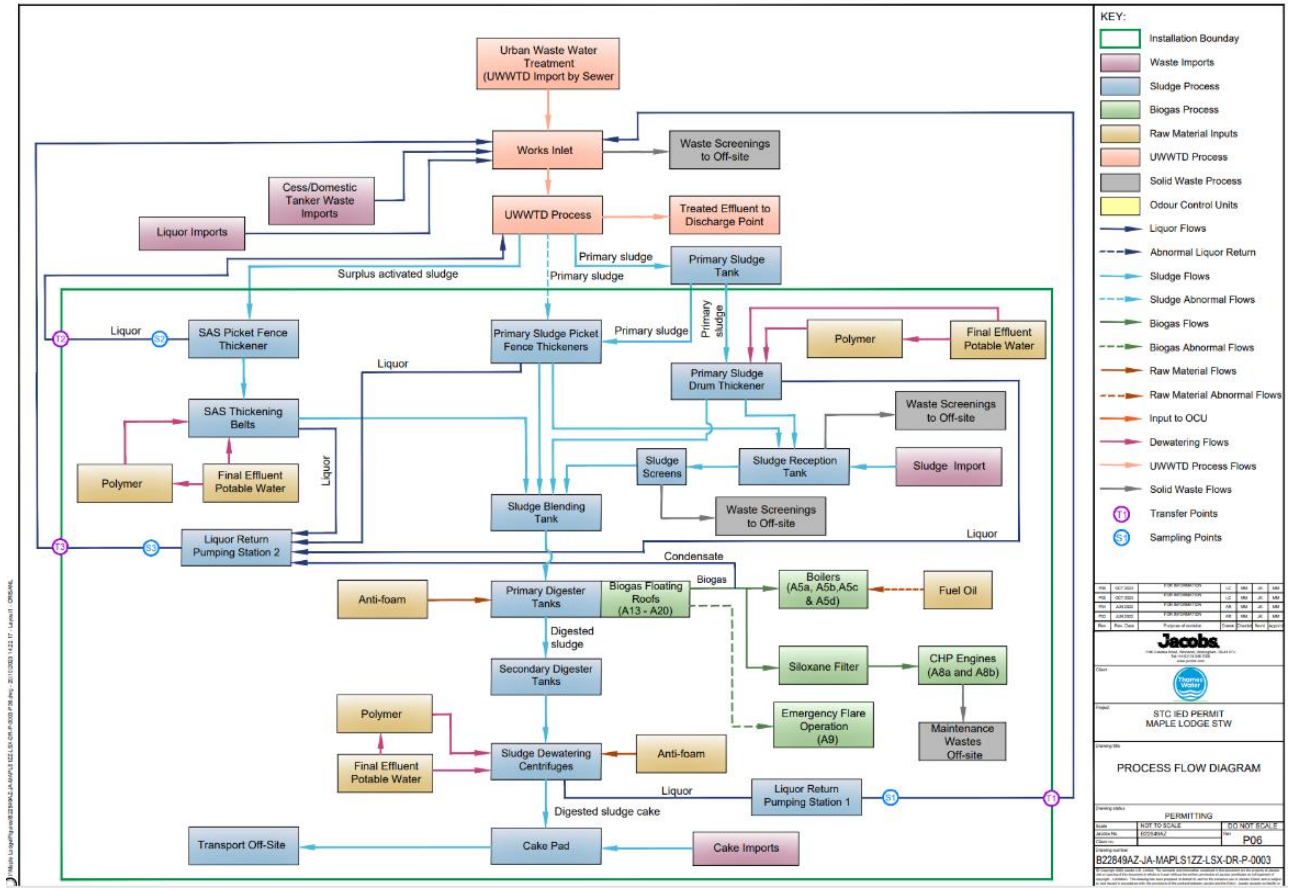


Figure D1 - Process Block Diagram

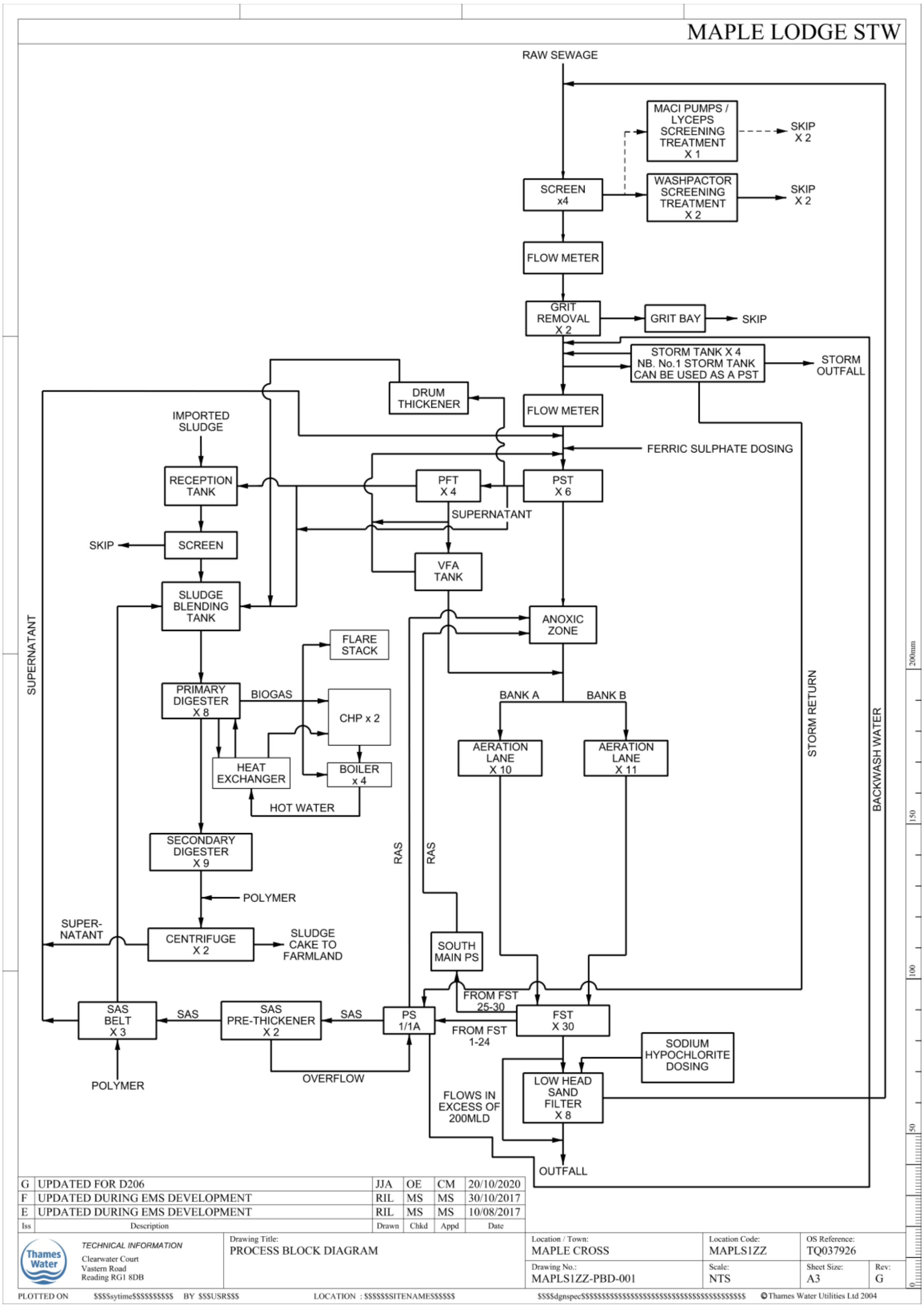
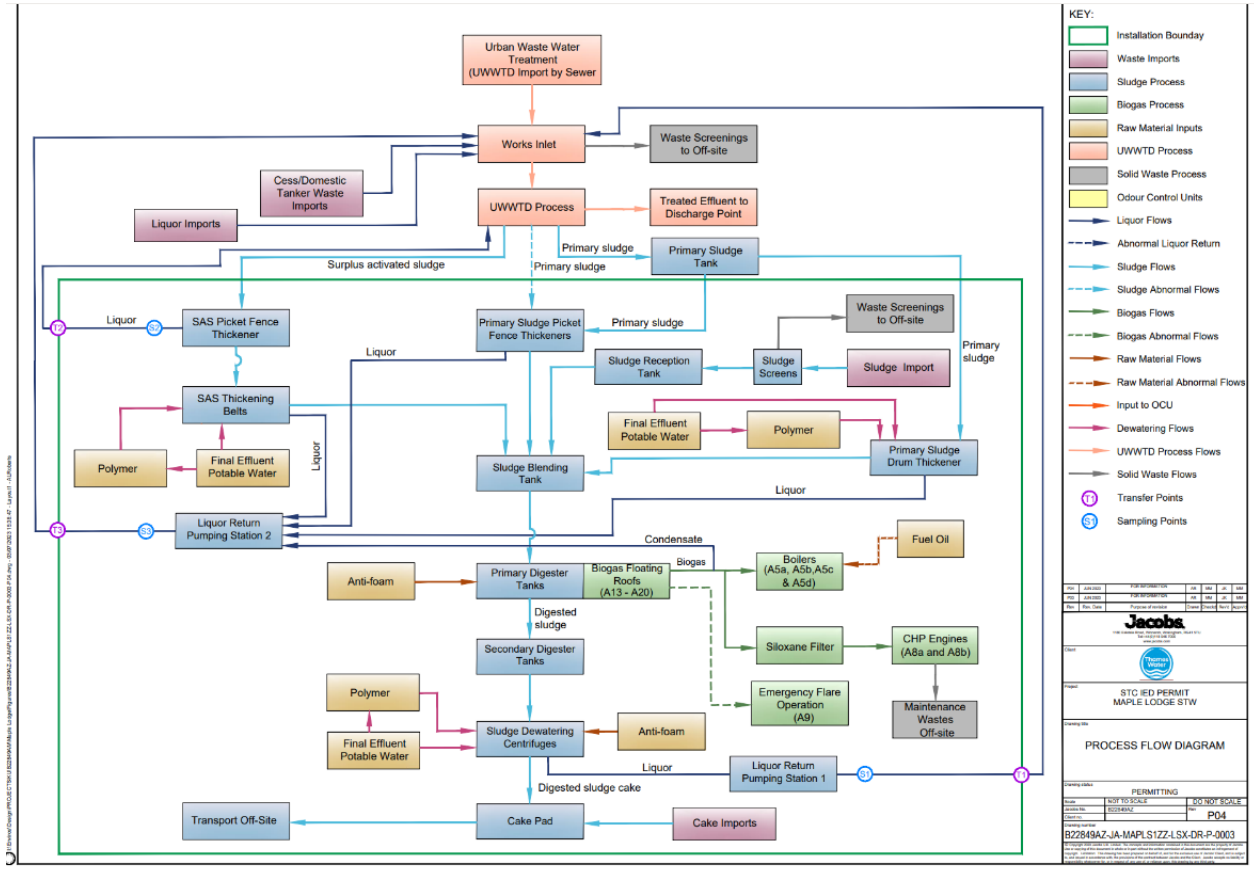


Figure D2 - Process Block Diagram for Sludge Treatment Centre Permit



Appendix 5. Generic Site Round Checks

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

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

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

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

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

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

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

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

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

ID	Instruction	Daily	Weekly
b)	Check weir overflow quality and the surface of the unit. Clear any buildup of debris	**X**	
c)	Log blanket measurements / pump timers	**X**	
d)	Sample from discharge pump (run manually if necessary) and assess product quality. Sample, analyse and record % dry solids entering the PFT. Sample, analyse and record % dry solids out (Monday, Wednesday, Friday)	**X**	
e)	Check control system is operating normally	**X**	
f)	Log any changes to settings or duty	**X**	
g)	Log sludge flows in (where meters fitted) and out	**X**	
h)	Visually assess the dry solids & flow entering the PFT	**X**	
i)	Log hours run meters	**X**	
j)	Remove buildup of debris on the rake	**X**	
8.3	**Belt Thickeners**	Daily	Weekly
a)	Check for good floc formation. Check sludge on the top belt and assess the conditioning of the sludge. Check belt drainage and filtrate quality	**X**	
b)	Check product quality & quantity. Check condition of hopper	**X**	
c)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	**X**	
d)	Sample, analyse & record % Dry Solids on feed and sludge/cake (Monday, Wednesday, Friday)	**X**	
e)	Check sludge feed rate and log	**X**	
f)	Check poly dosing system. Log polymer usage, note each bag change/delivery. Make adjustments to optimise	**X**	
g)	Ensure wash water pressure is available at a minimum of 6 bar	**X**	
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**	

ID	Instruction	Daily	Weekly
n)	Check condition of Belt Filter for blinding / blockages / good filtration	X	
o)	High pressure steam clean the belt from underside.		X
p)	High pressure steam clean complete machine, frame rollers and hoppers avoiding all electrical and instrumentation equipment		X
q)	Check condition of Belt Filter for wear i.e. Creasing / condition of seam to avoid failure / breakage and damage to other components		X
8.4	**Drum Thickeners**	Daily	Weekly
a)	Check for good floc formation. Check sludge feed rate. Check product thickness (visually). Check filtrate quality	X	
b)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	X	
c)	Sample for % dry solids analysis and record (Monday, Wednesday, Friday)	X	
d)	Check spray bar nozzles to ensure they are clear and spraying correctly. Check spray bar wash water pressure	X	
e)	Clean probes in discharge hopper, hose down and carry out cleaning duties	X	
f)	Log polyelectrolyte used – each drum/bag change	X	
g)	Log sludge inlet flow meter, monitor throughput	X	
h)	Check & clean flocculator tanks		X
i)	Check appearance of mesh, adjust cleaning and cleaning pause intervals if necessary.	X	
j)	Clean dry solids monitors sensors		X
k)	Clean foot valves on washwater suction lines		X
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	

ID	Instruction	Daily	Weekly
	Specific tasks for Biofilter OCU		
e)	Check the spray pattern from the irrigation nozzles and clean nozzles where required. (If possible)	**X**	
f)	Check for free discharge of effluent water to drain	**X**	
g)	Check for free discharge on any condensate removal points	**X**	
	Specific tasks for Chemical Scrubber OCU		
h)	Check water softener availability, check salt reservoir level, and top up if required.	**X**	
i)	Check stocks in bulk chemical tanks and reorder if required – tanker delivery	**X**	
j)	Check that the Redox and pH are within the agreed range – on dosing skid	**X**	
k)	Check duty and standby dosing pumps are available for each bulk chemical	**X**	
l)	Check the duty scrubber liquor recirculation pump is running and the standby is available in auto	**X**	
m)	Check that there is free drainage of scrubber blow-down liquor to drain	**X**	
n)	Check differential pressure gauges are within design range (if fitted)	**X**	
o)	General check for leaks in the scrubber liquor recirculation and dosing system – raise follow on work if any defects are identified	**X**	
	Specific tasks for Carbon OCU		
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?		

ID	Instruction	Daily	Weekly
e)	Check fault light(s) are not on	**X**	
f)	Check flow rate (where meter is fitted); is it within the normal operating range?	**X**	
g)	Check for undue pump noise and vibration by safely touching the lifting chain or guide rail.	**X**	
h)	Check non-return valve. Non return valves prevent water from flowing back through the pump when it is not in operation. If a weighted arm is fitted, is it at the usual angle? If it is low and chattering it could indicate the pump is blocked	**X**	
i)	Check operation of the ultrasonic level gauge. Is it reading correctly? Compare the well level with the normal readout from the display.	**X**	
j)	Check pumps, pipelines and couplings for leaks. Check for visible leaks.	**X**	
k)	Start the cleaning cycle manually where required	**X**	
l)	Pumps - Log hours run	**X**	
m)	Pumps - Log kWhrs	**X**	
n)	Check hard wired control floats - are floats weighed down with rag or debris preventing them from lifting if the water level rises.	**X**	
o)	**Washwater Pumping** - Check the pipe line pressure from a gauge (where installed) on the pressure vessel or the pipe line manifold. Possible indication of strainer blockage	**X**	
p)	**Washwater Pumping** - Check operation of surge vessels (where installed).	**X**	
q)	**Washwater Pumping** - Check the strainers. If necessary, put automatic strainers in manual clean and inspect the manual strainers where local conditions allow.	**X**	
r)	**Washwater Pumping** - Check automatic filters are operating correctly	**X**	
11	**Distribution Chambers**	Daily	Weekly
a)	Inspect all weirs and brush clean. Remove any debris, scum, algal growth, blanket weed, grit, etc. from the chamber. Check flow split is correct.	**X**	
b)	Ensure any rag is removed, especially from around the penstocks, gate valves and their spindles. Ensure none of this passes over the weir.	**X**	
c)	Check that all valve, penstock and weir operating positions are correctly set.	**X**	
d)	Check chamber for any visible leaks	**X**	

Appendix 6. Generic Sludge Round Checks

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

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

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

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

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

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

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

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

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

Appendix 7 OCU Monthly 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.	

Appendix 8 Odour sniff testing protocol

Purpose

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

Frequency

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

Pre-requisites for the assessor

The assessment is undertaken by a member of staff trained in the procedure. The assessment in response to complaints will 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 co
			High (e.g. housing, pub/hote

---- End of OMP ----