Asset Management
Asset Standard
Odour Management Plan

Maple Lodge STW

MAPLS1ZZ

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0 Document Control & Procedures

0.1 Contents

Figures and Tables:

0.2 Document Confidentiality

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0.3 Document Control

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Whilst Standards are mandatory, it is recognised that one process may not cover every eventuality and a document user may identify an improvement that does not compromise the objectives of the procedure; in this instance a change request against the Standard should be raised.

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It is a business requirement to comply with standards. Compliance issues will be escalated to the relevant governance group for further action as appropriate.

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]	[redacted]	May 2014
2.1	Change of Management	[redacted]	[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	[redacted]	[redacted]	July 2022

	application following EA feedback	[redacted]	

0.4 Sign Off

Technical Lead	[redacted]	Date: July 2022
Operations Area Manager		Date: July 2022
Performance Manager		Date: July 2022

0.5 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.

This OMP will be reviewed at least annually or sooner if any of the following occur:

- 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.

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

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

- Environment Agency – How to comply with your permit – H4 Odour Management', March 2011 (H4)
- Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (Waste Treatment BAT Conclusions)
- Environment Agency, Appropriate measures for the biological treatment of waste, Consultation draft July 2020.

The EA's H4 Odour Guidance has been used to assist the preparation of this OMP where it relates to activities regulated under EPR. As this guidance does not apply to UWWTD activities, where any wider reference to H4 is made within this document, including use of the guidance's recommended forms, this should not be inferred as H4 being applicable to UWWTD activities

This document also aims to meet the guidelines for Odour Management Plans set down in the DEFRA Code of Practice on Odour Nuisance from Sewage Treatment Works, published April 2006 – now rescinded. 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

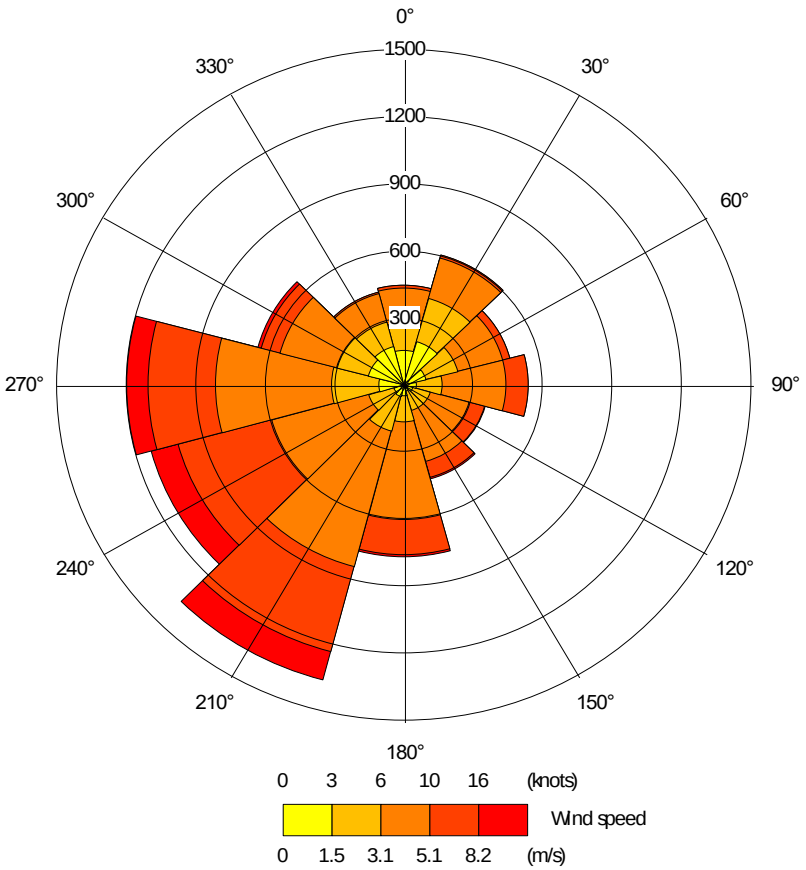
A Viridor Waste Treatment Plant operation is located on site, it is not a Thames Water owned operation, but could have potential to generate odour. Any risks to the STW should be covered by the terms and conditions of the trading agreement. Any serious odour generation from imported waste or resulting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

A wind rose showing the distribution of wind speed and direction close to the site is provided below and shows the predominant wind direction to be south westerly. The data is taken from Heathrow Airport meteorological station, approximate location NGR E 506952 N 176574. Data is recorded in hourly measurements and the information is from 2019.

Figure 2.31: Heathrow Airport meteorological station 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. 'Vickery's' escalator type 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 Chloride 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 Chloride, 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 Chloride 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 Viridor Waste Treatment Plant

Viridor 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. Biogas flares are available for use 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, there are two ground mounted emergency flares.

3 Site Management Responsibilities and Procedures

3.1 Site Roles

Figure 3.1 - Site Roles

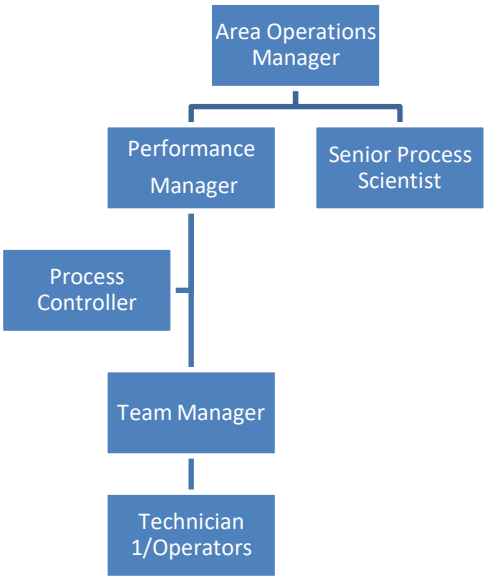


Table **3.1** - Tasks and Responsibilities

Role	**Tasks and Responsibilities**
Area Operations Manager	Responsible for the overall performance of the STW and catchments areas.
Performance Manager	Responsible for overall performance of the STW and will be responsible for • odour control and management at the site • day to day implementation of the OMP • dealing with customer complaints • assessing the scope of, and updating, the OMP as it is implemented.
Technically Competent Manager	Hold the required WAMITAB qualification to support the activities on site under EPR, ensuring permit conditions are complied with.
Team Manager	Responsible for day-to-day operation of the STW.
Technician 1/Operator	Day to day duties include maintaining and operating process equipment.
Process Controller (where applicable)	Monitoring and recording of site data and operating process plant.
Senior Process Scientist	Reports to Process 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 and Stakeholder Manager	Responsible for managing liaison with all external customers and stakeholders in liaison with customer centre, escalation team, local govt. liaison team etc.

Role	Tasks and Responsibilities
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]		
Process Manager			
Technically Competent Manager			
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 in the last 5 years, in 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 4.2 to 4.6.

4.2 Identification of Odour Critical Plant

4.2.1 Odour Risk Assessment

The Odour Risk Assessment was updated in July 2022 and a copy is included in Appendix 1.

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

It is constructed in the following manner:

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

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
- Flow & Distribution to Secondary Treatment
- Activated Sludge Plant Lanes & Zones
- Final Settlement Tanks
- SAS Chambers & Pumping
- RAS Chambers & Pumping

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

- Cess Reception, Discharge, Wash down & Drainage
- Odour Control Unit (OCU)
- Sludge Reception, Screening, Wash down & Drainage
- Screening Skip Management
- Primary Raw Sludge Thickening & Pumping
- SAS Thickening & Pumping
- Sludge Blending & Mixing
- Return Liquors
- Primary Digestion
- Secondary digestion and mixing
- Centrifuge
- Centrate Liquor Return
- Cake Pad & Drainage
- Vehicle Movements & Wash Down
- CHP Plant
- Standby generators
- 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)
Picket Fence Thickener	4	430	Steel	1.3 hours
Sludge Tank	1	565	Concrete	3.3 hours
SAS Tank	1	336	Steel	6.1 hours
Drum Thickener	1	312	Steel	12.4 hours
Reception Tank	1	525	Steel	9.42 hours
Sludge Blending Tank	1	1,050	Steel	16.9 hours
Primary Digester Tank	8	4125	Steel	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)	EWC Codes	Odour potential High Risk / Medium Risk / Low Risk	Maximum quantity on site at any given day	Maximum time held on site (hours or days)	Location of odorous materials on site
Raw imported sludge	19 08 05	Medium	Refer to Table 4.0 Site Tank Inventory	Retention times for each stage of the process are detailed in Table 4.0	Sludge Reception Tank
Primary Sludge	19 08 05	Medium	Refer to Table 4.0 Site Tank Inventory	Retention times for each stage of the process are detailed in Table 4.0	PFTs, Sludge Reception Tank
Thickened sludge import	19 02 06	Medium	Refer to Table 4.0 Site Tank Inventory	Retention times for each stage of the process are detailed in Table 4.0	Sludge Reception Tank

Odorous and potentially odorous material (any solid, liquid or gas)	EWC Codes	Odour potential High Risk / Medium Risk / Low Risk	Maximum quantity on site at any given day	Maximum time held on site (hours or days)	Location of odorous materials on site
Sludge Screenings	19 08 01	Low	1 skip	Max 3 days once full.	Sludge import area
Cake	19 06 06	Low	2500 tonnes	60 days	Cake pad
Biogas	-	Medium	-	Continuous operation	Primary digester roof space and pipework.
Liquor	16 10 02	Low	-	Continuous return of liquors	Site drainage.

4.3 Odour Control Measures

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

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

Daily site and sludge rounds are carried out to check each part of the site is operating correctly. These are detailed in Appendix 5 and 6.

4.3.1 Odour Control Units

Maple Lodge STW has one OCU that treats odours from cess tanker discharges. 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

The EA's H4 Odour Guidance has been used to guide the preparation of this OMP where it relates to activities regulated under EPR. As this guidance does not apply to UWWTD activities, where reference to H4 is made within this document, including use of the guidance's recommended forms, 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 4.2: 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
Incoming Sewers & Reception Wet Well	Septic sewage / M	Check for spills	Site Tech 1s	Visual Inspection	None
Storm & Balancing Tanks	Sewage / M	The need for cleaning will be reviewed at the beginning of the summer months with the likelihood of higher load influent.	Site Tech 1s	Visual Inspection	As required
Screens & Screening Conditioning, Drainage & Rag Skip Management	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 disruption caused by the build-up of screenings and associated spin-off problems with odour, rodents etc	Site Tech 1s	Visual Inspection	As required
Grit Removal Equipment, Drainage & Grit Skip Management	Acrid / M	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
Flow & Distribution to Primary Settlement Tanks - Chemical Dosing	Sewage / M	Ferric dosing has the benefit of suppressing odour generation in the sludge. The status of the dosing system is checked every shift.	N/A	Continuous	Continuous
Primary Settlement	Sewage / M	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
		Fats, Oil & Grease Scum Removal System	N/A	Continuous	Continuous
		Primary Raw Desludge Pumping	N/A	Continuous	Continuous
Activated Sludge Plant Lanes & Zones	Earthy / L	Use Vigilance to ensure no crust formation	Site Tech 1s	Visual Inspection	Daily

Final Settlement Tanks	Earthy / L	Empty Tank that collect stagnant water and scum	Site Tech 1s	Visual Inspection	As required

Table 4.3: 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
Cess Reception, Discharge, Wash down & Drainage	Septic sewage / M	Air abated through OCU. Spillages cleared as soon as possible.	Site Tech 1s	Daily Continuous (OCU)	Continuous
Cess Reception OCU	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
		Monthly performance checks by specialist Framework agreed contractors.	Contractors	As described	Monthly
SAS Chambers & Pumping	Earthy / M	Clear any scum build-up on SAS south.	Site Tech 1s	Visual Inspection	As required
Sludge Reception, Screening, Wash down & Drainage	Sludge / L	If out of service, can be diverted to digester feed tank. Check for spills.	Site Tech 1s	Visual Inspection	Daily
Skip Management	Sludge / L	Replace skips to ensure they are not left too long	Site Tech 1s	Visual Inspection	As required
Primary Raw Sludge Thickening & Pumping	Sludge / M	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
SAS Thickening & Pumping	Earthy / L	Belts enclosed in ventilated building.	N/A	N/A	Continuous
Sludge Blending & Mixing	Sludge / L	This tank feeds all eight digesters and therefore any issues are dealt with immediately.	Site Tech 1s	Visual Inspection	As required

Primary Digestion	Sulphur Compounds / L	Filling controlled by SCADA. Check for spillage / blockage / vents blowing.	Site Tech 1s	Visual Inspection / SCADA	Daily
Secondary Digestion	Sulphur Compounds / L	Levels are controlled by ultrasonic probe.	N/A	SCADA	Continuous
Centrate Liquor Return	Ammoniacal / M	Check lines for blockages	Site Tech 1s	Visual Inspection	Daily
Cake Pad & Drainage	Ammoniacal / M	Storage capacity is limited to less than four weeks; therefore movement of sludge cake is almost continuous.	N/A	N/A	Continuous
Vehicle Movements & Wash Down	Ammoniacal / M	Cover wagons. Use diversion and wheelwash.	Site Tech 1s	Visual Inspection	As required
CHP	Exhaust gases / M	Routine maintenance programme. Raised exhaust flume.	CHP Team	N/A	Continuous

Table 4.4: Intermittent (Int), abnormal (Ab), and emergency (E) events for assets under UWWTD

Process stage	Event	Status	Ops mitigation	Odour risk after mitigation
Incoming Sewers & Reception Wet Well	Spills	Ab	Clear up and isolate as per spills procedure in 4.3.3.	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.	Low
Screens & Screening Conditioning, Drainage & Rag Skip Management	Screens/ Washpacter block, fail. Washwater failure.	Ab	Repair, Unblock, see SOM for details	Low
	Enclosed skip unit failure.	Ab	Replace	Low
Grit Removal Equipment, Drainage & Grit Skip Management	Grit allowed to build up on slab.	Int	Remove	Low
Flow & Distribution to Primary Settlement Tanks - Chemical Dosing	Failure of dosing system	Ab	Repair, see SOM, see SOM for details	Low

Primary Settlement	Scaper Failure	Ab	Taken out of service unless they can be repaired within hours	Low
	Rising sludge due to failure of desludge	Ab	Desludging is carried out by over-pumping if the desludge system fails or is blocked.	Low
	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.	Low
	Blockage / Bridge failure on Fats, Oil & Grease Scum Removal System	Ab	Tanker to clear. Repair plant, see SOM for details.	Low
	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

Table 4.5: Intermittent (Int), abnormal (Ab), and emergency (E) events for assets under Sludge Treatment Centre Permit

Process stage	Event	Status	Ops mitigation	Odour risk after mitigation
Cess Reception, Discharge, Wash down & Drainage	Spills & Blockage	Ab	Clear up ASAP as per spills procedure in 4.3.3.	Low
	OCU fails	Ab	Divert cess, repair OCU. See SOM for details.	Medium
OCU	Failure	Ab	Replace media. Repair fan. See SOM for details.	Medium
Primary Raw Sludge Thickening & Pumping	Scraper failure. Sludge inversion. Blockage. Pump failure.	Ab	The tank will be emptied and recommissioned.	Medium
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.	Low
Primary Digestion	Spillage due to limpet blockage.	Ab	Unblock	Low
Centrate Liquor Return	Line Blockage	Ab	Inhibited. Overpump. Clear lines.	Low

Cake Pad & Drainage	Blocked drainage	Ab	Unblock	Low
	Full Stockpile	Ab	Implement cake removal - 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 4.6: General Intermittent (Int), abnormal (Ab), and emergency (E) events

Incidents and emergencies	Event	Status	Ops mitigation	Odour risk after mitigation
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.	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.	Medium
Flood	Reduced treatment capacity / damage to assets.	E	Diversion of imports to other sites. Potential to tanker indigenous sludge to other sites.	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

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.

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.

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

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.

4.5 Record Keeping

All records are stored in the ELogbook, SharePoint or on SCADA.

Site and sludge round records are stored on SAP and details can be found in the SOM.

4.6 Emergency Response and Incident Response Procedures

Risk assessments have been carried out for odour critical process stages, outlining possible risk and odour mitigation methods. These are given in Appendix 1.

Emergencies such as fire, flood and severe weather are managed by Thames Water's Incident Management and Business Resilience team. The processes employed can be found on Thames Water's SharePoint site and are entitled: 'Incident Management Arrangements'. This is a company confidential document and therefore, is 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.

4.7 Odour Improvement Plan

Items scored in the Odour Risk Assessment with a risk score greater than 10, 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.

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 4.1 above.

All maintenance is captured on the corporate system SAP, which generates work requests for the various activities for the treatment process assets. Maintenance procedures are details in the SOM.

5.1.2 Maintenance of Odour Control Units

At Maple Lodge STW there is a service contract with a specialist Contractor for the OCUs. They carry out monthly inspections of the OCUs. 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, Maintenance and Engineering or outsourced to contractor. Refer to the Odour Control Unit Asset Standard and Site Operating Manual for more information.

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.

Figure 5.1 Monthly OCU checks carried out by external contractor

Monthly Health Checks

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

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

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

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

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

Number	Task	Comments
1	Examine ductwork for any signs of damage or leaks and check trapped condensate drains are free flowing. If a manual drain valve is provided, operate the valve until the flow of condensate ceases and leave valve in closed position.	
2	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	
3	Visually inspect the Odour control system will be made and any defects or deterioration of the housings will be reported.	
4	Check the airflow through the system and any anomalies investigated.	
5	Measure the pressure drop across the system by measuring the inlet and outlet pressure. Record any abnormalities. Read off Delta-P gauge if fitted or using a portable manometer	
6	Measure the contaminate levels (primarily H2S) at the inlet and at the stack	
7	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	

5.1.3 Records

Maintenance history records are 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 4.2 are in place.

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

To ensure any limitations regarding everyday staff becoming desensitised to the odour, if site odour complaints persist with no result in locating its source, personnel who do not spend prolonged time on a single site, such as the Area Operations Manager 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 Customer Stakeholder Manager 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. For assets under EPR, we notify the EA as per the permit condition – usually if significant pollution occurs/anticipated or if an emissions limit is exceeded.

Appendices

Appendix 1. Odour Risk Assessment

Maple Lodge STW
SERV Odour Risk Asse

Appendix 2. Odour Improvement Plan

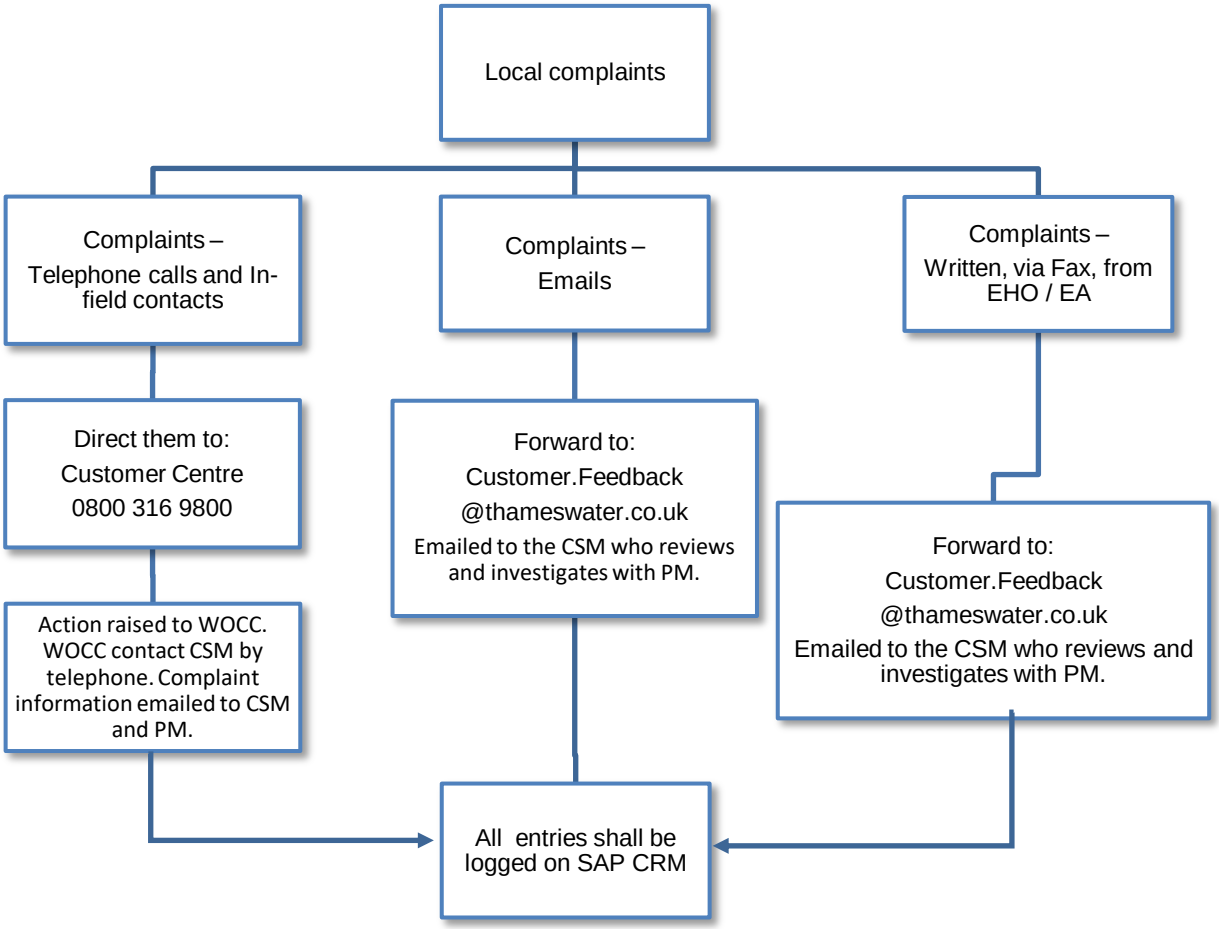
Odour Improvement Plan Maple Lodge STW

Review Date		Jul-22				
Process Stage	**Owner**	**Plan**	**Action**	**Expected difficulties**	**Measures to mitigate**	**Timeframe**
Storm Tanks	Waleed Janjua	Ensure effective cleaning following storm	Investigate amajet performance	None	Manual clean as required.	AMP 7

Appendix 3. Customer Communications Plan

Complaints Process

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



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

Name:	[redacted]
Telephone:	

Communications

Level 1	Stable operations: Compliant with Operational Asset Standards.			
Communications Approach	Standard regular proactive contact with key stakeholders.			
Stakeholders External	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
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

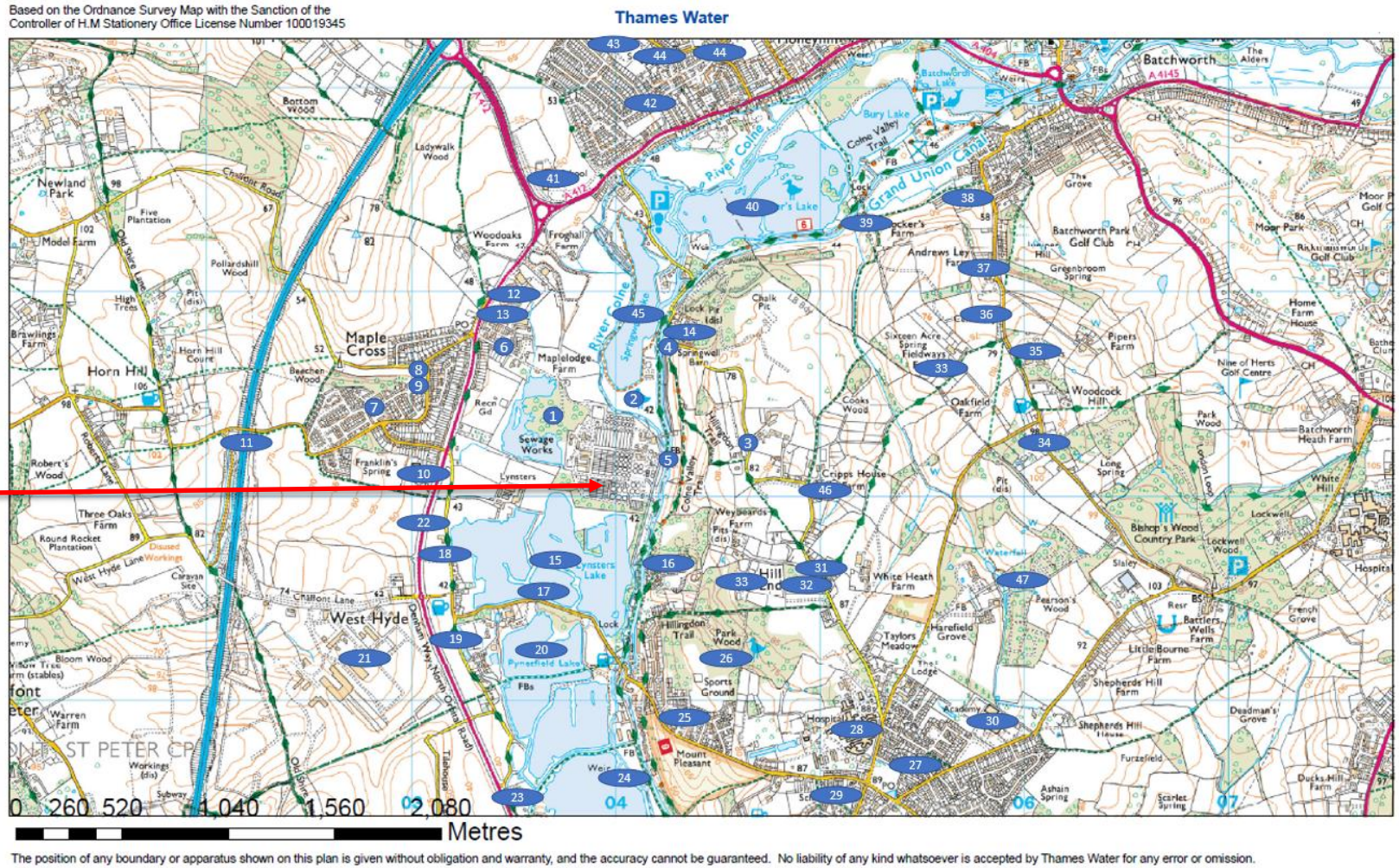
Level 3	Emergency • Temporary or transient activities not deemed to be compliant with Operational Asset Standards. High risk of odour emitting plant.			
Communications Approach	As level 2 plus: • Odour event set up internally (including OOH's cover from OMC (Kemble Court)). • Weekly discussions with 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

Maple Lodge STW



The position of any boundary or apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. No liability of any kind whatsoever is accepted by Thames Water for any error or omission.

Figure B - Site Plan

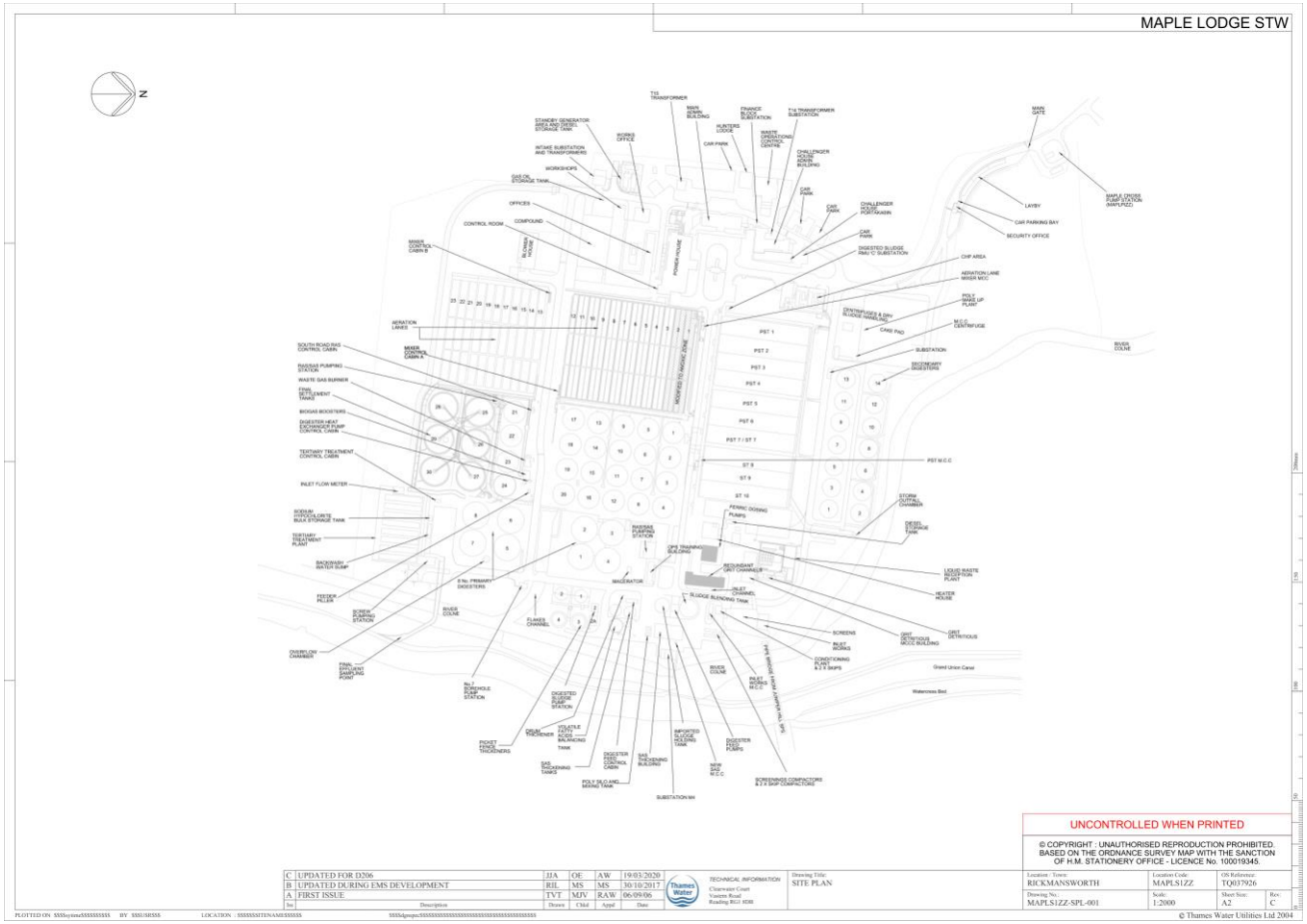


Figure C – Permitted Area

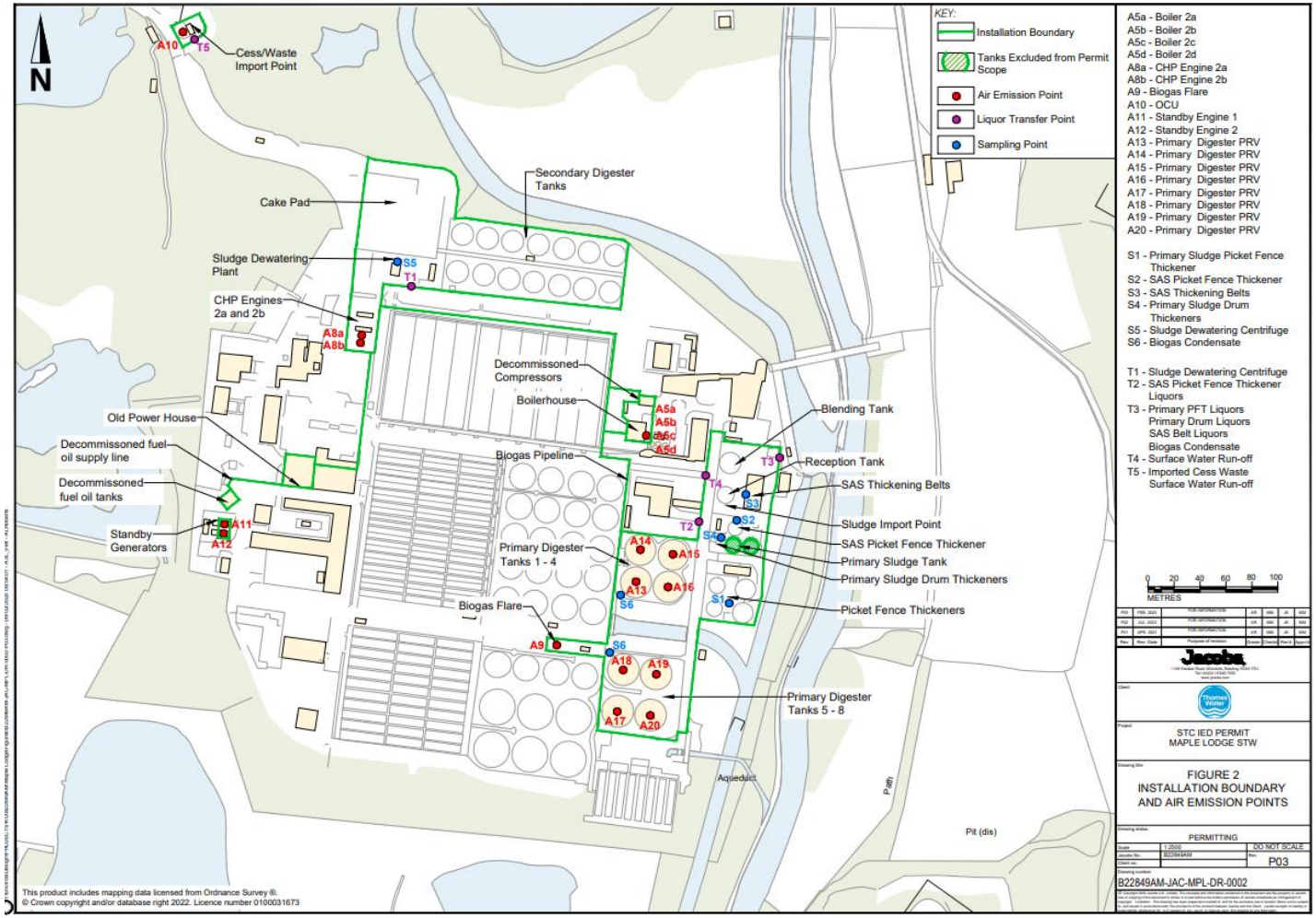


Figure D1 - Process Block Diagram

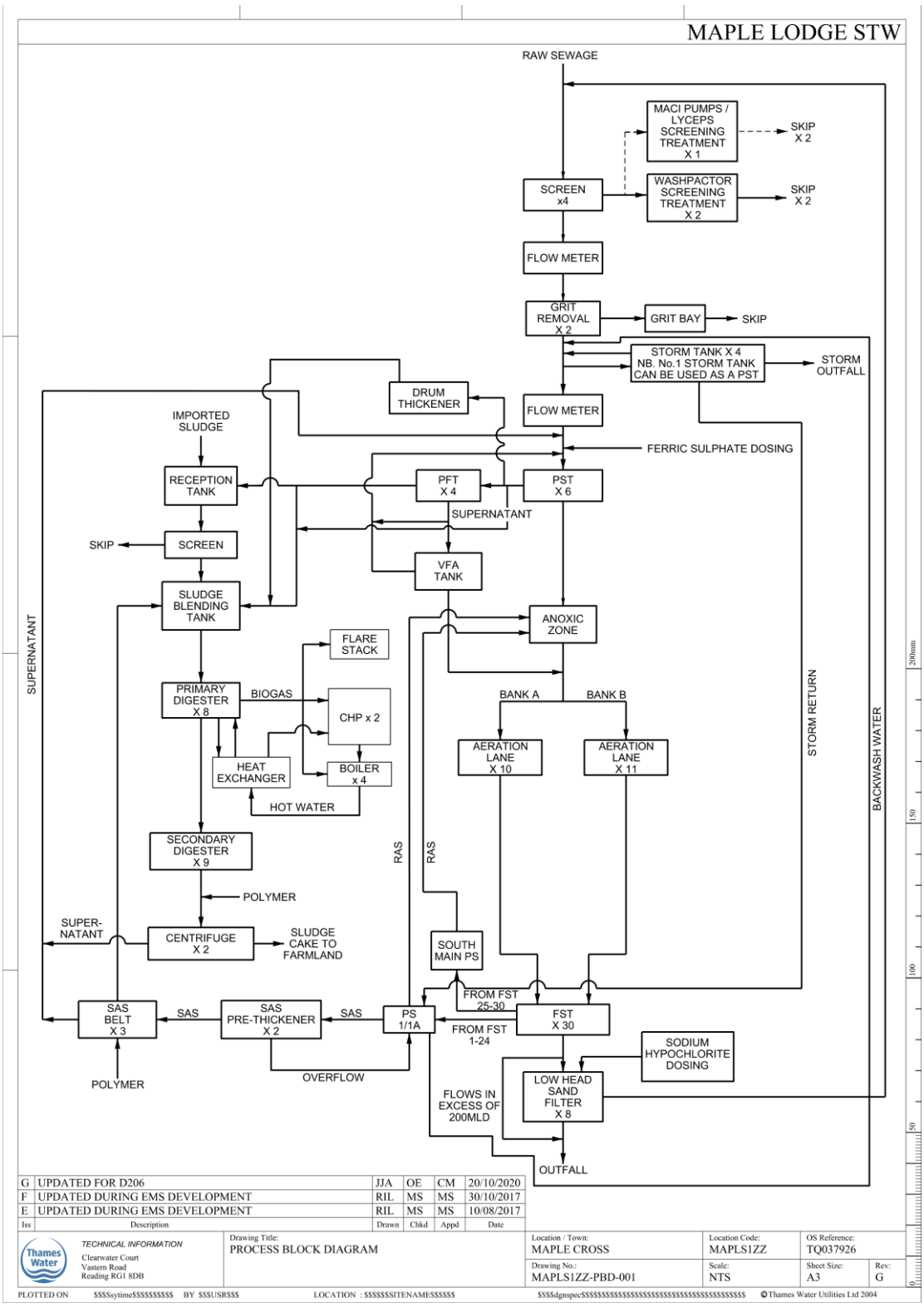
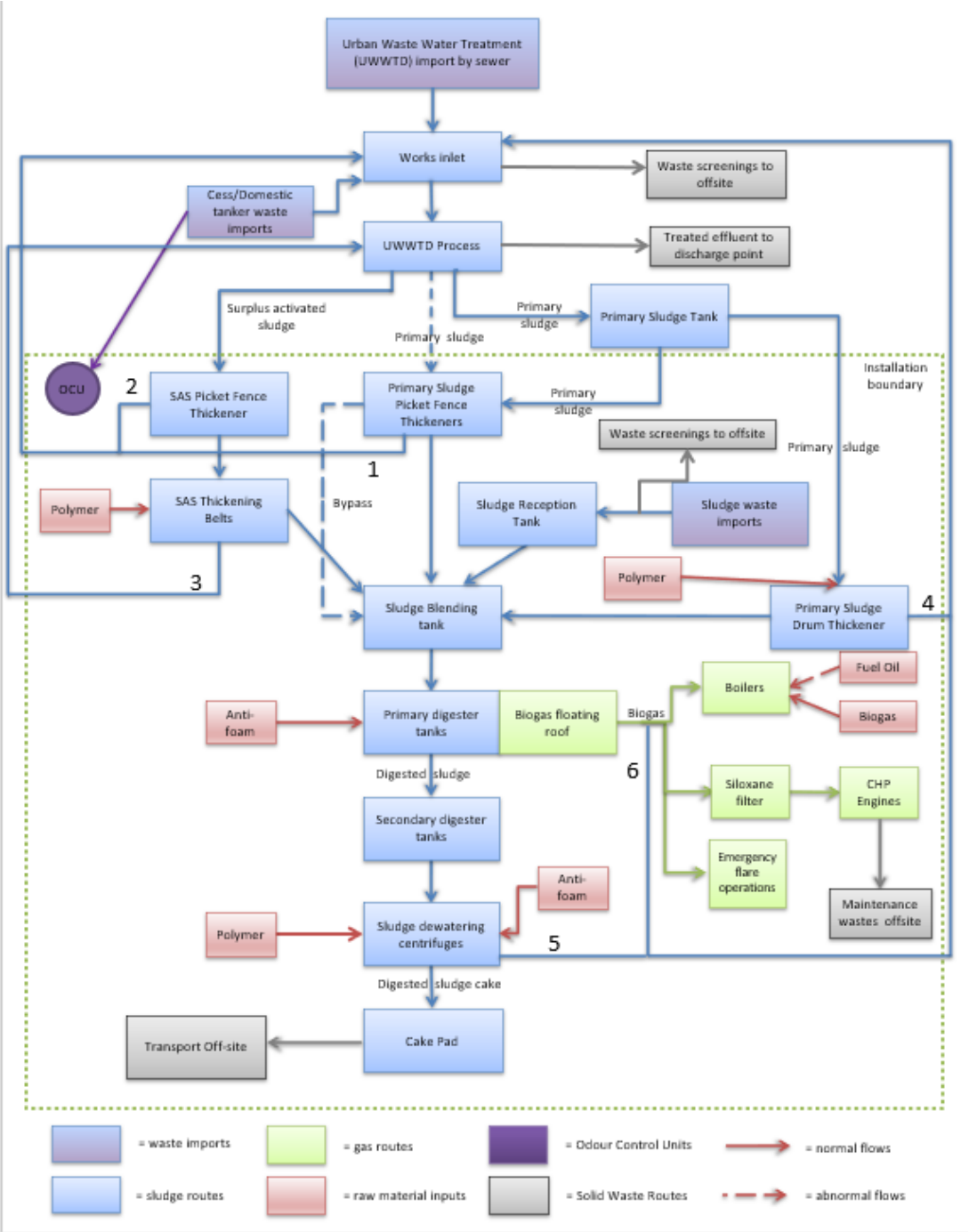
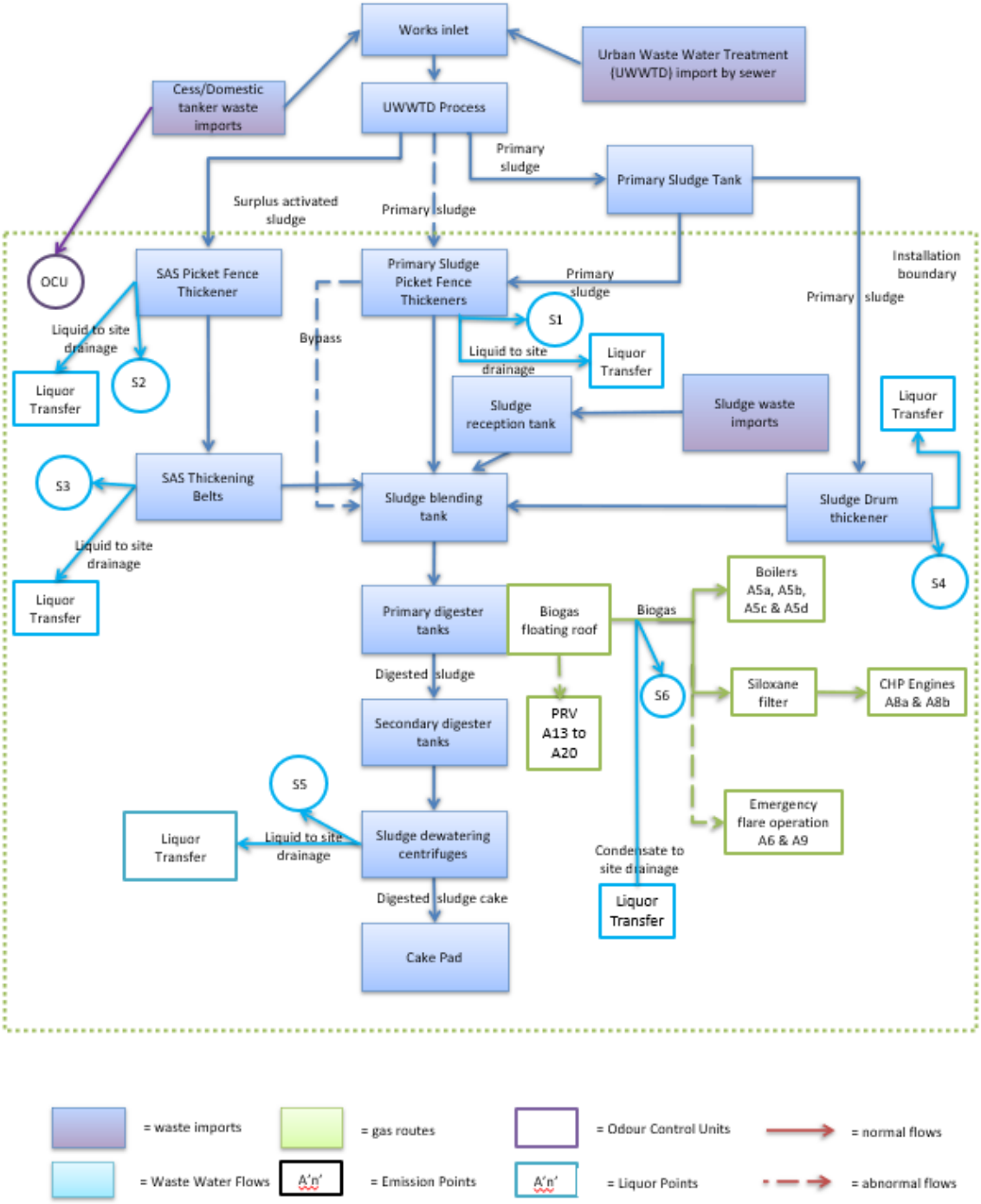


Figure D2 - Process Block Diagram for Sludge Treatment Centre Permit




Works inlet
Urban Waste Water Treatment (UWWTD) import by sewer
Cess/Domestic tanker waste imports
UWWTD Process
Primary sludge
Primary Sludge Tank
Surplus activated sludge
Primary sludge
Installation boundary
OCU
SAS Picket Fence Thickener
Primary Sludge Picket Fence Thickeners
Primary sludge
Primary sludge
S1
Liquid to site drainage
Bypass
Liquid to site drainage
Liquor Transfer
Liquor Transfer
S2
Sludge reception tank
Sludge waste imports
Liquor Transfer
S3
SAS Thickening Belts
Sludge blending tank
Sludge Drum thickener
Liquid to site drainage
Liquor Transfer
S4
Boilers A5a, A5b, A5c & A5d
Primary digester tanks
Biogas floating roof
Biogas
Digested sludge
S6
Siloxane filter
CHP Engines A8a & A8b
Secondary digester tanks
PRV A13 to A20
S5
Emergency flare operation A6 & A9
Liquor Transfer
Liquid to site drainage
Sludge dewatering centrifuges
Condensate to site drainage
Digested sludge cake
Liquor Transfer
Cake Pad
= waste imports
= gas routes
= Odour Control Units
= normal flows
= Waste Water Flows
A'n'
= Emission Points
A'n'
= Liquor Points
= abnormal flows

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)	<u>During storm</u> 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. If a weighted arm is fitted is it at the usual angle? If it is low and chattering it could indicate the pump is blocked.	X	

	Instruction	Daily	Weekly
5	**Pasteurisation**	Daily	Weekly
a)	Check batch rates according to sludge levels	X	
b)	Check digester temperatures in relation to pasteurisation plant	X	
c)	Check hmi panel	X	
d)	Check operation of biotherm reactor aeration blower package.	X	
e)	Check heat exchanger performance	X	
f)	Check digested sludge buffer tanks	X	
g)	Check blended sludge buffer tanks	X	
h)	Check operation of biotherm reactor mixer	X	
i)	Check operation of heat exchanger mixer	X	
j)	Check operation of scum cutter	X	
k)	Check pump and valve operation	X	
l)	Log and record flows, pressures and temperatures	X	
m)	Check % ds of feed sludge to pasteurisation plant (Monday, Wednesday, Friday)	X	
n)	Check, remove and clean temperature probe		X
6	**Primary Sludge Digestion**	Daily	Weekly
a)	Check sludge discharge to limpet chambers, where installed. Clear any blockages	X	
b)	Check digester feed system is working Clear any blockages	X	
c)	Check digester heating system is working & temperatures are within HACCP range.	X	
d)	Check digester mixing system is operating correctly	X	
e)	Log digester temperatures (HACCP) Log inlet and outlet temperatures of each boiler Log inlet and outlet temperatures of sludge and water in heat exchangers	X	
f)	Log sludge feed volumes into each digester and establish the retention time (HACCP)	X	
g)	Check operation of sludge and water recirculation pumps Check pumps, pipelines and couplings for leaks where possible.	X	
h)	Monitor water supply where glycol is not used to heat exchanges that are exposed to elements,	X	

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

	Instruction	Daily	Weekly
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	
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	

	Instruction	Daily	Weekly
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	
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

	Instruction	Daily	Weekly
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	
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	

	Instruction	Daily	Weekly
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	
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	

---- End of OMP ----