Asset Management
Asset Standard
Odour Management Plan

Mogden STW

MOGDS1ZZ

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V21.2

Document Control & Procedures

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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	Pasteurisation drain-down odour	[redacted]		26/01/06
2	Review and additional requirements			11/08/06
3	In-line with CoP guidelines			20/10/06
4	Review with LBH			21/02/07
5	Review and additional requirements			26/07/07

Revision No	Reason for Revision	Prepared by	Approved by	Date
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	Further review to version 1.7			24/03/09
8	Review to OCU & Boundary trigger values			27/03/09
	Further review to version 1.8			10/09/09
9	Six monthly review updating to version 1.9			30/06/10
10	Six monthly review updating to version 2.0			31/12/10
11	Six monthly review updating to version 2.1			30/06/11
12	Six monthly review updating to version 2.2			07/12/11
13	Review against H4 requirements updating to version 2.3			29/06/12
14	Six monthly review updating to version 2.4			21/12/12
15	Six monthly review updating to version 2.5			30/06/13
16	Six monthly review updating to version 2.6			31/12/13
17	Conversion and validation of OMP in new standard format			October 2014
18	Annual Review			June 2018
19	Annual Review			December 2019
20	Annual Review			May 2021
21	IED permit application			October 21
21.1	IED Permit Resubmission	[redacted]	[redacted]	December 2023
21.2	IED EA RFI reply – Site plan update	[redacted]	[redacted]	December 2024

0.3 Sign Off

Catchement Customer and Stakeholder Manager	[redacted]	Date: December 2023
Head of Catchment - Mogden	[redacted]	Date: December 2023
Area Treatment Manager	[redacted]	Date: December 2023

0.4 Glossary of Terms

TERM	DESCRIPTION
AD	Anaerobic Digestion
AMP	Asset Management Plan
ASP	Activated Sludge Plant
BFT	Biological Filtration Tanks
BOP	Best Operating Practice
BRC	British Retail Consortium
CHP	Combined Heat and Power
CSM	Customer and Stakeholder manager
DEFRA	Department for Environment, Food and Rural Affairs
DNR	Duke of Northumberland
DW	Day Works
EA	Environment Agency
EHO	Environmental Health Officer
EMS	Environmental Management System
EPR	Environmental Permitting Regulations (England and Wales) 2016
FST	Final Settlement Tank
GBT	Gravity Belt Thickener
H2S	Hydrogen Sulphide
H4	Environment Agency - How to comply with your permit – H4 Odour Management, March 2011
HACCP	Hazard Analysis Critical Control Point
HAZOP	Is it the same as above?
ICA	Instrumentation Control & Automation

TERM	DESCRIPTION
IED	Industrial Emissions Directive
LA	Local Authority
LBH	London Borough of Hounslow
MLSS	Mixed Liquor Suspended Solids
MRAG	Mogden Residents Action Group
OCU	Odour Control Unit
OHC	Out of Hours Coordinator
OM	Odour Monitor
OMC	Operational Management Centre
OMP	Odour Management Plan
OPEX	Operational expenditure
OU/m^3	Odour units
PAC	Pre-Aeration Channel
PCO	Process Coordinator
PCE	Process Control Engineer
PPB	Parts per Billion
ppm	Parts per Million
PPM	Planned Preventive Maintenance
PS	Pumping Station
PSHT	Pasteurised Sludge Holding Tank
PST	Primary Settlement Tank
RAS	Returned Activated Sludge
Receptors	Sensitive receptors are any fixed buildings or installations where odour annoyance may occur, such as residential homes, schools, hospital, offices, shops or garden centres. Open areas such as playgrounds and public footpaths should also be listed where these are known to have been affected by odour.
RSHT	Raw Sludge Holding Tank
S	Shift
SAP	SAP is the Thames Water IT system for all finance and HR electronic processes
SAS	Surplus Activate Sludge
SCADA	Supervisory Control And Data Acquisition
SDC	Sludge Dewatering Centre
SOM	Site Operating Manual

TERM	DESCRIPTION
SST	Secondary Settling Tank
STW	Sewage Treatment Works
TCM	Technically Competent Manager
TM	Team Manager
TW	Thames Water
WOCC	Waste Operations Control Centre
UWWTD	Urban Waste Water Treatment Directive

1 Introduction

This Odour Management Plan (OMP) forms part of Mogden 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 Mogden 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 sources of odour from Mogden STW are identified, and how, as far as is reasonably practicable, they are controlled and recorded. It is primarily a management guide; detailed operational procedures are contained within the SOM.

Changes to OMP procedures are captured in the SOM as part of the periodic reviews of this document.

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

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

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

This OMP was updated in 2021 to incorporate appropriate odour control measures for activities that will be newly regulated under an Environmental Permit issued under the Environmental Permitting (England and Wales) Regulations 2016 (EPR), following the principles transposed through the Industrial Emissions Directive. This follows the reinterpretation of the Industrial Emissions Directive in

exclusion of UWWTD activities - meaning that anaerobic digestion (AD) on a Sewage Treatment works now needs an Environmental Permit.

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

This OMP is stored electronically within Share Point.

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

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)

Where this Odour Management Plan relates to STW activities regulated under the UWWTD this OMP may still draw upon elements of best practice taken from H4 but this should not be inferred as H4 being applicable to these activities.
The OMP format used is in line with that adopted for other Thames Water sites.

In addition, this plan aims to avoid causing a statutory nuisance as defined by section 79(1) of the Environmental Protection Act 1990

Copies of the Odour Risk Assessment, Odour Improvement Plan, Customer Communications Plan, Site Drawings, OCU Monitoring Sheet, East Side Storm Water Tanks and Hoppers Management Plan and Mogden Storm Tanks – Daily checks are included in Appendices 1-8.

Copies of forms in respect to H4, if required by the Local Authority or Environment Agency, are included in Appendix 4, namely Table A1 and A2 An Inventory of odorous materials for sludge treatment centre

Hard copies of the SOM and key related documents are held on site.

2 Site Information

2.1 Location and Receptors

Site Address:

Mogden STW
Mogden Lane
Isleworth
Middlesex
TW7 7LP
EPR Permit number to be included when issued

Mogden STW is a large wastewater treatment works situated in Isleworth, Middlesex. It was initially constructed during the early 1930s and first operated in 1936. Three major extensions to provide for increasing population and changing regulatory requirements were carried out in 1962, 1999 and 2013.

Mogden STW serves eight London boroughs. The catchment area extends southwards to Sunbury and Staines and northwards towards Edgware. The site serves a population equivalent (PE) of 2.1 million. Full treatment is provided for incoming sewage flows of up to 1064 megalitres per day.

By the very nature of the raw material, the sewage treatment process can be odorous. The original works design was to current practice at the time in the 30s, when odour control was basic and the site was situated well away from residential housing. In more recent years, as residential development has grown along the site boundary, much more emphasis has been placed on avoiding odour release, and a number of improvements have been made to Mogden STW to restrict odour emissions. Details are included in Appendix 2 The Asset Management period 2005-2010 saw large areas of the process being covered and ventilated through odour scrubbing units to provide major reductions in odour emissions.

A plan of the site is shown in Appendix 5, together with process flow diagrams that show the sequential processes and major plant locations covered within this Odour Management Plan.

Receptors

The nearest receptors are given in Table 2.1:

Table 2.1 - Location of potentially sensitive odour receptors.

Receptor Number	Receptor Type	Receptor Name	Approximate distance to the nearest site boundary (km)	Direction from the site	Receptor sensitivity
1	Recreational	Twickenham Stadium	0.33	South	High
2	Hospital	Maswell Park Health Centre	0.94	West	High
3	Institution	Post Office - Chestnut Grove	0.22	East	Medium
4	School	Buttercups & Chalfont Park Day Nursery	0.32	North-East	High
5	Open area	Redless Park	0.07	North-East	Low
6	School	Oaklands School	0.47	North-West	High
7	School	Gumley House Convent School	0.62	North-East	High
8	School	Saint Mary's Catholic Primary School, Isleworth	0.61	North-East	High
9	Hospital	Whittington Hospital Emergency Department	0.69	North-East	High
10	Hospital	West Middlesex University Hospital	1.06	North-East	High
11	School	The Blue School	0.84	North-East	High
12	School	Worple Primary School / South Isleworth Children's Centre	0.65	East	High
13	Hospital	Richmond Lock Surgery	0.82	East	High
14	School	Harvard Park Pre-School / The Smallberry Green Primary School	1.22	North-East	High
15	School	Isleworth Town Primary School	0.98	North-East	High

16	School	The Green School / Osterley Park Day Nursery	1.64	North-East	High
17	School	Marlborough Primary School	1.57	North-East	High
18	Light industrial	Universal Express Distribution / Parker Car Service	0.08	North	Low
19	Light industrial	Robot Coupe (UK) Ltd. / Travis Perkins	0.08	North	Low
20	Light industrial	Commercial area between Worton Rd and Clock Tower Rd	0.27	North-East	Low
21	Residential area	Woodlands (East from Duke Of Northumberland's River, between Saint John's Rd, A310 Rd and Worton Rd)	0.06	North / North-East	High
22	Residential area	Woodlands (West from Duke Of Northumberland's River, between Worton Rd, Woodlands Rd and Saint John's Rd)	0.07	North / North-West	High
23	Commercial	Capri Foods	0.05	North-West	Medium
24	Institution	London Borough Of Hounslow Council - Vehicle Fleet Management / Hounslow Highways	0.59	North-West	Medium
25	Commercial	Nick Hudson Fine Furniture	0.13	North-West	Medium
26	Commercial	Kerry London at Worton Road (Insurance company)	0.12	North-West	Medium
27	School	Hounslow Town Primary School	0.97	North-West	High

28	Residential area	Hounslow South (between the railway, Hall Rd and Central Ave)	0.15	West / North-West	High
29	Residential area	Hounslow South (between the railway, Central Ave and Whitton Dene	0.14	West / South-West	High
30	Residential area	Hounslow (between the railway and A315 Rd	0.65	North-West	High
31	School	Chatsworth Primary School	0.69	West	High
32	Transport	Hounslow Train/Tube Station	1.15	West	Medium
33	Institution	Kneller Hall	0.70	South-West	Medium
34	School	Chase Bridge Primary School	0.55	South	High
35	Residential area	Ivybridge Council Estates - Residential Area between Chertsey Rd, London Rd and Rugby Rd	0.05	South-East	High
36	Residential area	Residential Area between Worple Rd, Northcote Ave and Brantwood Ave	0.06	East	High
37	Commercial	Tesco Extra	0.20	South	Medium
38	Commercial	Ivybridge Retail Park	0.22	South-East	Medium
39	Open area	Gainsborough Gardens Recreational Ground	0.39	South-West	Low
40	Open area	Murray Park	0.69	South-West	Low
41	School	Merry Gold Montessori School	0.81	South-West	High
42	School	Nelson Primary School	1.33	South-West	High

43	School	Richmond upon Thames College / The Richmond upon Thames School	1.40	South	High
44	School	Orleans Park School	1.74	South-East	High
45	School	St Mary's Primary School	1.72	South-East	High
46	Open area	Marble Hill Park	1.73	South-East	Low
47	Recreational	Twickenham Stoop Stadium	0.99	South	High
48	Open area	Thistleworth Marine	0.95	East	Low
49	Recreational	Rambert School Of Ballet And Contemporary Dance	0.88	East	High
50	Residential area	Residential Area between Worple Rd, South Str, A3004 Rd and Northcote Rd	0.38	East	High
51	Residential area	Residential Area between Worple Rd, Brantwood Ave, A310 Rd and South Street	0.36	North-East	High
52	Residential area	Old Isleworth (South) Residential Area (between South Str, A3004 Rd and Northcote Rd, A310 Rd, Duke Of Northhumberland's River and Thames River)	0.79	North-East	High
53	Recreational	Royal Mid-Surrey Golf Club	1.21	East / North-East	High
54	Open area	Syon House and Park	1.44	North-East	Low

55	Residential area	Old Isleworth (North) Residential Area (between Duke Of Northhumberland's River, A310 Rd, Park Rd and Thames River)	0.89	North-East	High
56	Residential area	Residential Areas between Saint John's Rd, the railway, Spur Rd and A310 Rd	0.73	North	High
57	Residential area	Residential Areas between London Rd, the railway and Bridge Rd	0.57	North-West	High
58	Residential area	Residential Areas between Glen Walk, Rugby Rd, Warren Rd, and Hall Rd	0.10	South-West	High
59	Residential area	Residential Areas between London Rd, Northcote Ave, A3004 Rd and Chertsey Rd	0.29	South-East	High
60	Residential area	Residential Areas between A3004 Rd, Railshead Rd, River Thames and The Avenue Rd	0.84	South-East	High
61	School	Ivybridge Primary School	0.62	South-East	High
62	School	St Stephen's C Of E Primary School	0.92	South-East	High
63	School	St Mary's Primary School	1.49	South-East	High
64	School	St Mary's Infant School	1.49	South-East	High
65	School	St Marys C Of E School	1.50	South-East	High

66	School	St Richard Reynolds Catholic College / Strathmore School at St Richard Reynolds	1.45	South	High
67	School	Capella House School / Clarendon Secondary Centre	0.97	South	High
68	School	Trafalgar Infant school	1.72	South-West	High
69	School	Trafalgar Junior School	1.99	South	High
70	School	Bishop Perrin C. of E. Primary School	1.95	South-West	High
71	School	Turing House School	1.90	South-West	High
72	Transport	Whitton Train/Tube Station	1.42	South-West	Medium
73	Transport	Twickenham Train/Tube Station	1.55	South-East	Medium
74	Transport	St Margarets Train/Tube Station	1.23	South-East	Medium
75	Transport	Hounslow Central Train/Tube Station	1.74	North-West	Medium
76	Transport	Hounslow East Train/Tube Station	1.30	North-West	Medium
77	Transport	Isleworth Train/Tube Station	1.09	North	Medium
78	Residential area	Residential area between Chertsey Rd, St Margarets Rd, the railway and Whitton Rd	0.76	South	High
79	Residential area	Residential area between Crown rd, the railway, River Thames and Richmond Rd	1.26	South-East	High

80	Residential area	Residential area between Richmond Rd, River Thames and Marble Hill Park	1.78	South-East	High
81	Residential area	Residential area between London Rd, the railway, Marble Hill Park and River Thames	1.25	South	High
82	Residential area	Residential area between The Duke of Nurthumberland's River, Whitton Rd and Chertsey Rd	0.60	South	High
83	Residential area	Residential area between The Duke of Northumberland's River, Whitton Rd/Warren Rd, High Street Whitton, the railway and Chertsey Rd	0.73	South-West	High
84	Residential area	Residential area between Nelson Rd, the railway, Park Ave and Whitton Dene	0.87	South-West	High
85	Residential area	Residential area between Nelson Rd, Percy Rd, Powder Mill Ln and Hanworth Rd	1.24	South-West	High
86	Residential area	Residential area between Percy Rd, the railway, Staines Rd and Hospital Bridge Rd	1.35	South-West	High
87	Residential area	Residential area between Heath Rd, the railway, London Rd and King Street	1.33	South-East	High

88	Residential area	Residential area between Hanworth Rd, Whitton Rd, Park Ave and its extension	1.15	West	High
89	Residential area	Residential area between London Rd, Lampton Rd and Spring Grove Rd	0.90	North-West	High
90	Residential area	Residential area between Spring Grove Rd, Great West Rd, Wood Ln and London Rd	1.10	North-West	High
91	Residential area	Residential area between Wood Ln, Great West Rd, Syon Ln and the railway	1.30	North-East	High
92	Residential area	Residential area between Great West Rd, Boston Manor Rd/Half Acre, London Rd and Spur Rd/Syon Ln	1.84	North-East	High
93	Recreation	Isleworth Leisure Centre and Library	0.32	North-East	High
94	Transport	Syon Lane Train/Tube station	1.95	North-East	Medium
95	Open area	Primrose Park	1.00	North-East	Low
96	Open area	Silverhall Park	0.86	North-East	Low
97	Open area	Thornbury Park	0.62	North-West	Low
98	Open area	Inwood Park	0.70	North-West	Low
99	Residential/Commercial	Hounslow Central High Street	1.50	North-West	High

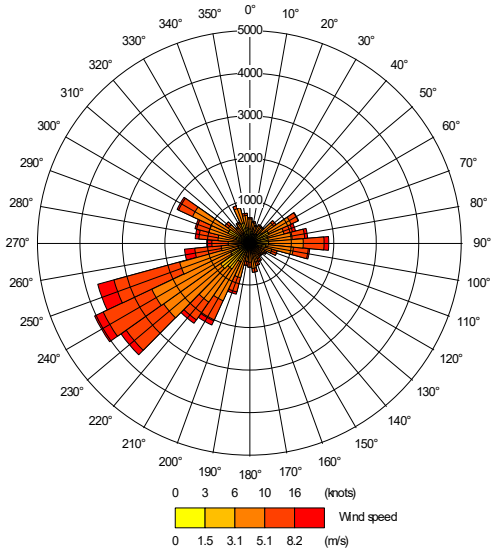
2.2 Off-site sources of odour

There are no known sources of off-site odour other than potentially from a nearby bakery.

2.3 Wind Rose and Weather Monitoring

Heathrow Airport meteorological station (approximate location NGR E 506952 N 176574) is located approximately 8.5 km west-northwest of the site and is considered the closest most representative meteorological monitoring station to the site. Data is recorded at the meteorological station in hourly measurements and the figure below presents the relationship between the frequency and speed of wind from compass point directions for the combined years 2015 – 2019. The figure illustrates the predominant wind direction to be west-southwesterly / southwesterly, which means receptors northeast of the site would have the highest probability of experiencing potential increases in odour emissions.

Figure 2.31 Heathrow Airport Meteorological station 2015-2019



There is a weather station at Mogden recording wind speed and direction. Weather on site can be reviewed if complaints are received or during periods of abnormal operations. The internal 'Weather' SharePoint site provides adverse weather information, and the UK Met Office website can also be used.

2.4 Site Layout and Treatment Processes

Details of the site layout and treatment processes are given in the following sections of the Site Operating Manual and are therefore only given summary attention in this OMP:

Section	Description
1	Governance & Control

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

2.4.1 UWWTD activities

Mogden STW serves a Population Equivalent of 2.1 million. The effluent treatment process is divided into three separate streams, known as the 'East Side Works', the 'West Side Works' and the 'West Side Extension Works'.

East Side Works (Batteries A & B)

Sewage is received from the Chiswick and Western Low Level Sewers and is pumped to the High Level Culvert and mixed with storm surplus from the West Side Works and cess imports. Ferric Sulphate is dosed into the flow to the East side Works downstream of the "Crump Weir" in the High Level Sewer reception chamber. The flow passes through 12no. 6mm band screens. Screenings are fed to a dewatering belt conveyor and then to 3no. dual Combiwasher units, then to 4no. compactor skips.

There are 6no. grit channels, one for each pair of screens. The grit is removed by a dredger and pumped to 3no. Wemco grit classifiers for dewatering and is then discharged into 1no. skip for removal. Excess flow overspills a weir and is directed to 8no. storm tanks. The screened sewage passes through 8no. rectangular PSTs (Primary Settlement Tanks).

The settled sewage is fed in two streams labelled 'Battery A' and 'Battery B' to a total of 12no. diffused air Activated Sludge lanes and 48no. FSTs (Final Settlement Tanks). 8no Former circular PSTs are now FSTs 71-78 with dedicated mixed liquor and RAS pumping stations.

West Side Works (Battery C)

Sewage is received from the Bath Road High Level Sewer reception chamber. Excess flow is spilled via the "Crump Weir" to East Side Works.

Ferric Sulphate is dosed downstream of Lucifer's gate to control odour/H_2S within the biogas.

The raw sewage enters the West Side inlet works, which comprises 4no. screens followed by 2no. cross flow grit traps. Screenings are treated by 2no. dual Combiwashers and deposited in 3no. compactor skips.

Flow is directed through 3no. pre-aeration lanes onto 4 no. circular Primary Settlement Tanks. The settled sewage is treated in 8 no. diffused air Activated Sludge Lanes divided into 2 no. batteries labeled 'C' battery and 'D' battery. 'C' battery has 24 no. FSTs and 'D' battery has 6 no. FSTs.

West Side Extension Works (Batteries D & E)

Sewage is received from the Bath Road High Level Sewer reception chamber.

Ferric Sulphate is dosed into the culvert feeding the West Side Extension to control odour/H_2S within the biogas. The West Side Extension Works is referred to as Battery 'E'.

The Inlet works includes 6no screens, 4no. Combiwashers, 2no grit separators and grit handling. The flow splits at this point, 155Mld (Max) goes into the Crude Sewage PS and then on to the PST tanks 21-25, the rest of the other flow goes to the 3no. Archimedean screws to Flow Split Chamber No.1. which feeds PSTs 13-20.Battery 'D'.

The Crude Sewage Pumping Station pumps the flow up to PSTs 21 to 25. PSTs 13-20 Battery 'D', receive the lifted flow from the Archimedean screws. Flow again splits after the combined PSTs, from here it feeds battery 'D' ASPs and also battery 'E' ASPs.

Intermediate Pumping station lifts the flows from the combined PSTs 13-25 to the Activated Sludge Plant (ASP). The Activated Sludge Plant includes 5no Aeration Lanes and 10no FSTs on Battery 'E'. A proportion of the flow from the rectangular PSTs feeds Battery 'D' Aeration Lanes 19-20 and 6no associated FSTs).

Battery 'E' includes PSTs 21 to 25 and aeration lanes 21 to 25 with associated FSTs 79-88.

Final Effluent

Final effluent from the East Side and the West Side works is combined and discharged to the centre of the River Thames at an island called 'Isleworth Ait'. The storm tank overflow discharges into the final effluent line. There are two separate final effluent sample points both combine before discharging into the final effluent culvert.

2.4.2 Sludge Treatment Centre Permit activities

The STC treats both indigenous sludges and imported sludges. Indigenous sludge is generated from the incoming flow to the STW which passes through the aerobic treatment process under the UWWTD. Indigenous primary sludges derived from the main flow are transferred to the two Primary Sludge Buffer Tanks~~,~~ and mixed with imported sludges from the Sludge Import Tank via Sludge Screens. The Sludge is then transferred through Sludge Screens to the Primary Sludge Thickening Plant. SAS from elsewhere in the aerobic process is subject to thickening in SAS Thickening Plant. Liquors from the SAS and Primary Sludge thickening processes are pumped back to the works inlet and UWWTD process for additional treatment, via the Liquor Return Pumping Station 9 and 16, respectively. Thickened SAS and thickened primary sludge are blended within the Thickening Sludge Buffer Tank, before being pumped to the Pasteurisation Process.

Imported sludge from other works is delivered to a sludge import point via tankers into a Sludge Import Tank, is screened and pumped to the Primary Sludge Buffer Tanks. All such imports are subject to appropriate waste pre-acceptance and acceptance checks, prior to acceptance. Indigenous primary sludge and imported sludge combine in the Primary Sludge Buffer Tanks and are pumped to Primary Sludge Thickening Plant via Sludge Screens, as described above.

The STC comprises two offloading points for permitted imported tankered waste to the works inlet of the STW. The waste arrives at the STC via tanker, is discharged and combines with incoming material from the sewer and is pumped to the Works Inlet. This material is passed via screens and subject to the aerobic treatment process under the UWWTD.

All imports will be assessed using the Thames Water standard waste pre-acceptance checks to ensure that they are appropriate for treatment via the UWWTD. Once pre-approved as suitable for treatment via the UWWTD route, the waste carriers are approved. Wastes will be subject to appropriate waste acceptance checks in accordance with Thames Water procedures.

Following the Pasteurisation Process, sludge is transferred to the Pasteurised Sludge Buffer Tanks before it is pumped to one of the 16 Primary Digester Tanks at the site. Primary Digester Tanks are buried by an embankment which surrounds the tanks, with Biogas Storage holders mounted on top of each Primary Digester Tank.

Following treatment over an appropriate number of days within the Primary Digester Tanks, digested sludge is transferred to the Digested Sludge Buffer Tank, from this tank, digested sludge is pumped by Sludge Pumping Station 14 to an Offsite Dewatering Plant (Iver South Sludge Dewatering Works (SDW)), which receives Mogden's digested sludge for dewatering. Operations at Iver South SDW are already permitted and outside of the scope of this permit variation application. As required, digested sludge is pumped to the Contingency Storage Tank before it is pumped offsite.

Biogas from the Primary Digester Tanks is captured and stored within roof mounted Biogas Storage holders. Individual biogas lines from each Biogas Storage holder join a common line and passes via a biogas compressors before it is sent to the CHP Engines, Gas-to-Grid plant, boilers or Emergency Flares. The biogas lines are fitted with condensate pots which captures entrained moisture for discharge to the site drainage. The Primary Digester Tanks are fitted with pressure release valves (PRVs) as a safety precaution in the event of over pressurising the system. A siloxane filter is fitted upstream of the CHP Engines in order to remove impurities prior to combustion of the biogas in the CHP Engines.

Biogas is combusted within one of the three CHP Engines on site, generating electricity which is normally all used within the site. Heat from the CHP Engines is recovered and used within the heat exchange on the Pasteurisation Process which is backed up by four dual fuelled auxiliary boilers which can combust biogas or diesel. Biogas is also utilised within the Gas-to-Grid plant, upgraded to biomethane and injected into the gas distribution network for offsite use.

In the event there is excess biogas, i.e. more than the CHP Engines, Gas-to-Grid plant, or boilers can utilise, or in the event that the CHP Engines, Gas-to-Grid plant, or boilers are unavailable, there are two ground mounted emergency flares which are utilised under 10% of the year or less than 876 hours per year.

3 Site Management Responsibilities and Procedures

3.1 Site Roles

Figure 3.1 - Site Roles

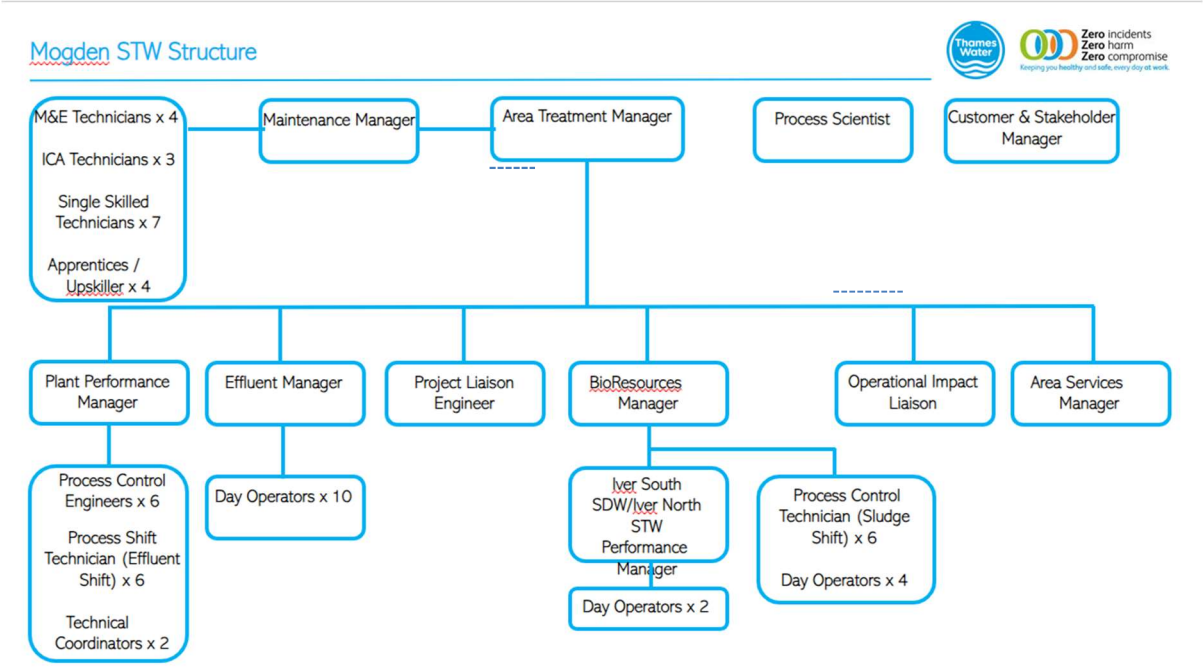


Table 3.1 - Tasks and Responsibilities

Role	Tasks and Responsibilities
Area Treatment Manager	**Responsible for the overall performance of the STW and is Controller of Premises.** • 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. ensuring staff undergo appropriate training
Plant Performance Manager	**Responsible for plant availability across the STW.**
Effluent Manager	**Responsible for the day-to-day effluent operation of the STW.**
Project Liaison Engineer	**Responsible for the close working of capital delivery and capital maintenance projects across the STW.**
BioResources Manager	**Responsible for supporting sludge teams and biogas processing / generation.**
Operational Impact Liaison	**Responsible for the operational impact and improvement of the STW.**
Area Services Manager	**Responsible for the support functions and services of the STW.**
Process Control Engineers	**Responsible for the 24/7 operating of the STW and the monitoring and recording of site data.**
Process Shift Technician (Effluent Shift)	**Responsible for the 24/7 effluent operation of the STW.**
Technical Coordinators	**Responsible for general technical coordination such as parts ordering, goods receipting and replacement assets / improvements.**
Day Operators	**Responsible for the day-to-day duties of the STW.**
Iver South SDW/North Performance Manager	**Responsible for the day-to-day operation of Iver South SDW/Iver North STW**
Process Control Technicians (Sludge Shift)	**Responsible for the 24/7 sludge operation of the STW.**
Process Scientist	**Responsible for compliance across the STW and process monitoring / improvements.**
Catchment Customer & Stakeholder Manager	**Responsible for managing the liaison with external customers and stakeholders.**
Maintenance Manager	**Responsible for the delivery of reactive works and planned maintenance of the STW.**
M&E Technicians	**Responsible for the reactive works and planned maintenance of the STW**
ICA Technicians	**Responsible for the reactive works and planned maintenance of the STW**

Single Skilled Technicians	**Responsible for the reactive works and planned maintenance of the STW**
Apprentices / Upskiller	**Responsible for the reactive works and planned maintenance of the STW**
Technically Competent Manager	Hold the required WAMITAB qualification to support the activities on site under EPR, ensuring permit conditions are complied with.
Customer Centre / Waste Control 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

Thames Water Website – www.thameswater.co.uk

Role	Name	Email address	Phone Number
Area Treatment Manager	[redacted]	[redacted]	[redacted]
Head of catchment - Mogden	[redacted]	[redacted]	[redacted]
Customer Centre	Mogden STW	customer.feedback@thameswater.co.uk	0800 316 0800

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.

All training records are currently held on Learning on Tap where they are accessible by the various Managers and individual members of staff.

4 Odour Critical Plant Operation, Monitoring and Management Procedures

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

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

4.1 Odour Sources, Critical Issues and History

When Mogden was opened in the early 30s, there was very little housing in the surrounding area. As the land around Mogden was developed for residential use, odour complaints began to be received about the works, however, it is difficult to quantify when they started. The earliest complaints held at Mogden are from the 60s.

The site is adjacent to a Thames Water asset - a sewer network – around the War Memorial, to the north.

An Odour Risk Assessment is included as Appendix 1.

An Odour Improvement Plan is included as Appendix 2.

Critical Odour Issues, Emergency Response and Mitigation Measures are summarised in Table 4.2-4.6

4.2 Identification of Odour Critical Plant

4.2.1 Odour Risk Assessment

An Odour Risk Assessment has been updated alongside the OMP 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.

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

4.2.2 Potential Odour sources

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

- Site drainage
- Inlet PS
- Works inlet
- Cess reception
- Screens
- Grit Removal
- PSTs
- Activated Sludge plant lanes & zones
- Flow & Distribution to Secondary Settlement (FSTs)
- Final Settlement Tanks
- RAS & SAS Chambers and pumping
- Final effluent
- Storm tanks
- Odour control Units

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

- Sludge Import tank and screening facility
- Cess reception
- primary sludge buffer tanks
- Sludge Thickening & Pumping
- Thickened sludge buffer tank
- SAS Thickening & Pumping
- Return Liquors
- Pasteurisation units and buffer tanks
- Primary digesters
- Digested sludge buffer tank
- contingency storage atnk
- Iver South Main
- Biogas Compressors
- CHP and Flare stack
- Boilers
- Standby Generators
- Odour control units

4.2.3 Odour Critical Plant

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

- Inlet PS
- Uncovered storm tanks
- Screening
- Pasteurisation units
- Contingency storage Tanks
- Iver south main
- Biogas compressors
- Flare stack
- Odour Control Units

4.2.4 Waste Storage for Sludge Treatment Centre Permit

An inventory of potential odorous materials relating to the Sludge Treatment Centre Permit is shown in Table 4.1 below. Air Emission Points are listed, and the locations shown on the site plan in Figure C of Appendix 5.

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

Table 4.0 Sludge Treatment Centre Permit Tank Inventory

Name	Quantity	Operational Volume (m3)	Material	Average retention time (where applicable)
Primary Sludge Buffer Tanks	2	1,505	Steel	11 hours
Sludge Import Tank	1	331	Steel	1 day
Thickened Sludge Buffer Tank	1	320	Steel	3 hours
12 x Pasteurisation Tanks (Each stream has 1 pre-heat tank, 1 reactor tank)	12	200	Steel	1 day
Pasteurised Sludge Buffer Tanks	2	150	Steel	2.5 hours
Primary Digester Tank s	16	4,125	Concrete	23.5 days
Digested Sludge Buffer Tank	1	520	Steel	4.5 hours
Contingency Storage Tank	1	1957	Steel	Not in ‘normal’ use
Raw Sludge Building Poly Silo	2	15 tonnes	Steel	NA
GBT Press Building Poly Silo	1	30 tonnes	Steel	NA
Sodium Hypochlorite Silo	1	42,000 litres	Not specified	NA

Sodium Hydroxide Silo	1	42,000 litres	Not specified	NA
Boiler House Diesel Tank	1	40,000 litres	Not specified	NA
Diesel Tank	3	32,000 litres	Not specified	NA
Standby Generator Diesel Tank	1	11,000 litres	Not specified	NA

Odorous materials for sludge treatment centre are listed in Appendix 4.

Table 4.1 Odorous raw materials for Sludge Treatment centre permit

Raw Material	Odorous	Storage	Mitigation	Odour Risk
Flopam FO4708 XXR Flopam FO4498 SSH Flopam FO4490 SSH	Not odorous	1. 30 tonnes in a bunded silo 2. 30 tonnes in 2x 15 tonne bunded silo systems 3. 30 tonnes in 2x 15 tonne bunded silo systems	Fully contained	Low
Flofoam H16F liquid	Mild odour	15 tonnes in 1 tonne IBCs on bunds	Fully contained	Low
White Deisel	Petroleum	1. 40,000 litres 2. 127,000 litres Fuel is stored within double skinned fuel tanks	Fully contained	Low
Chevron HDAX 6500 LFG - SAE40	Oil	7 tonnes (estimate) stored in a double skinned bunded tank or in IBCs on portable bunds	Fully contained	Low
Delo XLC Antifreeze / Coolant	Solvent	4 tonnes (estimate) stored in IBCs on portable bunds	Fully contained	Low
Aquasol Salt Pebbles	Not odorous	ordered in pallets as 25 KG bag	Within a building	Low
Liquified Propane Gas	Not odorous	12 tonnes contained within three, 4 tonnes tanks	Fully contained	Low
Granular Activated Carbon	Not odorous	9.85 tonnes contained within two tanks. One tank for H2S filtration (5.25 tonnes) and one	Fully contained	Low

		tank for siloxane filtration (4.6 tonnes)		
O Scent	Mild odour	50L	Fully contained	Low
Helium	Not odorous	100L	Fully contained	Low
Nitrogen, other inert gas mixtures	Not odorous	Minimal	Fully contained	Low

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

4.3 Odour Control Measures

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

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

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

4.3.1 Odour Control Units

UWWT activities: -

- 'East side' Odour Control Unit serves: G
    - East inlet including grit handling plant
    - PSTs 1 - 8
    - Storm tanks 4 and 5
    - Screen house

The plant comprises No.2 wet chemical scrubbers and No.2 carbon unit.

- 'Main pumping station' Odour Control Unit serves: F
    - Main pumping station wet well

The plant comprises a No.1 biofilter.

- 'West side' Odour Control Unit (Pumping Station 7) serves: E
    - Old West inlet area including grit handling
    - Pre-aeration channels

The plant comprises of No.1 biofilter and No.1 carbon unit.

- Odour Control Unit '11' serves: H
    - New West Inlet area including grit handling, screens and pumping stations.
    - PSTs 13 - 25

Odour control unit 11 comprises of No.2 wet chemical scrubbers, and No.3 carbon units.

EPR activities

- Sludge Thickening Odour Control Unit serves: B (A50)
    - Thickening building containing drum thickeners and centrifuges
    - Thickened sludge buffer tank

The plant comprises of No.1 biofilter and No.2 carbon units

- *Imported sludge Odour Control Unit.is no longer in use. Area C now connected to Odour Control Unit 12.*

- Odour Control Unit '12' serves: I and C (A47)

- Pasteurisation sludge buffer tanks and process
- Primary sludge buffer tanks
- New sludge screen house
- Imported sludge facility
- Pumping station 17
- SAS buffer tank (UWWTD)

The plant comprises No. 2 quench towers, No.1 wet chemical scrubber, No.8 biofilters and No.4 carbon filters.

- Transfer pumping station Odour Control Unit serves: D (OCU 48)
    - Digested sludge buffer tank

The plant comprises No.1 biofilter and No.1 carbon unit.

- Gravity Belt Thickener Building Odour Control Unit serves: (A49)
    - Gravity Belt Thickener Building

The plant comprises No.1 carbon unit.

4.3.2 Site Specific Measures

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

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

Tables 4.2-4.7 - Summary of Critical Odour Issues, Emergency Response and Mitigation Measures

The purpose of Tables 4.2-4.7 shall be to identify site specific emergency response procedures and mitigation measures relating to site odour generation and release. They include:

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

Table 4.2 : Summary of routine odour mitigation tasks for assets under UWWTD

Process	Odour and offensiveness	Specific tasks	Responsibility	Monitoring	Task/check frequency	Trigger for action	Remedial action and timescale
General		Housekeeping - keep site clean and tidy	DW	Management Team / All of site	Daily	PCE / S Daily Checks	As soon as safe and operationally practical
Site Drainage	Sewage (L)	Keep drains clear to enable effective wash-downs of odorous material	DW / Tanker	S	As required	PCE / S Daily Checks	As soon as safe and operationally practical
Works inlet (East side and West Side)	Sewage (L)	Clean up any spills	DW	S	As required	S Daily Checks	As soon as safe and operationally practical
Cess Reception, wash down and drainage Linked tasks specified in Appendix 9 section 2.1	Cess (L)	Clean up any spills, wash down area after use Ensure tankers coupled correctly	Cess Driver	S	After each driver	S Daily Checks	As soon as safe and operationally practical

Screens & Screening Handling Linked tasks specified in Appendix 9 section 2.3 &2.4	Sewage (L)	Clean up any spills immediately (including rag during skip changes - see 4.3.3)	DW	S	Daily	S Daily Checks	As soon as safe and operationally practical
		Keep screen building doors closed	DW	S	Daily	S Daily Checks	As soon as safe and operationally practical
		Clean plant internally and externally when taken out for service	DW	S	As required	S Daily Checks	As soon as safe and operationally practical
		Check combiwasher covers are closed	DW	S	Daily	S Daily Checks	As soon as safe and operationally practical
		No filled uncovered skips to be left on site	DW	S	Daily	S Daily Checks	As soon as safe and operationally practical

Grit Removal Linked tasks specified in Appendix 9 section 2.5	Sewage (L)	When a full skip is withdrawn from the odour controlled buildings, ensure swift removal from site	DW	S	As required	S Daily Checks	As soon as safe and operationally practical
Scum Removal	Sewage (L)	Remove scum as necessary	Tanker	S	As required	S Daily Checks	As soon as safe and operationally practical
Storm Tanks Linked tasks specified in Appendix 9 section 2.6	Sewage (L)	Empty & flush tanks and hoppers as soon as practicable after a storm event. Cleaning will normally be completed within 12 hours after completion of draining depending on number of tanks required to be cleaned.	S	S	Within 12h after tank is available for draining	PCE Daily Checks	As soon as safe and operationally practical
Storm tanks Linked tasks specified in Appendix 9 section 2.6	Sewage (L)	Check operation of Amajets when tanks are in use, confirm that swing arms are operating.	S	PCE	Daily when in use	PCE Daily Checks	As soon as safe and operationally practical

		Ensure the minimum number of tanks is in operation in order to deal with storm flows effectively.	S	PCE	As required	PCE Daily Checks	As soon as safe and operationally practical
		Operate Tanks 4&5 as first fill tanks.	S	PCE	As required	PCE Daily Checks	As soon as safe and operationally practical
		Log condition and usage of storm tanks and hoppers on Daily Checks Sheet.	DW & S	PCE	Twice daily	PCE Daily Checks	As soon as safe and operationally practical
		Remove any build-up of scum or rag on tank surface, weirs or launder channels that may result in odour emission	DW	DW / Tanker	Daily	PCE Daily Checks	As soon as safe and operationally practical
Primary Settlement Tanks 1 – 25 Linked tasks specified in	Sewage (L)	Operational target for sludge stocks in uncovered circular tanks - below 500m3	S	DW	Daily	S Daily Checks	As soon as safe and operationally practical

Appendix 9 section 3		Monitor sludge blanket depths minimum twice weekly and chart	DW/S	DW	Minimum twice weekly	S Daily Checks	As soon as safe and operationally practical
		Report to PCE tanks with high sludge levels/gassing	DW	DW	Daily	S Daily Checks	As soon as safe and operationally practical
		In case of bridge/scraper failure the tank will be drained and hosed down, if required, as soon as is reasonably practicable, but within 48hrs. Potentially odorous operation for west side circular tanks - communicate to site management so customers can be notified	DW / S	DW	As required	S Daily Checks	As soon as safe and operationally practical
		Check and clear blockages in scum removal system	DW	DW	Daily	S Daily Checks	As soon as safe and operationally practical

		Sludge stock levels to be recorded and reported to PCE.	DW	DW	3 times a week	S Daily Checks	As soon as safe and operationally practical
Chemical dosing (ferric/ferrous) for all incoming sewage		Check that dosing is taking place and at correct rate (dependant on whether using ferric or ferrous).	S	S	Daily	S Daily Checks	As soon as safe and operationally practical
Activated sludge plant lanes and zones Linked tasks specified in Appendix 9 section 4.1	Earthy (L)	Check aeration patterns, assess levels, presence of foam, general health	DW	S	As required	S Daily Checks	As soon as safe and operationally practical
Final Settlement Linked tasks specified in Appendix 9 section 5	Final Effluent (L)	Blanket level checks, scum monitoring	DW	S	As required	S Daily Checks	As soon as safe and operationally practical
RAS and SAS chambers and pumping	Earthy (L)	MLSS sampling to be taken from all ASP batteries.	DW	DW	3 times a week	S Daily Checks	As soon as safe and operationally practical

Linked tasks specified in Appendix 9 section 10		Avoid co-settling SAS	S	S	As required	S Daily Checks	As soon as safe and operationally practical
		Check all hatches are closed	S	S	Daily	S Daily Checks	As soon as safe and operationally practical
Odour Control Units Linked tasks specified in Appendix 9 section 9	(L)	Observational checks, reactive maintenance when required	DW	DW	Weekly	S Daily Checks	As soon as safe and operationally practical

Table 4.3: Summary of routine odour mitigation tasks for assets under Sludge Treatment Centre Permit

Process	Odour and offensiveness	Specific tasks	Responsibility	Monitoring	Task/check frequency	Trigger for action	Remedial action and timescale

Sludge import reception Linked tasks specified in Appendix 10 section 1	Raw sludge (L)	Check area is clean and clear any spillages immediately (See 4.3.3) Unsure tankers coupled correctly	DW / S	DW	Daily	S Daily Checks	As soon as safe and operationally practical
		Remove full skips from site asap	S	S	ASAP	S Daily Checks	As soon as safe and operationally practical
Cess Reception, wash down and drainage Linked tasks specified in Appendix 9 section 2.1	Cess (L)	Clean up any spills, wash down area after use Ensure tankers coupled correctly	Cess Driver	S	After each driver	S Daily Checks	As soon as safe and operationally practical
Screening and skip management Linked tasks specified in Appendix 10 section 2	Sludge (L)	Empty full skips from site asap	S	S	ASAP	S Daily Checks	As soon as safe and operationally practical
primary sludge buffer tank Linked tasks specified in Appendix 10 section 3	Raw sludge (L)	Monitoring of raw sludge level and integrity of tank	S	S	Daily	S Daily Checks	As soon as safe and operationally practical

Thickened Sludge buffer Tank Linked tasks specified in Appendix 10 section 3	Thickened sludge (L)	Check all hatches are closed	S	S	Daily	S Daily Checks	As soon as safe and operationally practical
		Clean any spillages immediately (See 4.3.3)	DW	S	ASAP	S Daily Checks	As soon as safe and operationally practical
Primary sludge thickening Linked tasks specified in Appendix 9 section 8	Sludge (L)	Monitoring of asset availability	S	S	Daily	S Daily Checks	As soon as safe and operationally practical
SAS thickening Linked tasks specified in Appendix 9 section 8	Sludge (L)	Monitoring of asset availability	S	S	Daily	S Daily Checks	As soon as safe and operationally practical
Pasteurisation units	Thickened sludge (L)	Monitoring of asset availability	S	S	Daily	S Daily Checks	As soon as safe and operationally practical
contingency storage Tanks	(L)	When in use regular turn over of sludge to prevent septicity	S	S	As required	S Daily Checks	As soon as safe and operationally practical

Digester Area Linked tasks specified in Appendix 10 section 6	Digested sludge (M)	Check for sludge spillages around annular seals and clean any spillages immediately (See 4.3.3)	DW/S	S	ASAP	S Daily Checks	As soon as safe and operationally practical
		Monitor bell heights to prevent leaks of biogas	S	S	Daily	S Daily Checks	As soon as safe and operationally practical
		Check for blowing Whessoes (gas release values) or gas leaks in general	S	S	Daily	S Daily Checks	As soon as safe and operationally practical
Digester Area	Digested sludge (M)	Dose with anti-foam to prevent foaming	DW/S	S	Daily	S Daily Checks	As soon as safe and operationally practical
Digested sludge buffer tank prior to iver south SDC	Digested sludge (L)	Monitoring tank level and tank integrity	S	S	Daily	S Daily Checks	As soon as safe and operationally practical
Iver Main	Digested sludge (L)	Monitor main integrity, pump availability in PS14 and relevant odour control	S	S	Daily	S Daily Checks	As soon as safe and operationally practical

Gas Compressor House Linked tasks specified in Appendix 10 section 8	Biogas (L)	Check for gas leaks	S	S	Daily	S Daily Checks	As soon as safe and operationally practical
Flare Stack Linked tasks specified in Appendix 10 section 8	(L)	Service contract (control panels and ignition source)	Technical Coordinator	S	Six monthly	S Daily Checks	As soon as safe and operationally practical
Odour Control Units Linked tasks specified in Appendix 9 section 9	H2S (L)	Observational checks, reactive maintenance when required	DW	S	Weekly	S Daily Checks	As soon as safe and operationally practical

Table 4.4: Intermittent, abnormal, and emergency events for assets under UWWTD

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Works inlet	Flooding OCU failure/maintenance	Ab	Over pumping/tankering	DW	Medium/Low
Cess reception	Spillage	Ab	Clean up ASAP	Cess Driver	Low
Storm tanks	Accumulation of fat &scum Filling/emptying Unable to return contents Amajets failure	Ab	Flush out with FE to prevent odour release Daily area checks Over pumping/tankering Manual hosing and tankering	DW	Medium
Screening and skip management	Spillages Skips not removed from site	Ab	hose down area and clear Rag Skips should be covered	DW	Medium
Grit removal and skip management	Channel out of service Failure Maintenance	Ab/P	Empty and clean channel Use one of the other available classifers/detritor	DW	Low
PSTs	Inability to desludge Bridge/scraper failure Tank drained down Failure of scum removal system Roof/panel damage	Ab	Replace pumps Carry out repair (drain and hose were required) Wash out tank Repair and hose down Drain down and clean tank whilst repairing	Maintenance / DW	Medium
Activated Sludge plant	Lane drained down	P	Hose down tanks immediately after drain down	DW	Low

FSTs	Surface scum accumulation Scraper failure Drained down	Ab	Hose surface Drain down tank and hose down Hose down tanks immediately after	DW	Low
RAS and SAS pumping and chambers	Crust due to air mixing system failure	Ab	Hose to break crust and repair	DW	Low
Odour Control units	Failure	Ab	Engage with contractors to repair, consider additional odour control measures	Operational Impact Liaison	Medium

Table 4.5: Intermittent, abnormal, and emergency events for assets under Sludge Treatment Centre Permit

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Cess Reception	Spillage	Ab	Clean up ASAP	Cess Driver	Low
Sludge import	Spillage/blockage	Ab	Clean up ASAP and unblock screens	Import Driver	Low
Screening and skip management	Overfilling	Ab	Clean up and cover skip	DW	Low
primary sludge buffer tanks	Overfilling Hatches left open	Ab	Wash down sludge to local drainage Close hatch	DW	Medium
thickening sludge buffer tank	Spillages Hatches left open	Ab	Wash down area Close hatch	DW	Low
Primary sludge thickening	Spillages	Ab	Wash down area	DW	
SAS thickening	Spillages	Ab	Wash down area	DW	Low
Liquor returns	PS16 not in operation	Int		DW	Low
Pasteurisation units	overfilling	Ab	Repair level sensors and hose down local drainage	DW / Maintenance	Medium
Digester area	Biogas release Spillage Purging	Ab	Isolate the digester / Turn extra CHP on to draw down the gas filled / And anti foam digester sealed / Divert flow to other digesters	PCE	Medium
digested sludge buffer tank	overfilling	Ab	Clean up area and resolve cause	DW	Low

contingency storage tank	Iver South SDC pumping failure	Ab	Use contingency storage tank and repair main	PCE	High
Iver South Main	Pipe burst	Ab	Stop pumping sludge and clean up area	PCE / DW	High
Biogas compressor	Biogas leak	Ab	Shut down affected compressor and run stand by until leak fixed	PCE	Medium
Flare Stack	Failure to ignite	Ab	Hire flare or repair	Technical Coordinator	High
Power Management System	Failure	Ab	Hire in temporary generators	Technical Coordinator	Medium
Odour control units	Failure	Ab	Engage with contractors to repair, consider additional odour control measures	Operational Impacto Liaison	Medium

Table 4.6: General Intermittent, abnormal, and emergency events

Incidents and emergencies	Event	Status	Ops mitigation	Expansion of TWUL operational response	Odour risk after mitigation
Fire	Failure of OCU fans or sludge building	E	Use of SHTs for storage of sludge. Tanker from site		Medium
Severe weather	Transport of sludge from site inhibited resulting in back up of sludge in site resulting in additional odour release from tanks and PSTs	E	Event unlikely as there is provision for storage on site.		Low
Flooding	Flooding causing process or equipment problems	E	Not an identified problem at Mogden. Site incident procedures would be followed.		Low
Illness/absence of key staff	Accumulation of sludge/loss of odour control etc.	E	Task allocation is independent of individual staff.		Low
Power cuts	Loss of power to fans leading to loss of odour control	E	Emergency power generation for critical activities until power restored.		Medium
Other incidents	Transport of sludge to land inhibited for other reasons leading to back up of sludge in site resulting in additional odour release from tanks and PSTs	E	Provision for storage on site plus additional storage in the existing sludge holding tanks. Transport to other STWs if necessary		Low

Table 4.7 Summary of routine odour mitigation tasks for OCU's

Process	Specific tasks	Dayworks/Shift	Task/check frequency
	All routine site checks as per SOM	DW	Weekly

Odour Control Units (OCUs)	OCU performance trends shall be monitored, and deteriorating performance shall trigger investigation into the efficiency of the OCU	Performance/ Process Manager	As required
	Monitor performance weekly using Jerome and on-line readings from OCUs and report to Operational Impact Liaison and Effluent Manager	DW	Weekly
Odour Monitors	Check readings on SCADA and action accordingly	S	Daily
	Arrange for calibration of instruments	Operational Impact Liaison	Monthly Service Contract

Trigger levels are set for the circular West Side UWWT PSTs as follows:

	Trigger level (m^3 of sludge total)	Trigger level for individual tank in group – min depth of water above sludge surface (in m)
West Side 1 – Tanks 9-12 (circular)	500	2.5

Note: The sludge stock holding in both the East side and West side rectangular tanks is tracked, but no longer used for triggering notification to London Borough of Hounslow EHO because they are covered and Odour controlled. However, these levels are used to determine the desludge regime for the day.

It is a specific requirement of the Abatement Notice Schedule agreed between the London Borough of Hounslow and Thames Water that exceedance of the trigger (alert) level for total sludge volume held in the circular West Side PSTs is notified to London Borough of Hounslow EHO the next working day and with any appropriate remedial measures taken notified within three days.

The normal operating target sludge depth in each tank shall be below the depth stated in the table above. If the freeboard (i.e. water depth above the sludge surface) in any individual tank is less than this trigger level then the tank shall be subject to manual desludging, until the sludge depth is reduced.

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).

4.3.4 Chemical Dosing

The chemical dosing plant (dosing ferric sulphate to incoming sewage for sulphide reduction) is linked to SCADA and monitored at the control room. Failure of the dosing plant will generate an alarm.

4.3.5 Storm Tanks

Thames Water will comply with the East Side Storm Water Tanks and Hoppers Management Plan where reasonably practicable.

4.3.6 Skip covering

Any skip on site that contains odorous material will be kept covered unless in constant use.

4.3.7 Digester Bell Height Monitoring

Currently the digester sludge level is taken twice a day and reported to the PCE. The PCE will then take the corrective action required to adjust these levels as required to hit a target level of between 300 – 700 mm from the top level of the concrete surface.

4.3.8 East Side PST's

The East Side PST sludge stocks are under constant monitoring and are kept to a minimum. Currently the sludge stocks are taken three times a week and reported to the PCE as well the Process Scientist.

4.4 Routine Monitoring

Overall plant performance is assessed daily as part of the generic site and sludge rounds, which apply to Thames Water large STW sites. The objective of these are to ensure that treatment processes, including odour control, are checked for effective operation as per the SOM.

The objective of these are to ensure that treatment processes, including odour control, are checked for effective operation as per the SOM. Any of the checks that result in performance of the process outside of the limits defined in the SOM or a fault being detected will require an Operator to change the process

to bring the plant back into acceptable limits or the fault needs to be logged and reported for follow up maintenance/repair.

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

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

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

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

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

- pH: At a pasteurisation digestion site such as Mogden the processes is maintained around pH 8 but within the range 7.5-8.6 (this is % dry solids and digester load dependant) for healthy operation.
- alkalinity: Levels dependant on feedstock characteristics (primary sludge: surplus activated sludge (SAS) ratio). Advanced digestion (pasteurisation) typically, 5,000 - 10,000mg/litre range (target range from 6,000-8,000 mg/litre) but is dependent on % dry solids and digester load.
- temperature: minimum target of 40°C for advanced digestion. This is maintained within the range 36-45°C.
- 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. Mogden fits into the second row of the table.
- Dry solids feed: see table below, Mogden has a target of 10%DS, but this can vary between 8-14%DS and impacts the HRT.

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

* mesophilic anaerobic digestion

[X] surplus activated sludge, arising from the UWWTD treatment route.

- VFA (volatile fatty acid) concentration: There is no specific range for VFAs as it depends on the feedstock. It is used as an indicator of digester health rather than a process control. The production of organic acids depends on the volume of solids fed to

the 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 but not based on single parameter.

Sniff Testing

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

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

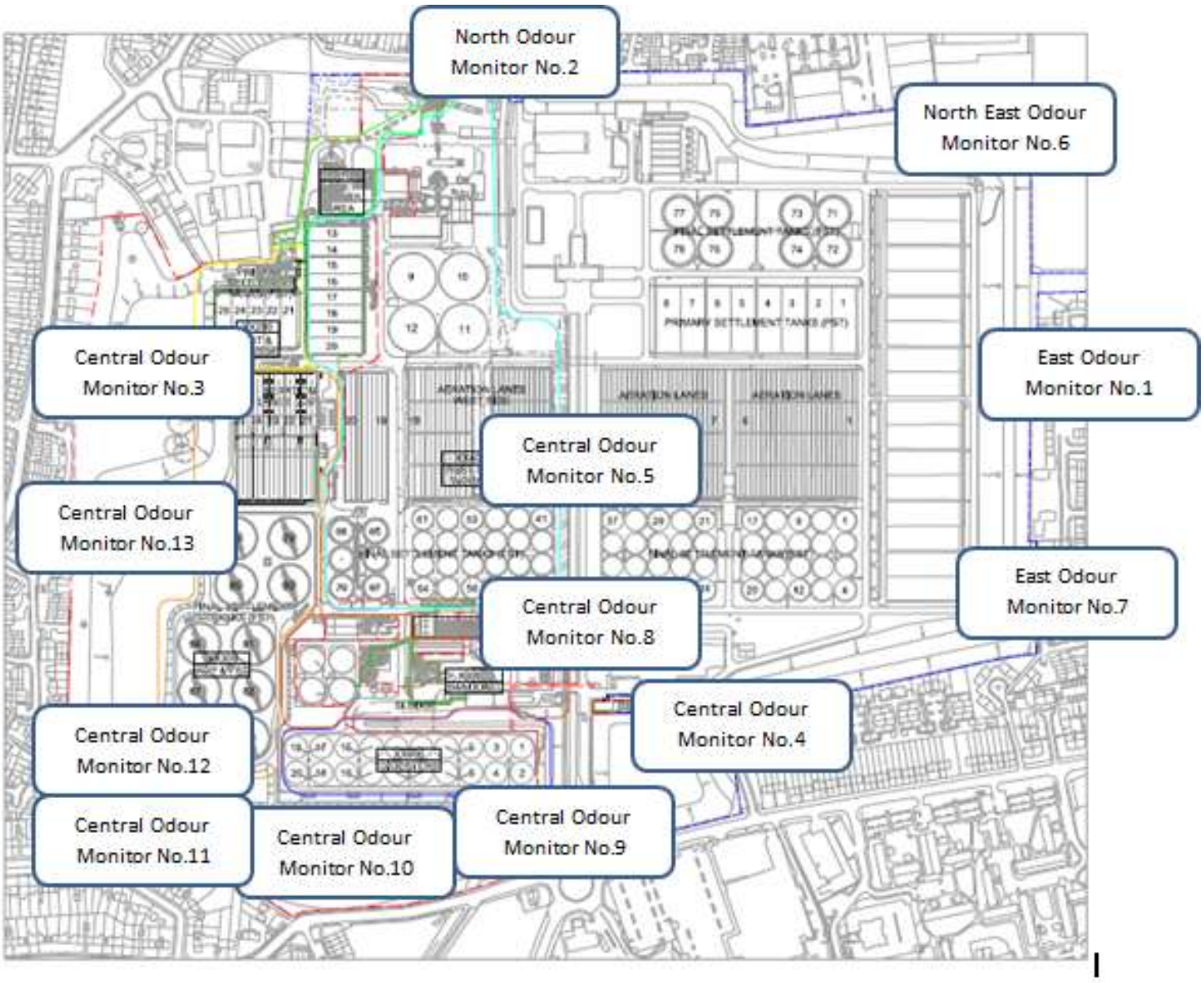
- Sniff testing will be carried out at by someone not routinely based at site, who are less sensitised to odour produced on site.
- Assessing potential odour sources within the Urban Waste Water Treatment (UWWT) and Sludge Treatment Centre (STC) processes and attempt to trace the odour to its source.
- The procedure and recording form which will be used can be found in appendix 12 of the OMP.

4.4.1 Performance Checks and Testing

4.4.1.1 Boundary Monitoring

Continuous odour monitoring of the site is carried out using up to 13 fixed hydrogen sulphide (H_2S) monitors, referred to as Odour Monitors (OM). . OM 1 to 4 are located around the boundary in the north, south, east and west locations. OM 5 is located at the centre of the site. There are an additional eight OMs around the south west of the site, including the digester and west side extension area.

All the monitors are sensitive to 1 part per billion (ppb) of H_2S. The monitors are linked to the site control room computer (SCADA) system, which displays current readings, and also trends them continuously. The sample frequency is five minutes. Additional information from the site wind speed and direction monitors is used in conjunction with the monitor readings to assess impact and to cross check when any complaints are received. The trigger level for investigating odour release at the boundary is 0.015 ppm H_2S, sustained on any one monitor (since single transient ‘spikes’ occur occasionally) for a minimum of 20 minutes. Weekly monitoring report on H_2S levels and site log to be provided to LBH and are also available on our odour trend graph.



4.4.1.2 Odour Control Unit Monitoring

Monitoring for effective operation of the Odour Control Units (OCUs) is carried out on a weekly basis, using a gold leaf H_2S analyser (Jerome). Samples are taken of the air entering and exhausted from each OCU. An average of three readings of each are used to assess the effectiveness of the OCU. The results are recorded. The Operational Impact Liasion is responsible for monitoring the performance data and taking action as appropriate. An example of the log sheet is included in Appendix 6.

Interstage performance monitoring of OCUs is undertaken through specialist odour contractors on a monthly basis.

An in-house OCU assessment is undertaken on a weekly basis, with the task spec is listed in table 4.7 and appendix 9.

The OCUs for the thickening, pasteurisation plant and sludge transfer pumping station have on-line monitoring. Readings taken from these are recorded on the SOM log sheets.

Trigger/action levels for each OCU averaged exhaust readings have been set as follows:

Main Pumping Station OCU	0.2ppm H_2S
Thickening plant OCU	0.5ppm H_2S
OCU 12	0.5ppm H_2S
Transfer Pumping Station OCU	0.5ppm H_2S
East Side OCU	0.05ppm H_2S
West inlet	0.05ppm H_2S
OCU 11	0.5 ppm H_2S
GBT building OCU	0.5 ppm H_2S

Exceedances of these trigger/action levels are to be reported to London Borough of Hounslow EHO during weekly site inspections.

The chemical treatment OCU's are also to have the PH and redox values checked weekly. These values are in the table below and represent the performance of the chemical dosing process for the OCU's. If any of these values are not within tolerance, immediate action is to be taken on site to investigate.

	PH set point	PH Tolerance	Redox Value	Redox Tolerance
Eastside OCU	9.2	+ 0.2	700mV	+ 25mV
OCU No.11	9.2	+0.2	710mV	+ 25mV
OCU No.12	9.2	+0.2	710mV	+ 25mV

Surveys of the site are carried out, either by hand held H_2S monitors, or by a specialist contractor which samples the air for olfactometric analysis. These surveys are used to assess odour before and after improvement schemes or major changes to operational practices.

Olfactometry performance tests on each OCU are a requirement of the Abatement Notice Schedule and will be carried out annually by a specialist contractor. The annual testing will be carried out to the following protocol:

- All Odour Control Units (OCUs) will be tested by olfactometric testing of inlet and outlet air to assess compliance with individual odour emissions rate limits (ou_E/s) and/or outlet odour concentrations (ou_E/m^3), and to assess performance in terms of percentage abatement (that is percentage reduction in odour concentrations).
- All OCUs will be tested between the 1 May and 15 June so that performance is known and optimised before the higher odour risk summer period.
- Representative odour samples will be collected in triplicate from sampling ports located in the inlet and outlet ducts (and at an intermediate stage for multi-stage OCUs) for each OCU. These samples will be analysed by olfactometry and for hydrogen sulphide concentrations (using a calibrated Jerome high resolution meter or a suitably sensitive alternative meter). Olfactometric analysis will be conducted in accordance with BSEN 13725: 2003 and will be carried in a UKAS accredited laboratory.
- At the same time that odour samples are taken, the air flow through each OCU will be measured and recorded using calibrated flow measuring equipment in order to enable emission rates to be calculated as ou_E/s.
- The Council will be notified at least 7 days before any sampling is carried out and will be free to observe the testing.
- The Council will be supplied with reports of the result of all olfactometric testing within 30 days of the testing being carried out.

- Should the test results for any OCU exceed the individual odour emission rate or odour concentration limits set out in the OMP, then Thames Water shall inform the Environmental Health Department at LBH within 10 days of the testing having been carried out, and will provide a summary of the non-compliant results along with this notification.

- Reporting limits for emission rates / odour concentrations are: (for example)
- 1. OCU A : X,000 ou_E/s;
- 2. OCU B : emission not to exceed concentrations of 1,000 ou_E/m^3;
- 3. OCU C : to achieve at least 95% abatement

- Any OCU that exceeds the emission or odour concentration limits set out in the OMP in routine annual testing shall be repaired or rectified and re-tested as soon as reasonable practicable, allowing for complexities of the repair, procurement of material and on completion of a risk assessment on the potential odour impact of the work being carried out. Thames Water shall carry out a re-test of the OCUs as soon as the remedial work is completed and will then report the results of the re-test to the Council within seven days of the re-test being carried out.

- Should the re-test exceed the above limit, Thames Water shall check the design and performance of the installation and arrange a meeting with the Council to discuss the reasons for the exceedances and what further remedial actions will be taken to improve abatement performance.

4.5 Record Keeping

All records relating to odour mitigation i.e. OCU performance data etc. will be kept on site in the admin building.

Records of routine monitoring, site and sludge inspection rounds and sludge blanket checks are kept on SAP. Sludge blanket levels are recorded on run charts and electronically via the Cockpit.

4.5.1 Reagents and Chemicals

All OCU and ferrous dosing chemicals are ordered through the Thames Water Stock Inventory SAP IT system. This shows the volume and quantity of chemical ordered for each OCU and the usage quantity.

The OCU carbon and media for OCUs are regularly tested for effectiveness. This data will be tracked and any regeneration of material will be planned as per the requirement. This data will be logged on site and on the Thames Water APS asset investment tracker. This data will be reviewed in a HAZOP of the OCUs for 2016 and an appendix added to this OMP.

4.6 Emergency Response and Incident Response Procedures

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

Hazard reporting and accidents are all recorded on the Health and Safety software database Rivo Safeguard (http://www.rivosafeguard.com) and monitored by Thames Water's Health, Safety & Environment team.

In the event of power failure, the site will run on island mode.

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

Odour mitigation for emergency events have been detailed in Tables 4.4 - 4.6. The purpose of Tables 4.2 - 4.6 shall be to identify site specific emergency response procedures and mitigation measures relating to site odour generation and release as well as additional site-specific odour issues and mitigation measures associated with process stages identified under the site Odour Risk Assessment.

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

(a) Targeted use of 'Jerome' hydrogen sulphide analysers
(b) Targeted use of sniff tests ('calibrated nose')
(c)H2S measurements of stored materials where septicity is either present, or the material is at risk of septicity from continued storage especially in the open air, for example, prior to de-watering where measurements of sulphide & dissolved O2 would inform a condition assessment. Quantities and storage times precipitating a need for such assessments. This recommendation is being raised with the Area Process Scientist.
(d) Inclusion of temporary odour suppressants/misting agents and continued access to process critical spares (odour minimisation by early intervention).
(e) Further expansion of odour risk within site incident planning (this is already referenced in Tables 4.4, 4.5 & 4.6 under relevant Intermittent; Abnormal Operation & Emergency scenarios)
(f) For PSTs, asset condition (wear/damage) would consider odour risks where assets are taken offline
(g) Telemetry/alarming of whessoe valve releases – there is an existing phased project within TWUL to enhance this at our sludge locations).

5 Maintenance and Inspection of Plant and Processes

5.1 Routine Maintenance

5.1.1 General Requirements

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

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

All maintenance is captured on the corporate system SAP, which generates work requests for the various activities for the treatment process assets.

5.1.2 OCU Selection and Performance Validation

STC OCUs

GBT Building OCU (A49)

Media type	Lava Rok
Design Air flow rate	2,545 m_3/hr
Design H2S Inlet Load	50 ppm (average) 100 ppm (max)
Design inlet temp	10-30
Design removal efficiency	98%

Duty/stand by fans	Present

Nominal design criteria back calculated by ERG

For continuous operational monitoring, system incorporates:

- Visibility of fans on SCADA, with alarms, for loss of extraction from odorous sources
- mains power supply failure alarm

For periodic monitoring:

- Inlet and outlet Hydrogen Sulphide concentrations recorded and assessed for removal efficiency and below maximum designed inlet loading during monthly inspections. Following the monthly inspections, hydrogen sulphide concentrations are trended by ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG would include this in the recommendation section of their inspection report, for example media replacement.
- System integrity checked during daily site rounds and monthly inspections to confirm extraction points and routes undamaged.

Pumping station 14 OCU (A48)

Biofilter

Original Manufacturer	Osil LavaRok
Media type	Lava Rok
Design Air flow rate	2,545 m_3/hr
Design inlet temp	20
Design removal efficiency	98%
Duty stand by fans	Present

Carbon Filter

Original Manufacturer	Osil CuCarb Absorber
Media type	CuCarb

Design Air flow rate	2,545 m3/hr
Design H2S Load	1 ppm (average) 2ppm (max)
Design removal efficiency	99%
Duty stand by fans	Present

Nominal design criteria back calculated by ERG

For continuous operational monitoring, system incorporates:

- Visibility of fans on SCADA, with alarms, for loss of extraction from odorous sources
- Visibility of recirculation pumps with alarms
- Continuous inlet and outlet H2S monitoring capability

For periodic monitoring:

- Inlet and outlet Hydrogen Sulphide concentrations recorded and assessed for removal efficiency and below maximum designed inlet loading during monthly inspections. Following the monthly inspections, hydrogen sulphide concentrations are trended by ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG would include this in the recommendation section of their inspection report, for example media replacement.
- System integrity checked during daily site rounds and monthly inspections to confirm extraction points and routes undamaged.

Sludge thickening OCU (A50)

Biofilter

Original Manufacturer	Osil LavaRok
Media type	Lava Rok
Design Air flow rate	7070 m3/hr
Design H2S inlet load	10 ppm (average) 50 ppm (max)
Design inlet temp	20

Design removal efficiency	98%
Duty stand by fans	Present

Carbon Filter

Original Manufacturer	Osil CuCarb Absorber
Media type	CuCarb
Design Air flow rate	3535 m_3/hr
Design H2S Load	10 ppm (average) 50ppm (max)
Design removal efficiency	99%
Duty stand by fans	Present

Nominal design criteria back calculated by ERG

For continuous operational monitoring, system incorporates:

- Visibility of fans on SCADA, with alarms, for loss of extraction from odorous sources
- Visibility of recirculation pumps with alarms
- Continuous inlet and outlet H2S monitoring capability
-

For periodic monitoring:

- Inlet and outlet Hydrogen Sulphide concentrations recorded and assessed for removal efficiency and below maximum designed inlet loading during monthly inspections. Following the monthly inspections, hydrogen sulphide concentrations are trended by ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG would include this in the recommendation section of their inspection report, for example media replacement.
- System integrity checked during daily site rounds and monthly inspections to confirm extraction points and routes undamaged.

OCU 12 (A47)

The OCU 12 is a large OCU consisting of two gas inlet streams that converge part way through the OCU for common remaining treatment. The first stream is from the sludge stream, and the second stream is from the pasteurisation units.
The pasteurisation stream flows from two quench towers towards two separate pairs of biofilters in series (2 then 2) before entering a wet scrubber. After being scrubbed, this stream converges with the sludge stream.
The sludge gas stream initially flows into two pairs of biofilters in series (2 then 2) before converging with the pasteurisation stream to enter two pairs of carbon filters in series (2 then 2).
After the combined stream has passed through the last carbon filter, it is discharged to atmosphere via a common stack.
In total, OCU 12 contains, 8 off bio filters, 1 off alkaline scrubber and 4 off carbon filters.

Biofilter x8 (4 pairs)

Original Manufacturer	Group Europe Environment 2900-4M (2011)
Design Air flow rate	2253 m_3/hr
Design H2S inlet load	First pair in stream 100 ppm (average) 300 ppm (max) Second pair in stream 5ppm (average 10 ppm (max)
Design inlet temp	20
Design removal efficiency	98%
Duty stand by fans	Present

Wet scrubber

Original Manufacturer	Group Europe Environment 2900-4M (2011)
Dosing	NAOH or NaOCl
Design Air flow rate	4506 m_3/hr
Design H2S Load	10 ppm (average) 50ppm (max)
Design removal efficiency	99%

Duty stand by fans	Present

Carbon Filter x4

Original Manufacturer	Osil CuCarb Absorber Group Europe Environment 2900-4M (2011)
Design Air flow rate	5529 m_3/hr
Design H2S Load	First pair 1 ppm (average) 5 ppm (max) Second pair 0.5ppm (average) 1 ppm (max)
Design removal efficiency	99%
Duty stand by fans	Present

Nominal design criteria back calculated by ERG

For continuous operational monitoring, system incorporates:

- Visibility of fans on SCADA, with alarms, for loss of extraction from odorous sources
- Continuous discharge H2S monitoring capability

Alarms for chemical dosing failure and recirculation pump failure

For periodic monitoring:

- Inlet and outlet Hydrogen Sulphide concentrations recorded and assessed for removal efficiency and below maximum designed inlet loading during monthly inspections. Following the monthly inspections, hydrogen sulphide concentrations are trended by ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG would include this in the recommendation section of their inspection report, for example media replacement.
- System integrity checked during daily site rounds and monthly inspections to confirm extraction points and routes undamaged.

UWWTD OCUs

Main pumping station OCU

For periodic monitoring:

- Inlet and outlet Hydrogen Sulphide concentrations recorded and assessed for removal efficiency and below maximum designed inlet loading during monthly inspections. Following the monthly inspections, hydrogen sulphide concentrations are trended by ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG would include this in the recommendation section of their inspection report, for example media replacement.
- System integrity checked during daily site rounds and monthly inspections to confirm extraction points and routes undamaged.

East side OCU

For continuous operational monitoring, system incorporates:

- Visibility of fans on SCADA, with alarms, for loss of extraction from odorous sources
- Continuous discharge H2S monitoring capability
- Alarms for chemical dosing failure and recirculation pump failure

For periodic monitoring:

- Inlet and outlet Hydrogen Sulphide concentrations recorded and assessed for removal efficiency and below maximum designed inlet loading during monthly inspections. Following the monthly inspections, hydrogen sulphide concentrations are trended by ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG would include this in the recommendation section of their inspection report, for example media replacement.
- System integrity checked during daily site rounds and monthly inspections to confirm extraction points and routes undamaged.

Westside OCU

For continuous operational monitoring, system incorporates:

- Visibility of OCU on SCADA

For periodic monitoring:

- Inlet and outlet Hydrogen Sulphide concentrations recorded and assessed for removal efficiency and below maximum designed inlet loading during monthly inspections. Following the monthly inspections, hydrogen sulphide concentrations are trended by ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG would include this in the recommendation section of their inspection report, for example media replacement.
- System integrity checked during daily site rounds and monthly inspections to confirm extraction points and routes undamaged.

OCU 11

For continuous operational monitoring, system incorporates:

- Visibility of OCU on SCADA

For periodic monitoring:

- Inlet and outlet Hydrogen Sulphide concentrations recorded and assessed for removal efficiency and below maximum designed inlet loading during monthly inspections. Following the monthly inspections, hydrogen sulphide concentrations are trended by ERG which would enable identification of a decrease in H2S removal. Should this occur, ERG would include this in the recommendation section of their inspection report, for example media replacement.
- System integrity checked during daily site rounds and monthly inspections to confirm extraction points and routes undamaged.

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

5.1.3 Maintenance of Odour Control Units

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

Parameter	Monitoring Method	Action if red flag identified and Expected timescales	Frequency	Biofilter	Carbon	Chemical scrubber
Performance monitoring						
Gas inlet temperature (5-40C)	Temperature probe	Investigate any anomalies relating to temperature, such as individual process checks	Monthly	X	X	X
Gas outlet temperature (5-40C)	Temperature probe	Investigate any anomalies relating to temperature, such as individual process checks				
Gas inlet flow rate or velocity (6m/sec)	Calibrated velocity meter	Investigate any anomalies relating to flow rates; velocities and pressure drop across the system by measuring the inlet and outlet pressure. Check fan functionality; presence of obstructions; bring forward contractor service. If fan replacement needed c. 2* months minimum typical duration depending on severity of issue/condition of back up fan (*time of order to mobilisation; assumes second duty fan runs; timescale includes time to install replacement and fabrication). If solely an electrical issue, recourse to TWUL ICA Technician mostly likely within a week. Other root causes are usually blocked media; duct and failure of non-return dampers around fan sets.	Monthly	X	X	X
Gas outlet flow rate or velocity (6m/sec)	Calibrated velocity meter					
Gas inlet humidity (Post biofilter humidification > 90% Carbon units <70%)	Hygrometer	Check any preheaters fitted to system before carbon, or check irrigation is working on biofilter.	Monthly	X	X	-
Back pressure (to assess media thatching or media compaction) Typically systems work around 0.5 kPA	Calibrated digital pressure meters	Values above threshold would be 'RAG' banded in the OCU contractor inspection reports. If pressure gauges are over-pressurised to the extent fouling is or has occurred to be treated as high priority. Check for blockages, poor FFE quality/check if media is of a type susceptible to biodegradation.	Monthly	X	X	X
pH of discharge irrigation water (2-3pH)	pH paper	Less than 2 increase irrigation.	Monthly	X	-	-

pH of scrubber liquor (9.2 pH)	Calibrated pH probe (calibrated with standard solutions)	Recalibrate pH probe and check dosing and chemical availability	Continuous	-	-	X
Redox potential of scrubber liquor (700-730 mV)	Calibrated redox probe (calibrated with standard solutions)	Recalibrate redox probe and check dosing and chemical availability	Continuous	-	-	X
Gas inlet/outlet concentrations for hydrogen sulphide (50ppb used for media change out)	Drager Tubes/CEN TS 13649 for sampling NIOSH 6013 for analysis OR US EPA M11*	Check functionality of odour control unit. If repair or replacement media required raise a job on SAP or APS risk and arrange for contractor repair. Timescale Bespoke to root cause/see later entries. Arrange re-test post remedial work. Major repairs up to 6 months depending on complexity	Monthly/ 6 monthly	X	X	X
Gas inlet/outlet concentrations for ammonia (20mg/m3)	EN ISO 21877 OR CEN TS 1369 for sampling NIOSH 6016 for analysis*	Check functionality of odour control unit. If repair or replacement media required raise a job on SAP or APS risk and arrange for contractor repair. Timescale Bespoke to root cause/see later entries. Arrange re-test post remedial work. Major repairs up to 6 months depending on complexity	6 monthly	X	X	X
Gas inlet/outlet concentrations VOCs and RSH	RSH – Drager tubes VOC – PID as isobutylene		Quarterly	x	x	x
Maintenance checks and inspections						
Check integrity of tank covers for damage and ensure access hatches are closed		Close hatches ASAP	Daily	X	X	X
Check building & door integrity for damage or leakage; doors closed (if required)		Closed doors ASAP	Daily	X	X	X
Check damper positions on ductwork are in the correct positions		Correct positioning	Daily	X	X	X
Check irrigation and humidification systems are functioning		Turn on systems or investigate malfunction.	Daily	X	-	-

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

Check irrigation pumps condition and operation	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	-	
Check chemical reagent levels and supply	Order when required. Ensure no low-level alarms.	Weekly	-	-	X
Check chemical dosing and blow down pump condition and operation	If outside pH levels, investigate. Initiates blow down to correct level.	Daily/Monthly	-	-	X
Check blow down rate is within correct range	If outside pH levels, investigate. Initiates blow down to correct level.	Monthly	-	-	X
Check ph and Redox probes are working and in calibration	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	-	-	X
Check recirculating liquor strainer and replace if necessary	Flows recorded on SCADA	Monthly	-	-	X
Check water softener is working correctly (if installed)	Water hardener test papers used to check water quality.	Monthly	-	-	X
Check dampers are operational and in good condition	Swap over duty fan to stand by fan and record flow volumes to identify issue.	Monthly	X	X	X
Inspect electrical control panel and check for faults and alarms	Visual inspection by monhtly contractor and investigation any alarm conditions.	Monthly	X	X	X
Simulate duty / standby fan and pump changeover	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	X	X
Check H_2S meter is functioning and calibrated (if installed)	Check calibration is still in date during monthly contractor inspection.	Monthly	X	X	X

*Only required on OCUs covered by STC permit

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

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

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

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

The OCUs are specifically designed to minimise the release of odour, bioaerosols and microorganisms.

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

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

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

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

All OCUs, irrespective of media type, *will stipulate a minimum of 30 seconds* ***retention time***, for a a biofilter to achieve a minimum of 95%, removal efficiency. A minimum of 2-3 seconds retention time for a carbon filter is stipulated, and 2 seconds for a chemical scrubber.

H2S readings are reported in the monthly service reports which inform odour equivalents (OEs). The accepted OEs for H2S at 0.5 part per million is equivalent to 1,000 odour units. A "red action" would be raised for any value 3 parts per million or greater on the discharge from the biofilter (before the carbon filter) and 0.5 parts per million off the subsequent carbon filter. There is a relationship between increases in discharge efficiency from the biofilter since if this rises it will start to exhaust the carbon filter defining the red action. Contextual knowledge must inform any triggers for action; rather than focusing on a single value. Where a biofilter or carbon filter is alone a red action would be raised for any value above 0.5 ppm regardless of removal efficiency.

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

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

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

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

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

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

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

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

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

- Visibility using local SCADA control panels for OCU , which records fan status
- Daily site rounds by Thames Water technicians. These are Psion based checks using SAP Plus for escalations including, for example, internal MANDAT tickets or identifying a need for contractor support. The tasks in the daily checks mirror the numbered tasks in the contractor 'Monthly Health Checks'. See appendix 11 and section 9 in Appendix 9 in the OMP. There is connectivity between the site rounds and SCADA, for example, if excessive noise is recorded this could relate to an operational fault in OCU, and in turn, is visualised on the local SCADA screens.

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

For **humidity**, *the gas is humidified before being received by the biofilter,* so this parameter has less relevance. Biofilter post humidification should achieve a level of >90%. Carbon units should be set at <70%.

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

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

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

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

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

5.1.4 Records

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

5.2 Fault Reporting

Faults identified during routine inspections are reported to the Effluent, Plant Performance or BioResource Manager, Technical Co-Ordinator or Process Controller who assesses criticality before entering the task into the job scheduling system for allocation to an appropriate person and to a timescale appropriate to the criticality.

5.3 Emergency Repairs

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

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

6 Customer and Environmental Health Organisation Communications

6.1 Action to be taken when carrying out odour investigations

When an on-site investigation is required in response to a breach of the boundary trigger levels or a customer complaint the individual investigating the occurrence will need to check and record the following:

- If the breach is in a specific area, i.e. a trigger level exceedance of a boundary monitor, the operation of OCUs in the vicinity is to be confirmed. This is to include the operation of fans, irrigation water and chemical stocks (if appropriate).
- Investigate for any sludge spillages in the vicinity.
- Investigate any plant in the vicinity that may not be performing, particularly plant that is associated with raw sludge handling, bio-gas operations or screening/grit production.
- Verification with portable Jerome monitor when required.
- Record the required details of the site investigation in the Odour Log.

6.2 Notification of process improvements

Where improvements have been made to the treatment processes that will reduce odour emissions, notification is given using the Mogden website, a Notification email (sent to all stakeholders who have chosen to be on the mailing list), newsletter, and Residents Liaison Meeting.

6.3 Customer Odour Complaints Process

Customer contacts regarding Mogden STW will be made via the Customer Services Centre, logged, and passed (directly, or via the WOCC) to local Operations (Area Treatment Manager, Customer and Stakeholder Manager and Operational Impact Liaison via e-mail. 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 Services Centre to report if they are noticing odour from Mogden 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 'Mogden Sewage Treatment Works'

3. Telephone - Customer Services 0800 316 9800

4. For local customers and locaL resident groups - Mogden@thameswater.co.uk with the subject 'Mogden Sewage Treatment Works' this is only manned Mon-Fri 7:30-15:30

The Mogden Line can be reached on 0800 009 3984, which takes out the menu system. However, Customer Services can also be reached on a Freephone number: 0800 316 9800

If the customer / resident would prefer to contact the Environmental Services of London Borough of Hounslow, their contact details are as follows:

London Borough of Hounslow – Environmental Services
Telephone – During normal working hours: 020 8583 2000
Telephone – Out of hours: 020 8583 2222

Environment Agency – 0800 80 70 60

Customer contacts regarding Mogden STW that are received directly on site are responded to by the local Operations team. The Operational Impact Liaison , 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 are sent to the Mogden site management from the Customer Centre or the Mogden Control Room via the Waste Operation Control Centre.(WOCC)
- The Process Controller on shift will check the SCADA system for wind direction and on-site odour monitor readings, including verification with portable Jerome monitor, and checks for plant failures.

- The Process Controller or Shift Technician will go out on site to physically check the operation of plant and may also go off site to check for odour in the vicinity of the complainant.
- Any problems will be actioned and logged.
- The customer is contacted by the site management team to discuss the outcome.
- Actions are logged at Mogden, the Customer Centre is informed and the customer contact closed.

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

6.4 Customer Communication Plan

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

6.5 Investigating a complaint

Upon receiving a complaint the Wastewater Control Centre have 48 working hours to respond to the customer with an update. Operational Impact Liaison The site management team will carry out an investigation to determine whether the odour source is coming from the Thames Water site. If the odour is decided to be from the Thames Water site, then the root cause is investigated.

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

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

The root cause investigation may include site walkaround checks, which look for irregularities such as spillages / open doors and hatches, ensuring appropriate measures as detailed in table 4.2 and 4.3 are in place. It may also include off-site visits to the Customer location.

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

6.6 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 Mogden STW we have notification process, where we can notify up to 150 residents of any upcoming planned / potential risks.

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

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

Appendices

Appendix 1. Odour Risk Assessment

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Appendix 2. Odour Improvement Plan

Mogden Odour Improvement Plan (OIP)							
Dec-23							
Process Stage	Owner	What is happening that may lead to Odour? (4 weeks plus)	Action taken to mitigate odour issues during longer term remedial work	Plan - long term fix	Expected Difficulties	Measures to Mitigate	Time frame
East Inlet	Chantelle Dixon	Odour Issues Persist	Washed down as required.	Investigate wider root cause of odours in this area and reinstall drain covers which are missing.	Odourous due to the nature of the material	Frequent washdowns	Ongoing
Initial Screening	Chantelle Dixon	Poor performance of West Side Screens	Tanker out the E battery channel as required.	Refurbishment of West Side Screens is delievered. RAG still within the system means that tankering continues	None	Long term fix funding approved. Tankering as required.	Ongoing
PSTs	Joshua Callaway	Failure of scum removal traps on west side uncovered PSTs. Pumps out of operation and traps blocked.	Mitigation is robust with manual cleaning undertaken as required.	Ongoing refurbishment plan for all PSTs is in delivery. 4 PSTs awaiting completion	Process compliance making release of assets difficult	Manual cleaning as required.	May-24
OCU	Joshua Callaway	Action recommendations laid out by monthly health checks	Action recommendations laid out by monthly health checks	Ensure delivery of funded OCU Refurbishment projects, and Condition-Based Monitoring (CBM) of all OCU Assets across to site to uncover future investement needs. OCU11 has had c. £800k funding released for refurbishment.	Funding	Monitoring of Asset Availability and Operability of OCUs, and deployment of reactive maintenance where	Ongoing
Sniff testing	Odour Specialist	Implement sniff testing procedure	Procedure written for sniff testing, in order to achieve effective sniff testing personnel needs to be identified to carry out the procedure who are not acclimatised to smells on site.	Implementation of Sniff Testing procedure as required	Resource	Site Round, Monthly health checks	6 months from permit issues

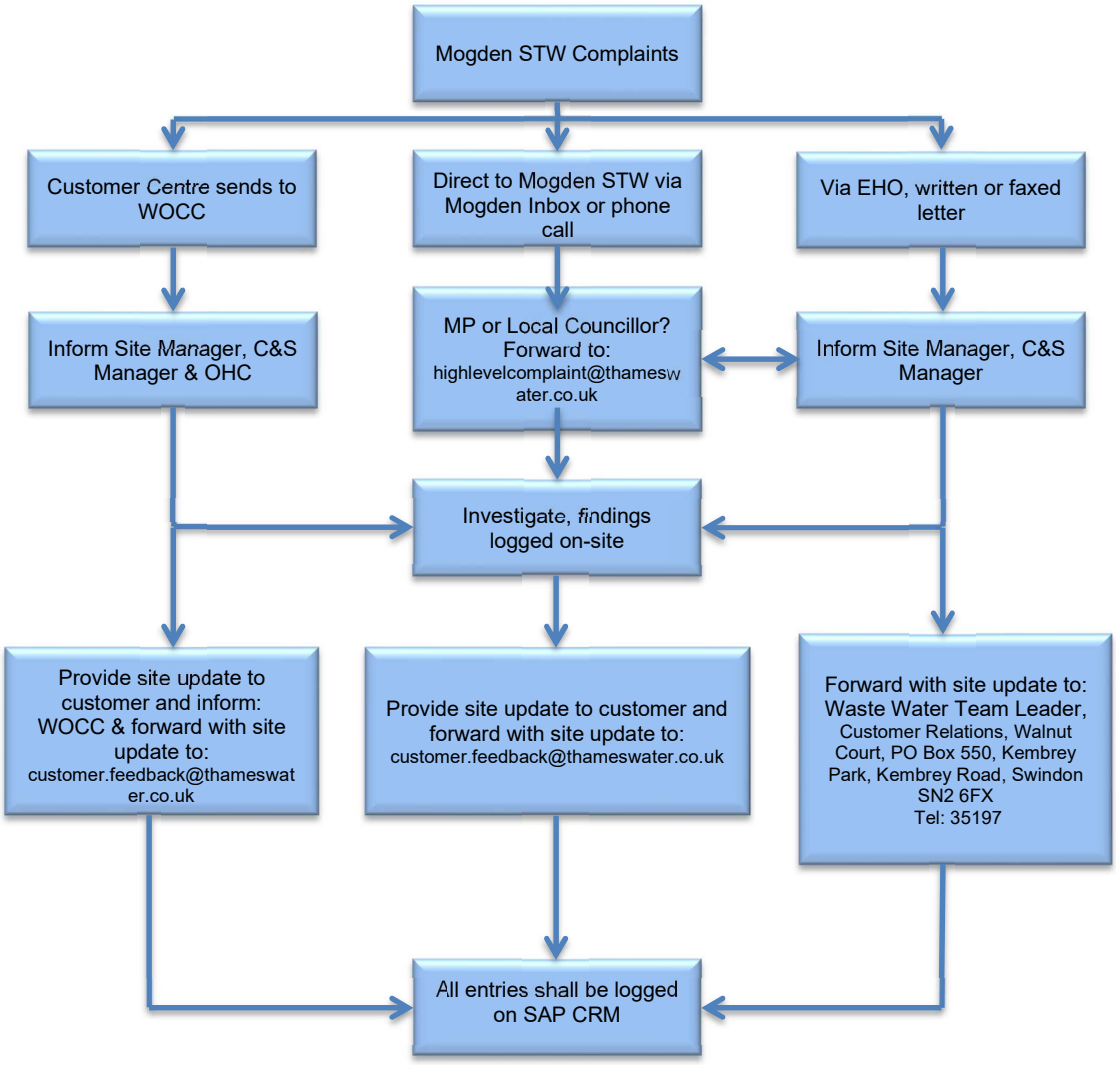
Appendix 3. Customer Communications Plan

Complaints Processes

All locally received complaints are re-directed to the Customer Centre, after being fully investigated on-site. Please see below for details.

Typically Mogden STW has three streams of receiving local complaints:

- A complaint can be received by the Customer Centre (if a customer calls 0800 009 3984 the priority line which operates 24hrs a day) who will then allocate the complaint to WOCC, WOCC will in turn inform the Mogden Customer & Stakeholder Manager, the Operational Impact Liaison and the OHC (if out of hours).
- A complaint can be received from an EHO of London Borough of Hounslow or Richmond upon Thames London Borough Council. (to the Site Manager or the Customer & Stakeholder Manager) acting on behalf of local customers.
- A complaint can be received directly from a customer either by phone or directly to the Mogden email address (Mogden@thameswater.co.uk).



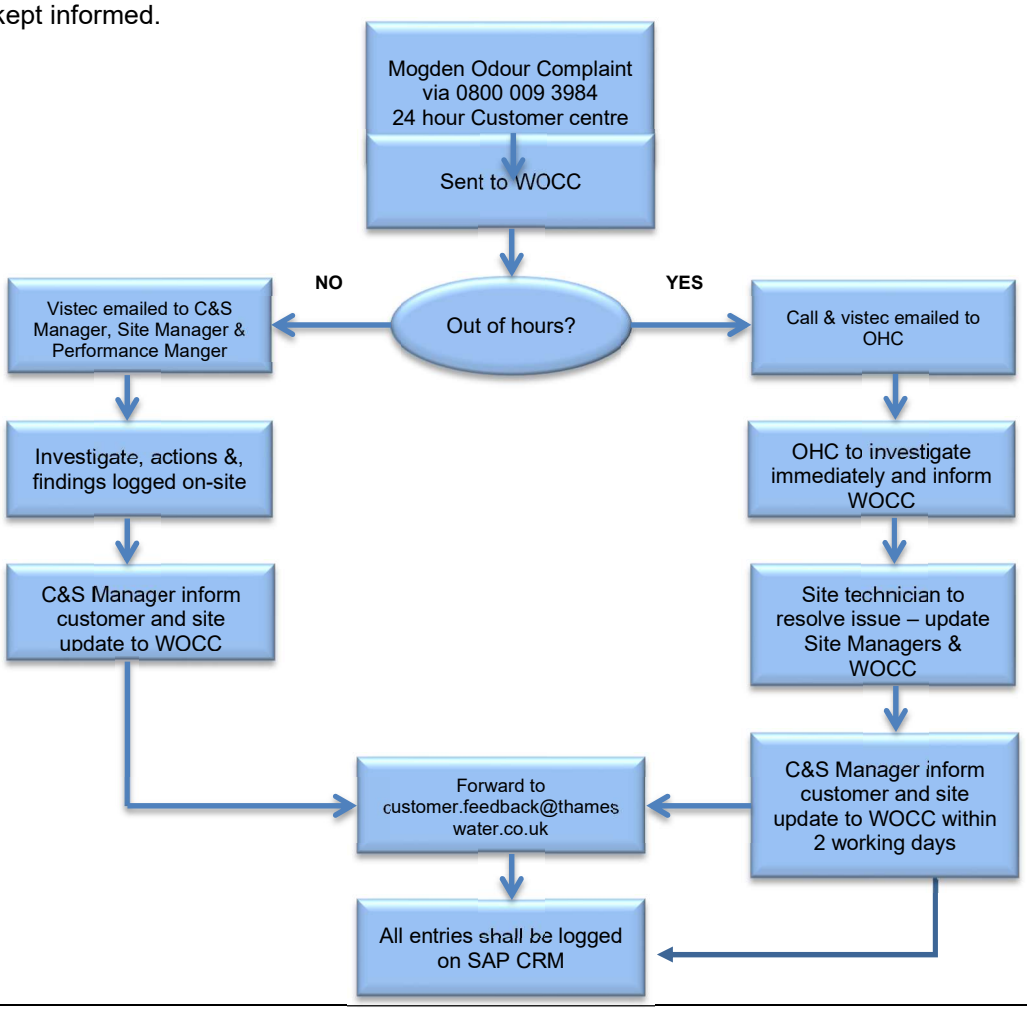
24 hour Odour Priority Line Process

If a customer suspects a problem with Mogden STW they can call the 24 hour priority line, 0800 009 3984

This goes straight through to a WOCC agent who will contact the PCE/OHC on site immediately on 07747640643 and inform of time and location of the customer.

The PCE or OHC (if out of hours) will investigate the odour complaint immediately, logging their findings and raising an action from a site technician if required.

The customer details will be sent to the Customer and Stakeholder Manager in Mogden via the Mogden inbox (mogden@thameswater.co.uk). The Customer and Stakeholder Manager will then liaise with the customer within 2 working days. WOCC and customer.feedback@thameswater.co.uk will be kept informed.



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**
Local residents	As required	Website updates Customer centre bulletin boards Residents meeting Newsletter	To reassure the general public and their representatives that Thames Water are operating Mogden in a responsible manner and to meet any ad-hoc questions or complaints.	Customer and Stakeholder Manager
Environmental Health Officers	As required	Update meeting On site inspection visits	To reassure the Local Council that Thames Water are operating Mogden in a responsible manner and to meet any ad-hoc questions or complaints.	Site management
MPs and Councillors	As required	Phone / email / residents meeting	To reassure the Government and Local Council that Thames Water are operating Mogden in a responsible manner and to meet any ad-hoc questions or complaints.	Customer and Stakeholder Manager
Environment Agency	As Required	Telephone / email / meeting	Update on operation activity on site	Site Manager and Air and Waste Permitting Team

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**
MPs and Councillors	As required	Phone / email	To inform them before their constituents contact them	Local and Reg Government Liaison Officer
Environmental Health Officers	As required	Phone / email / copied into email notification	To inform the Local Council of any risk of increase in odour levels at the same time the residents are informed.	Site Management
Residents	As required	Email, Customer Centre bulletin board and website update. Call back following any complaints	To inform customers and of any risk of increase in odour levels, including hours of work and likely duration.	Site Management
Communications Advisor, Local & Reg Government Liaison Officer	As required	Phone / email	To keep Communications Team up to date.	Site Management
Press Office	As required	Phone / email	To keep Press Office up to date	Site Management
CEO (Chief Executive Officer) and EMT (Executive Management Team)	As required	Briefings based on level of attention from external stakeholders	To keep up to date.	Area Operations Manager / Site Management
Environment Agency	Potential for notification procedure	As required as per notification procedure	As required as per notification procedure	Pollution desk

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**
MPs and Councillors	Regular	Phone / email	To inform before their constituents contact them.	Local & Reg Government Liaison Officer.
EHO	ASAP and regular updates	Phone / email / meetings	To notify of any risk of increased odour levels.	Site Management
Residents	ASAP and regular updates	Email notification at start of emergency and updates throughout, to coincide with updates of the website. Daily website update and bulletin board update, if required. Follow up any complaints	To inform customers.	Site Management
Communications Advisor, Local & Reg Government	ASAP and regular updates.	Phone / meeting / email	To keep Communications Team up to date	Site Management
Press Office	ASAP and regular updates.	Phone / email	To keep updated – a press release may be required.	Site Management
CEO and EMT	As required	Regular briefings as required	To keep updated	Site Management
Environment Agency	As required as per notification procedure	As required as per notification procedure	As required as per notification procedure	Pollution desk

Appendix 4. Environmental Permit Activities

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.

Identification of potentially odorous permitted activities, control measures and approach to mitigation:

Table A1: Inventory of odorous materials for sludge treatment centre permit

Odorous material	Management	Odour description	Hedonic tone	Quantity *	Process control	Process monitoring
Cess waste (Cess reception point)	Discharged directly to inlet works through close coupled connector.	Septic sewage, sulphide	Unpleasant	216 - 884m^3/week (Figures considered: Sept.13 – Aug. 14) normally Monday to Friday deliveries between 7:30am and 4:30pm (see note below)	Quantity managed by TW Commercial and TW Biorecycling checking that quantities are within permit limits	Discharge logged by tanker driver using swipe card. Records and accounts are managed by TW Commercial and checked by CoTC holder for the site.
Imported Liquid Raw Sludge (Sludge import tank)	Discharged to a covered tank through close coupled connector and into the enclosed sludge screens then onto the enclosed PS 19 and then onto the covered and odour-controlled primary sludge buffer Tanks.	Septic sludge, sulphides	Unpleasant	790 m^3 / week (Average: April 13 - Oct. 14)	Quantity managed by TW Biorecycling to be within permitted limits, weekly amount agreed in advance with TW Operations	Discharge logged by tanker driver using swipe card. Records and accounts are managed by TW Biorecycling.

Odorous material	Management	Odour description	Hedonic tone	Quantity *	Process control	Process monitoring
Sludge screenings	Screenings discharged into skip. Skips covered with a tailor-made tarpaulin before removal from site.	Septic sludge, sulphides	Unpleasant	As produced	Managed by TW Operations	Checked by the sludge shift operators on site daily.
Blended indigenous and imported raw sludge (RSHTs x 2)	Indigenous and imported sludge via underground pipe to RSHTs	Septic sludge, sulphides	Unpleasant	Up to 249,999 m3 / year for all imports	Managed by TW Operations	Via ultrasonic level detector which inhibits flow if high.
Thickened indigenous and imported raw sludge (Drum thickeners)	Sludge is screened and polymer added before entering the drum thickeners.	Septic sludge, sulphides	Unpleasant	N/A	Managed by TW Operations	Checked by the sludge shift operators on site daily. There are dry run sensors on the drum thickeners to stop operation when there is no sludge to process.
SAS (GBTs)	SAS enters the SAS buffer tank (UWWTD) via underground pipework then is transported to the GBTs where polymer is added.	Earthy	Acceptable	Up to 249,999 m3 / year for all imports	Managed by TW Operations	Checked by the sludge shift operators on site daily. There are dry run sensors on the GBT pumps to stop operation when there is no sludge to process.
Thickened SAS / indigenous & imported raw sludge (thickened sludge buffer tank)	Sludge is transferred in the covered and odour controlled Balancing Tank via pipework.	Septic sludge	Unpleasant	Up to 249,999 m3 / year for all imports	Managed by TW Operations	Via ultrasonic level detector which inhibits flow if high.

Odorous material	Management	Odour description	Hedonic tone	Quantity *	Process control	Process monitoring
Pasteurised sludge (Pasteurisation plant and PSHTs, Transfer PS 5)	Sludge is transferred to the covered and odour controlled PSHTs via pipework then to the enclosed PS 5.	Hot sludge	Unpleasant	Up to 249,999 m3 / year for all imports	Managed by TW Operations	Via ultrasonic level detector which inhibits flow if high.
Digested sludge (Digesters, digested sludge buffer tank and Transfer PS 14)	Sludge is forwarded from PS 5 to the digesters via underground pipework. After digestion the sludge is transferred to the digested sludge buffer tank and is then pumped to Iver South SDC via PS 14 for drying.	Digested sludge	Unpleasant	Up to 249,999 m3 / year for all imports	Managed by TW Operations	Monitored by the Process Control Engineer via SCADA. There are ultrasonic level detectors inside the digesters and the digested sludge buffer tank which inhibit flow if high.

Table A2: Odorous materials for sludge treatment centre permit – see also Appendix 1 Odour Risk Assessment for mitigation under varying and emergency conditions

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.

Odorous material	Control of evaporation	Odour containment and abatement	EWC Code	Type of emission	Odour mitigation process control	Process monitoring	Odour potential high/medium/low risk
'Cess'	Discharged to inlet works through close coupled connector, so no evaporation takes place. Any spills cleaned at time. The East inlet area is odour controlled via the East side Odour Control Unit.	None because delivery is via sealed tankers. Vented to odour control unit.	16 10 02 (cess and portable toilet waste) 20 03 04 (Septic tank sludge) 20 03 06 (waste from sewage cleaning)	Point Source (via OCU)	OCU monitored via SCADA and condition of close coupled connector and pipework checked.	Visual inspection for spills by driver and TW Operations.	Medium
Imported sludge	Discharged to a covered tank through close coupled connector. Delivery on an impermeable hard standing with sealed joints and kerbs. Any	None, because delivery is via sealed tankers. Vented to odour control unit.	19 08 05	Point Source (via OCU)	OCU monitored via SCADA and condition of close coupled connector and pipework checked.	Visual inspection for spills by driver and TW Operations.	Medium/high

Odorous material	Control of evaporation	Odour containment and abatement	EWC Code	Type of emission	Odour mitigation process control	Process monitoring	Odour potential high/medium/low risk
	leakages and spillages are washed into the site drainage. The imported sludge area is odour controlled via the Imported Sludge Odour Control Unit.						
Thickened blended sludge (SAS / indigenous)	Containment within covered and odour controlled tanks / building.	Vented to odour control unit.	19 02 06	Point Source (via OCU)	OCU monitored via SCADA.	Visual inspection for spills by TW Operations.	Medium/high
Sludge Screenings	Screenings held in skips. Skips covered with a tailor-made tarpaulin prior to removal. Spillages cleaned to drain which returns the liquid to the head of the works for processing.	Screenings are dewatered before discharge to skip prior to removal from site. Skips are covered with a tailor-made tarpaulin prior to removal.	19 08 01	Diffuse	Visual inspections to ensure skip covers are in place.	Visual inspection for spills by TW Operations.	Low

Odorous material	Control of evaporation	Odour containment and abatement	EWC Code	Type of emission	Odour mitigation process control	Process monitoring	Odour potential high/medium/low risk
Pasteurised sludge	Sludge contained within pressure vessels and pipework. Any spillages to be cleaned up immediately. The pasteurised sludge area is odour controlled via the Odour Control Unit 12.	Vented to odour control unit.	19 02 06	Point Source (via OCU)	OCU monitored via SCADA.	Monitored by Process Control Engineer via SCADA. Visual inspection for spills by TW Operations.	Medium
Digested sludge	Sludge contained within gas holding tanks. Any spillages to be cleaned up immediately. Any digester releasing biogas to be anti-foamed and biogas drawn off.	Any spillages to be cleaned up immediately. Any digester releasing biogas to be anti-foamed and biogas drawn off. Digested sludge buffer tank vented to odour control unit.	19 06 06	Point Source (via OCU)	Digesters monitored via SCADA and visual inspection of the area.	Monitored by Process Control Engineer via SCADA. Visual inspection for spills/gassing by TW Operations.	Medium

Appendix 5. Site Drawings

Figure A - Site Location Map – Mogden STW

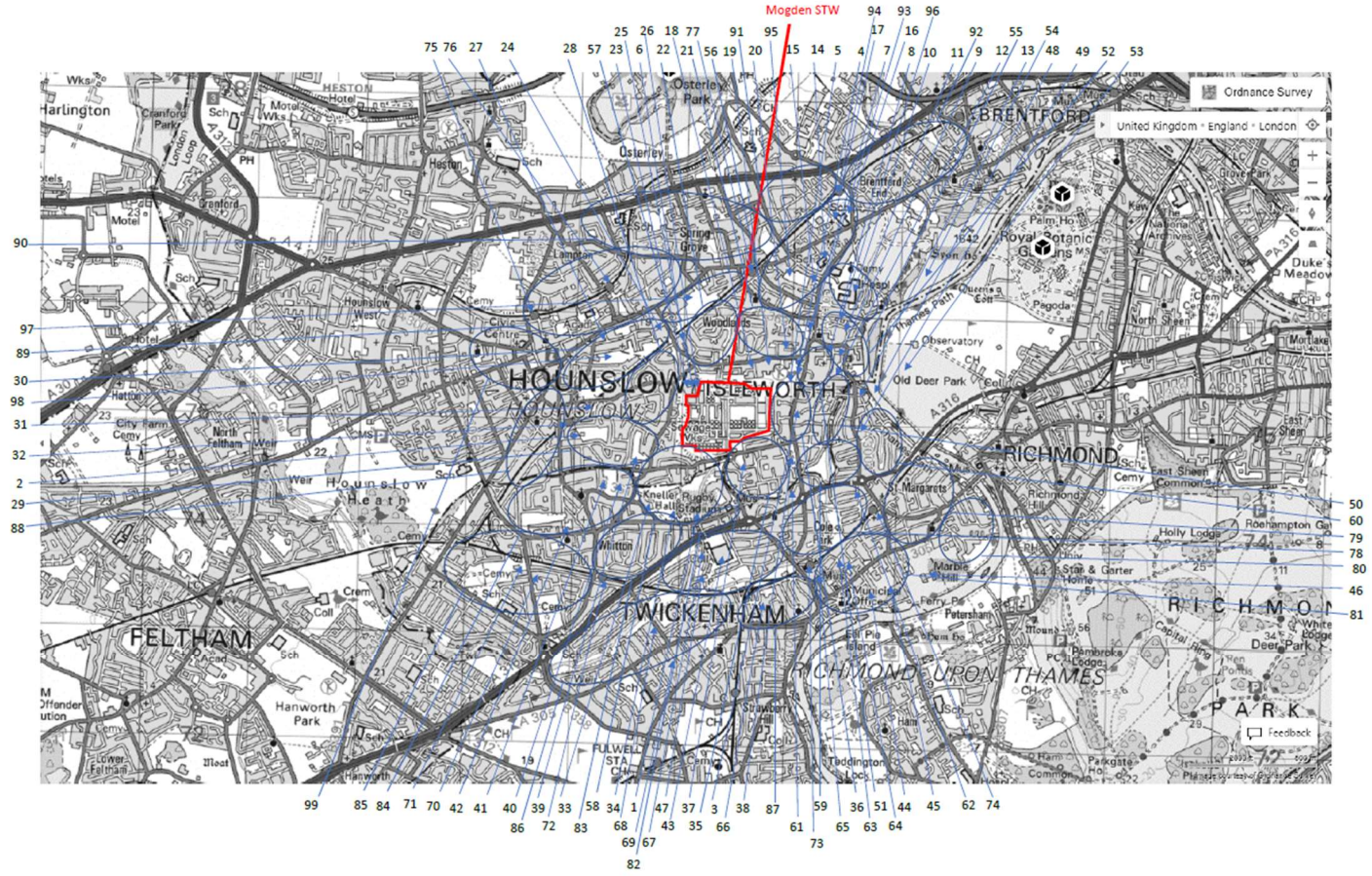
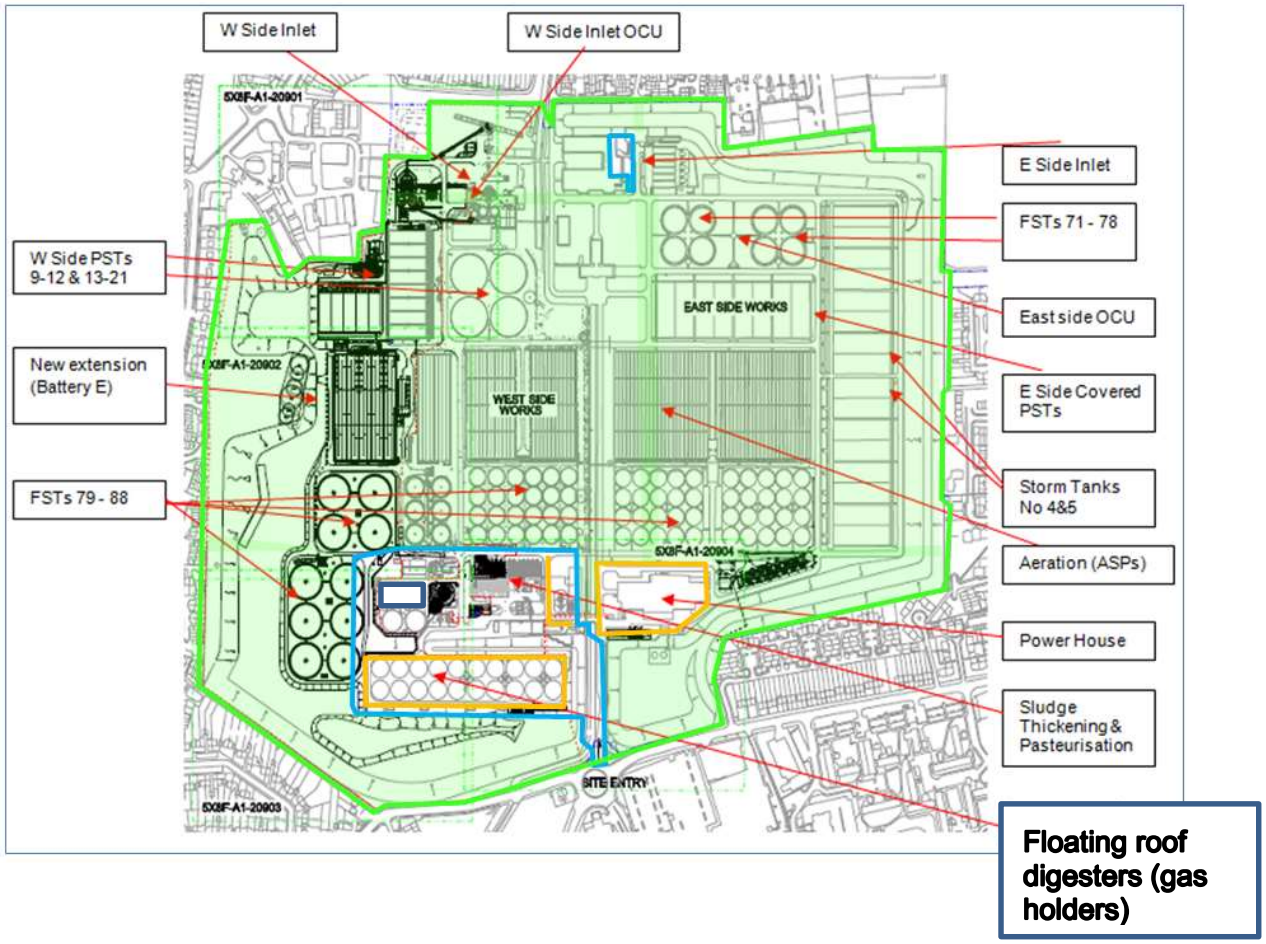


Figure B - Site Plan



LEGEND:

SITE BOUNDARY

AREA COVERED BY URBAN WASTE WATER TREATMENT DIRECTIVE

IED AD ACTIVITY DETAILED IN FIG C

IED AD ACTIVITY DETAILED IN FIG C

Figure C Area Permitted Sludge Treatment Centre Permit

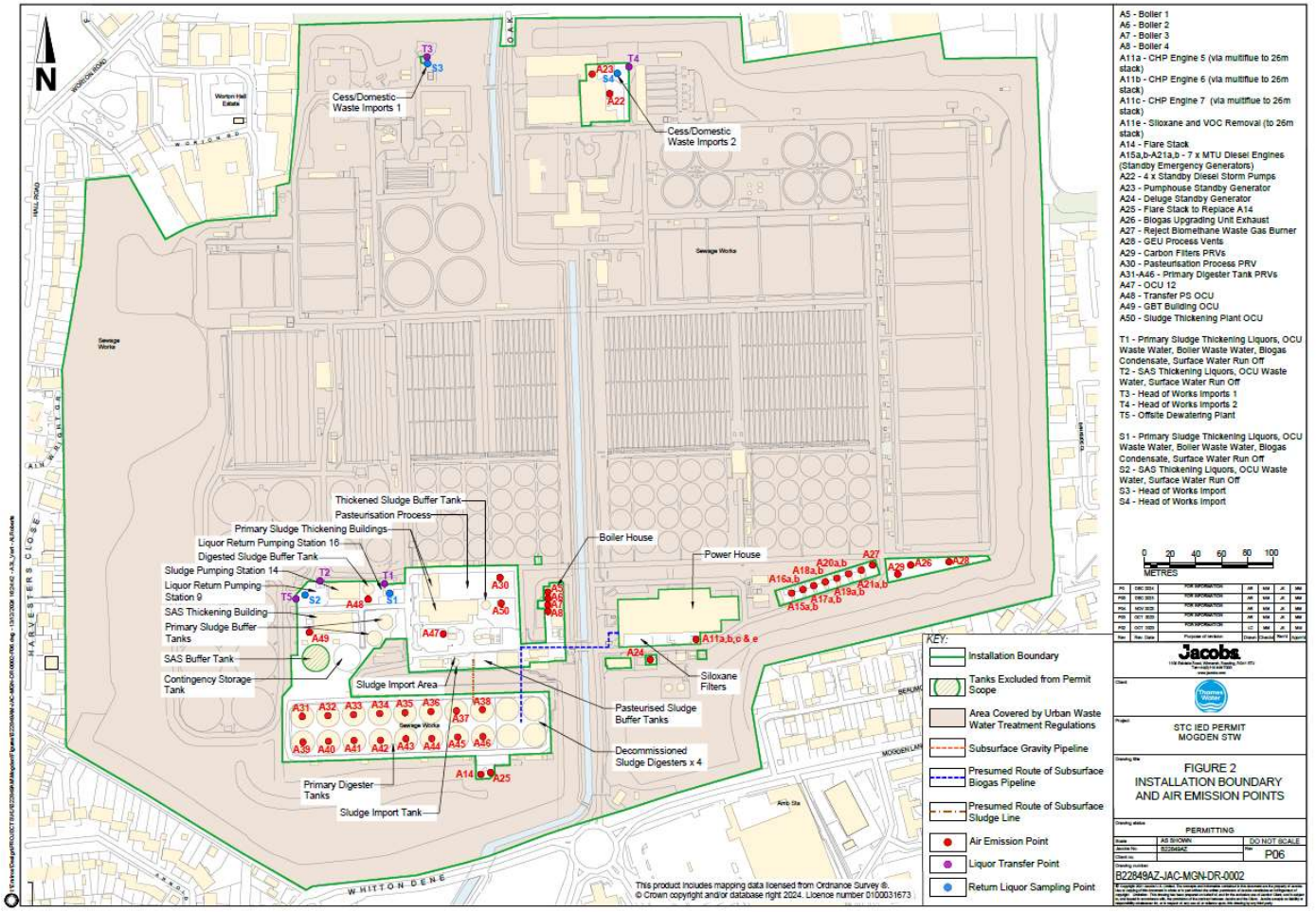


Figure D - Odour Control Location Plan

LEGEND:

A	Pasteurisation Plant OCU (redundant)
B	Thickening OCU
C	Imported Sludge OCU (redundant see section 4.3.1)
D	Transfer Pumping Station OCU
E	West Side (PS7) OCU
F	Main Pumping Station OCU
G	East Side OCU
H	OCU 11
I	OCU 12
J	GBT Building OCU

Figure E - Process Block Diagram – whole site

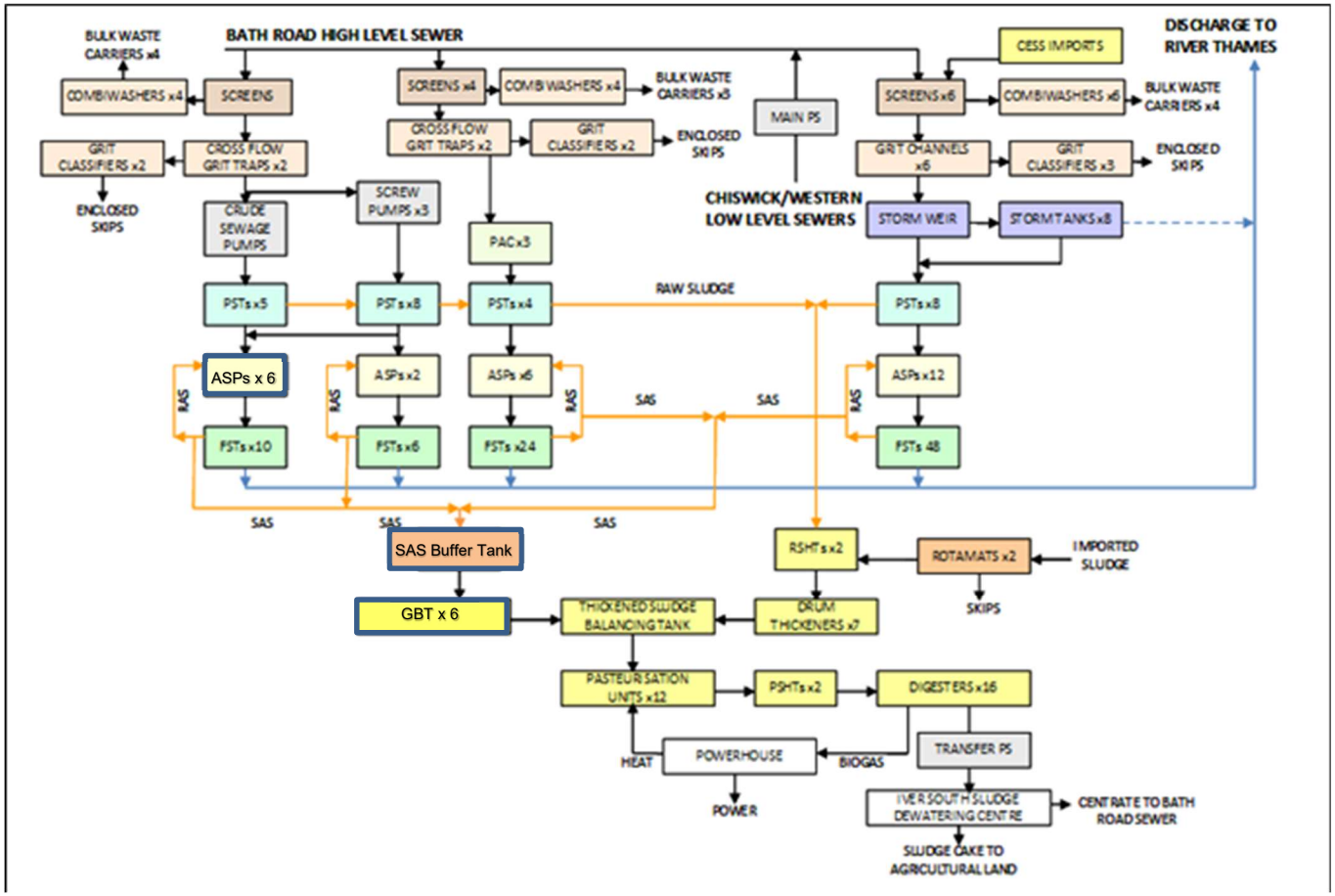
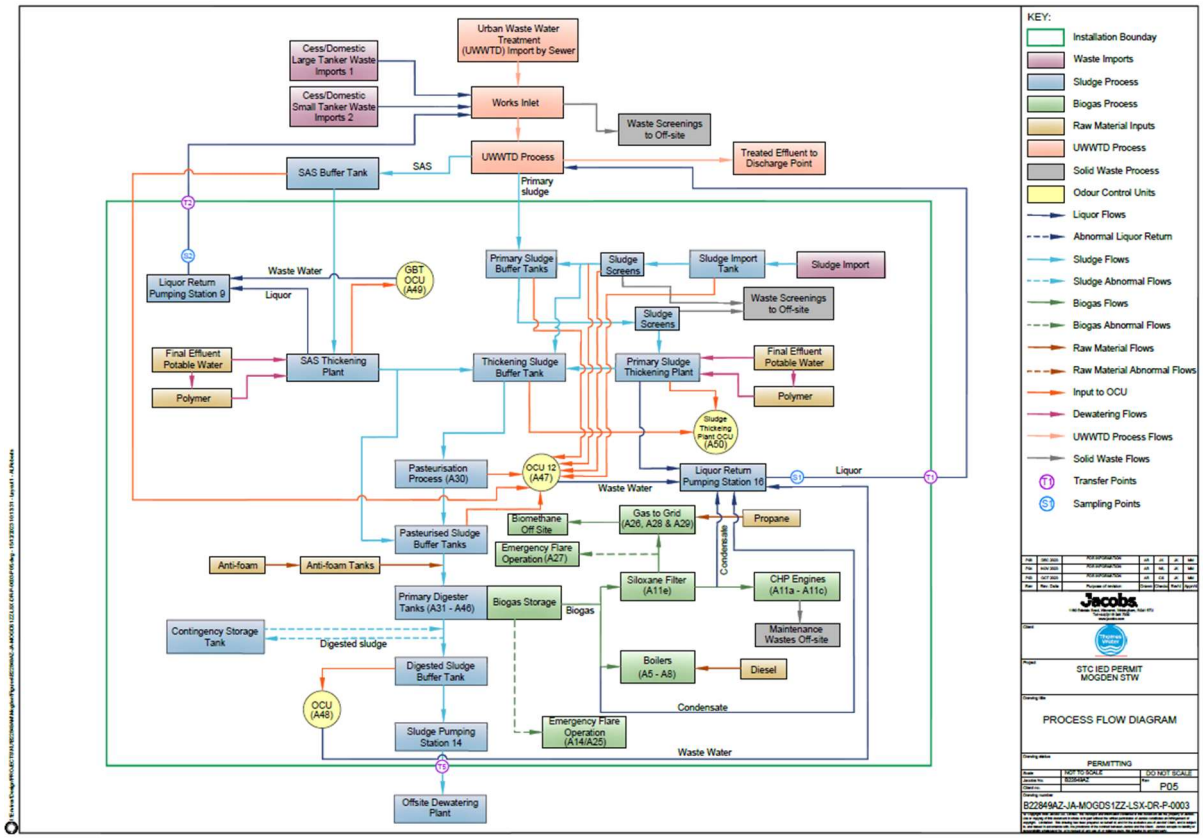


Figure F - Process Block Diagram – Sludge Treatment Centre Permit.



Appendix 6. OCU Monitoring Sheet

MOGDEN STW WEEKLY ODOUR CONTROL UNIT MONITORING

Date …… **Name ……**

Site Location	Reading 1 PPM	Reading 2 PPM	Reading 3 PPM	Action Level Outlet Valves PPM	Fan(s) Operating OK? (Yes/No)	Irrigation Water Operating OK? (Yes/No)	Comments
Main Pumping Station Outlet				0.2			
East OCU				0.05			
West Inlet OCU				0.05			
Thickening Plant Outlet				0.6			
New West Inlet (OCU 11)				0.5			
Pasteurisation (OCU 12)				0.5			
Transfer PS Inlet							

Transfer PS Outlet				**0.6**			
GBT Plant OCU Outlet							

Submit copies of this sheet to Team Manager and Process Coordinator and retain a copy.
Exceedances of action levels to be reported to Plant Manager and London Borough of Hounslow EHO.

Appendix 7. East Site Storm Water Tanks and Hoppers Management Plan

Reviewed – May 2021

Introduction:

Mogden Sewage Treatment Works (STW) has eight pairs of storm water storage tanks located very near to the Eastern boundary of the works. These storm water storage tanks are used to store partially treated storm water during high flow conditions.

This storm water tank management plan has been written with the intention of providing a framework to ensure effective management of the storm water storage tanks and to minimise possible odour emissions from the tanks which could potentially result in detectable off-site odour.

When peak flows into the treatment works exceed the maximum flow to full treatment, which is currently 1064 Mld as agreed with the Environment Agency, a weir system located at the inlet diverts the flow to the storm water storage tanks.

In these circumstances, the storm sewage is stored in the tanks until the inlet flow arriving at the works has abated sufficiently to allow the return of the stored storm water to full treatment through the STW processes. If the high flow conditions are sustained for a sufficient period and the available storage capacity becomes full, then the storm sewage will discharge into the final effluent channel and ultimately into the River Thames.

Two of the eight tanks are covered and are connected to an Odour Control Unit on the East side of the works. These two tanks are numbered 4 & 5 and are designated "first fill". The covered tanks will receive the most odorous first flush during storm conditions and for this reason number 4 & 5 storm tanks will be used as first fill tanks subject to the exceptions set out in Section 1 below. The covered tanks will be filled to 3.5 m and then isolated and the remaining uncovered tanks will be then filled in the order: 3, 6, 2, 7 and finally 1 & 8.

Section 1: Use of covered tanks

The covered storm water storage tanks numbers 4 & 5 will be used as first fill tanks and will be filled before the uncovered tanks when required, except:

(a) where the covered tanks 4 & 5 are unavailable due to being temporarily out of commission, due to repair, renewal or maintenance (section 5), in which case the next adjacent available open tank will be used; or

(b) where there is an occurrence of the STW being hydraulically locked through high tides in the River Thames, in which case tank No.8 will be used for final effluent storage (as

this tank will be storing final effluent there is a very low risk of odour being generated in these circumstances).

Section 2: Returning of Storm Water Tanks to full treatment.

The contents of the storm water storage tanks will be returned to full treatment as soon as reasonably practicable and in any event within 72 hours.

To minimise odour and maximise the time window available to return the uncovered storm tanks, all covered and uncovered tanks will be returned concurrently. To aid the removal from service of the uncovered tanks, the covered storm tanks will cease being returned before the uncovered tanks.

Returning all tanks together will create capacity in the covered tanks for them to be used for the “first flush” should this be required.

As soon as is practicable, and therefore subject to operational constraints and health & safety requirements, the empty tanks will be inspected to confirm that the Amajet cleaning system has effectively cleaned the tank of residual sludge.

Upon completion of this inspection if it is found that a tank has not been effectively cleaned, Thames Water Operations will arrange for the tank to be cleaned as soon as is practicable. The cleaning of the tank will take the form of whatever means is considered the most practicable at the time, this may include the repairing of the amajet system, hosing the tank down from the back of the tank or flushing the tank by flooding with either final effluent or screened sewage and returning the contents to full treatment.

Any failures of the Amajet cleaning system are to be treated as a priority and repaired urgently. There are to be at least 2 spare amajets held within the stores and any failed units are to replaced within 48Hrs.

Where practicable this will be completed within 24 hours.

Section 3: Hopper management

Thames Water Operations will undertake to manage the contents of the storm water tank hoppers such that they are kept to the minimum practicable levels achievable through the means set out below.

In the event that the hoppers have not drawn down to an acceptable level by the storm water return pumps TW Operations will arrange for the hopper to be pumped down. The pumping down of the hoppers may take the form of whatever is considered the most practicable by TW Operations, and will be mindful of prevailing operational priorities, this may take the form of, but will not be limited to, over-pumping by mobile pumps or tanker.

Where practicable this will be completed within 24 hours.

Section 4: Storm feed channels

There are two storm feed tank channels. One feeds tanks 1-4 and one feeds tanks 5-8. If the storm tanks are out of use for an extended period of time, there is a potential that the contents of these channels may become stagnant. During the daily inspections if it is noted that any of the channels require flushing, the channel(s) will be flushed through with final effluent to keep the contents fresh.

Section 5: Storm tank inspections

TW Operations will inspect the condition of the storm tanks on a minimum frequency of once per shift and record the findings on a record sheet, which is attached to form part of this Appendix 8. These records will be kept for a period of 24 months and TW Operations shall forward copies of these records to the Council by facsimile (0208 583 5350) or by email (pollution@hounslow.gov.uk) no later than 24 hours after initially completed, barring technical issues.

Any corrective actions that are required will be undertaken as soon as practicable.

Section 6: Maintenance

The storm water storage tanks will have their maintenance regime recorded on Thames Water's corporate maintenance system, currently WAMI, and will be subject to an appropriate planned preventative maintenance (PPM) programme.

Defect maintenance (DM) will be carried as soon as practicable and will be prioritised appropriately.

The prioritisation is assigned in the SAP maintenance system and is defined as below:

P2 Within 2 hours

P3 Within 4 hours

P4 Within 24 hours

P6 Within 3 days

P7 Within 5 days

P8 Within 11 days

Thames Water will undertake to hold and maintain a stock of appropriate strategic spares for critical plant or will enter into maintenance contracts with external contractors to ensure that critical plant remains available as far is reasonably practicable.

In the event of a failure of an item that is held as a critical spare Thames Water will assign the highest level of priority to its replacement, as allowed in the corporate maintenance system. In any event TW will endeavour in good faith to replace the defective item within 72 hours and will restock the item in the critical spares store as soon as practicable, subject to suppliers' delivery lead times.

Section 7: Communications

The contents of this management plan will be made available for inspection by Pollution Control officers of the Local Authority at any reasonable time and with reasonable notice.

Thames Water will notify the local authority, and other affected stakeholders such as local residents, of an occurrence that may lead to an increase in odour as detailed in the Odour Management Plan.

This Storm Water Management Plan is designed to complement documents such the Site Operating Manual and Odour Management Plan.

Thames Water will review this document on an annual basis and will seek the recommendation of the Local Authority in reviewing this document.

Section 8: Odour monitoring

TW Operations will carry out odour patrols as per the prevailing requirements of the Odour Management Plan in response to the triggers laid out in that document.

To facilitate effective investigation and recording of odour incidents associated with the Storm Water Storage tanks, Thames Water will undertake to provide training to key members of operational staff in whatever methodology is considered appropriate and agreed between Thames Water and the Local Authority's pollution control department.

Appendix 8. Mogden STW Storm Tanks - Daily Checks

DATE: **TIME:** **MOGDEN STORM TANKS – DAILY CHECKS** ***info from Control Room**

Tank	Tank needs flushing?	Hoppers need pumping?	Faults?	Comments?	Action taken	Storm tank level* (depth in metres)	Storm feed channel needs flushing?
1A							North channel: Y/N
1B							
2A							
2B							
3A							
3B							
4A							
4B							
5A							South channel: Y/N
5B							
6A							
6B							
7A							
7B							
8A							
8B							

NAME: **SIGN:**

Appendix 9. Site Rounds

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix 10. Sludge Rounds

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

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

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

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

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

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

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

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

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

Appendix 11 – Monthly Health Checks

Monthly Health Checks

Biofilter

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

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

Chemical Scrubber

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

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

Carbon Adsorber

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

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

Appendix 12 Odour sniff testing protocol

Purpose

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

Frequency

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

Pre-requisites for the assessor

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

Assessors must comply with the following:

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

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

Odour complaint investigation

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

At each location the following procedure is undertaken:

a. The assessor will stand facing the wind and breathe deeply, for a period of 3-5 minutes.

b. The following information is recorded using the odour monitoring form.

    i. Time, wind speed and direction, temperature, precipitation.

    ii. The type of any odour(s) detected.

    iii. The intensity of any odours detected on a scale of 0 to 6.

    iv. The persistence of the any odours detected i.e. constant or intermittent.

    v. The likely source of any odours detected (e.g. a specified onsite IED source, a specified non IED sources, offsite odour source, etc).

    vi. Any abnormal conditions on site that may account for the odour e.g. broken duct, open door, unusual operation, spillage etc.

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

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

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

Odour monitoring form

Date: _____ Assessor name: _____

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

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

---- End of OMP ---