



Environmental Site Management Plan

Accident Prevention and Management Plan: Maple Lodge STW



Using this standard

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This standard works in combination with other corporate documents including the Asset Standards, Site Operating Manuals, site Odour Management Plans, Health and Safety Standards, and regulatory permits.

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0 Document Confidentiality

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1 Glossary of Terms

TERM	DESCRIPTION
AD	Anaerobic Digestion
CHP	Combined Heat and Power
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EMS	Environmental Management System
EPR	Environmental Permitting Regulations
FFT	Flow to Full Treatment
ICA	Instrumentation Control & Automation
IED	Industrial Emissions Directive
OCU	Odour Control Unit
OMC	Operational Management Centre
OMP	Odour Management Plan
PFT	Picket Fence Thickener
PM	Process Manager
PS	Pumping Station
PST	Primary Settlement Tank
Receptors	Sensitive receptors are any fixed buildings or installations where odour annoyance may occur, such as residential homes, schools, hospital, offices, shops or garden centres. Open areas such as playgrounds and public footpaths should also be listed where these are known to have been affected by odour.
SAP	Thames Water's enterprise resource and planning system
SCADA	Supervisory Control And Data Acquisition
SOM	Site Operating Manual
STW	Sewage Treatment Works
TW	Thames Water
UWWTD	Urban Waste Water Treatment Directive

2 Executive Summary

In accordance with the consolidated IED Environmental Permit for Maple Lodge; Waste BAT, specifically BAT1; and associated written management systems, this is the site management plan covering accident prevention and management. Thames Water Utilities Ltd is required to review this plan at least every 4 years, unless there are incidents, operational or managerial changes at the site which would require an earlier review.

The prime function of the sludge treatment facility at Maple Lodge Sewage Treatment Centre is to capture the energy potential from the treatment of sewage sludges. The plant is run 24/7 due to the continuous supply of sewage received at the treatment works either from the surrounding catchment, or via tanker discharge.

This document forms part of the Thames Water Environmental Management System (EMS) for the permitted Sludge Treatment Centre (STC) within Maple Lodge Sewage Treatment Works.

Thames Water is committed to continual environmental improvements, including minimising the risk of accidents both on the site and its operations and in the wider environmental setting. This commitment is delivered through efficient control of processes, capital investments, and environmental training.

This site management plan for accident prevention and management follows relevant guidance produced by the Environment Agency¹ and includes the following sections:

- This plan provides a list of off-site receptors (Section 4.2);
- This plan provides details of the potentially polluting substances located at the site (Section 4.3);
- This plan identifies potential accidents and states the likelihood and consequence of each accident (Section 5);
- This plan states the measures taken to avoid accidents and measures taken to minimise the impacts of accidents on the environment (Section 5);
- This plan outlines the reporting, recording and review steps to be taken should a potentially polluting incident occur (Section 6); and
- This plan includes reporting forms that should be used in the event of incident occurring (Appendix B).

3 Process Responsibility

The Operational Manager for the site has overall responsibility for reviewing the processes on the site to minimise the risk of accidents and reduce the impact of any such accidents that occur. This document is reviewed 4-yearly, but the review process is ongoing as part of the regular performance monitoring for the site. This plan was prepared in July 2022 and is next scheduled for review in July 2026.

4 Accident Prevention

In accordance with Thames Water's health and safety obligations and commitments, the STC is to be operated in a manner designed to reduce the risk of accidents to staff, the site and the wider environment.

As part of the design process for any new plant or equipment on site, a HAZOP review is undertaken to ensure that the risk of accidents and their impacts is reduced through design. The site has been assessed under DSEAR and appropriate zoning applied, with clear signage indicating the zones.

¹ Guidance 'Develop a management system: environmental permits' published 1st February 2016, last updated 4th August 2021.

Regular maintenance of the installation, is carried out in accordance the sites preventative maintenance programme, and the SOM. This ensures that there failures of plant are minimised over time and early remedial action implemented for any identified faults noted during maintenance.

4.1 Spill Prevention

The site is equipped with a number of spill kits and drain covers, located close to chemical and oil storage areas and tanks. Staff are trained in the use of these items to minimise the impact of spillages and risks to the works of chemicals or oils entering the site drainage system.

4.2 Off Site Receptors

Maple Lodge STW site is located to the east of the village of Maple Cross in Hertfordshire in a largely rural environment. The site is bounded on the north and east by the River Colne. To the south is Lynsters Lake and to the west is farmland and Maple Lodge Nature Reserve. The site is not within an Air Quality Management Area (AQMA). The nearest AQMA is more than 2.5 km to the south-west of the site.

Part of the site benefits from flood defences on the River Colne but parts of the site sit within Flood Zones 3, including one sludge tank, one decommissioned tank and some of the sludge dewatering plant from within the permitted area; these assets are subject to a 1:100 or greater annual probability of river flooding. Other areas of the site including import points, sludge thickening assets, sludge blending assets, some secondary digester tanks, boilers and standby generators are located within areas of Flood Zone 2 with between a 1:100 and 1:1000 annual probability of flooding. Primary digesters, most of the secondary digesters, the cake pad and CHP engines all sit within Flood Zone 1 meaning that there is a less than 1:1000 annual probability of flooding in these areas.

The site sits within the boundaries of a SPZ. There are parts of the site on both the northern and southern perimeters, including sludge assets, that are within a SPZ 1 Inner Protection Zone. Other parts of the site, including sludge digestion assets, are within SPZ2 and SPZ3.

There are a total of five designated habitat sites within the relevant distances of the site. The closest is the Old Park Wood Site of Special Scientific Interest (SSSI), which is located approximately 450 m to the South-East of the site, whilst the Mid Colne Valley SSSI is located approximately 960 m to the South of the site. There are two Local Nature Reserves (LNRs) to the North-East, with Stockers Lake approximately 720 m to the North-East and Rickmansworth Aquadrome approximately 1.5km to the North-East. Finally, there is one Special Area of Conservation (SAC), Burnham Beeches, approximately 9.8km to the South-West. There are no Special Protection Areas (SPAs), Ramsar sites or Marine Protection Areas (MPAs) within 10 km of the site and no National Nature Reserves (NNRs) within 2km of the site.

There is one area of Ancient Woodland within 2 km of the site, comprising Old Park Wood Ancient and Semi-Natural Woodland located approximately 450m to the South-East of the site.

There are six non-statutory designated LWS's within 2 km of the site, with the Maple Lodge LWS and Springwell and Stocker's Lakes LWS representing the closest LWSs to the site.

There are also records of protected species and protected habitat located within the specified screening distance of the site.

For habitat sites, the relevant distance for consideration are: International designations (SAC, MPA, SPA and Ramsar - 10km); National designations (SSSI – 2km); Local and National Nature Reserves, Local Wildlife Sites (LWSs) and Ancient Woodland (2km).

Designated site review

Site Name	Designation	Direction from site	Distance from site
Burnham Beeches	SAC	South-West	9,800m
Old Park Wood	SSSI	South-East	450m
Mid Colne Valley	SSSI	South	960m
Stockers Lake	LNR	North-East	720m
Rickmansworth Aquadrome	LNR	North-East	1,540m
n/a	Ramsar	n/a	n/a
n/a	SPA	n/a	n/a
n/a	NNR	n/a	n/a
n/a	MPA	n/a	n/a
Old Park Wood	Ancient and Semi-Natural Woodland	South-East	450m

List of Local Wildlife Sites	
Springwell and Stocker's Lakes Springwell Pit Wood Summerhouse Lane Chalk Pit Colne Valley Gravel Pits Maple Lodge Nature Reserve London's Canals	All sites <2,000 m

4.3 Stored Substances

Site tank inventory

Tank Purpose	Number	Operational Volume (m ³)	Construction
Picket Fence Thickener	4	430	Steel
Sludge Tank	1	565	Concrete
SAS Tank	1	336	Concrete
Drum Thickener	1	312	Steel
Reception Tank	1	525	Steel

Sludge Blending Tank	1	1,050	Steel
Primary Digester Tank	8	3,407	Steel
Secondary Digester Tank	14	2,200	Concrete
SAS Polymer Silo	1	Not specified	Steel
Digested Sludge Polymer Silo	1	25 tonnes	Steel
Boiler Fuel Oil Tank	1	56,160 litres	Steel
Generator Fuel Oil Tank	1	84,000 litres	Steel

5 Assessment

Risk Matrix and Terminology for Accident for Risk Assessment

Likelihood ↓	Consequence		
	Low	Medium	High
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High

Classification of Likelihood

Classification	Definition
Low	Probability of an event is low and likely only to occur in the long-term (a yearly basis or less frequent).
Medium	It is probable that an event will occur periodically in the medium-term (twice yearly basis).
High	An event is very likely to occur in the short-term (monthly or weekly basis) and is almost inevitable over the long-term OR there is evidence at the receptor of harm or pollution.

Classification of Consequences

Classification	Definition
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Low	<p>Impact is low or a minor, short-term nuisance.</p> <p>Minor release to a non-sensitive receptor or pollution of water course.</p> <p>Non-permanent health effects to human health (easily prevented by appropriate use of PPE).</p> <p>Minor surface damage to a building, structure, service or the environment which can be repaired immediately.</p>
Medium	<p>Impact is noticeable in the short to medium-term.</p> <p>Large release impacting on the receiving media which kills flora and fauna and requires remediation.</p> <p>Nuisance causing non-permanent health effects to human health.</p> <p>Damage to buildings, structures and services which prevents use in the short-term and/or requires a specialist repair.</p>
High	<p>Impact is significant, wide-ranging and long-lasting effect.</p> <p>Has either a chronic or acute impact on human health.</p> <p>Very large release that has a major impact on flora and fauna which may be very difficult to remediate.</p> <p>Significant damage to a single or multiple building, structure and service which prevents use over a long-term and may require complete replacement.</p> <p>May cause a long-term impact or contribute towards a global issue due to releases of greenhouse gases.</p>

The following categorisation of risk has been developed and the terminology adopted as follows:

Term	Definition
Low	A level of harm is possible although this may not be noticeable to a receptor and would be a short-term event without lasting effects. Level of harm can be reduced using industry best practice and appropriate measures and techniques.
Medium	A level of harm may arise to a receptor which is noticeable although not long-lasting and may require some remedial actions in order to prevent re-occurrences.
High	A level of harm is likely to arise to a receptor that is severe causing significant harm to human health or the environment without appropriate remedial and mitigation measures being implemented. Remedial works to infrastructure and processes is required in the long-term.

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Major fire and/or explosion causing the release of polluting materials to air, water or land.	<p>Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population</p> <p>Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p>	Low	High	Medium	<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Management systems requires DSEAR assessment which is adhered to by site operations.</p> <p>Designated ATEX zones on site and lightning protection system in place around biogas storage. Fire alarm systems installed and maintained.</p> <p>Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop gas flows, electric temperature sensor, pressure monitors, flame arrestors, etc.</p> <p>Warning signs clearly displayed, and staff wear gas alarms to alert to the presence of biogas. All visitors subject to site inductions and accompanied. Permit-to-work system in place.</p> <p>Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively.</p> <p>Smoking only permitted in designated areas of site.</p>	Low
Minor fire causing the release of polluting materials to air, water or land	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory	Low	Medium	Low	Follow site Incident Response Plan and inform relevant authorities.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	<p>irritation, illness and nuisance to local population</p> <p>Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p>				<p>Management systems requires DSEAR assessment which is adhered to by site operations.</p> <p>Designated ATEX zones on site and lightning protection system in place around biogas storage. Fire alarm systems installed and maintained.</p> <p>Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop gas flows, electric temperature sensor, pressure monitors, flame arrestors, etc.</p> <p>Warning signs clearly displayed, and staff wear gas alarms to alert to the presence of biogas. All visitors subject to site inductions and accompanied. Permit-to-work system in place.</p> <p>Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively.</p> <p>Smoking only permitted in designated areas of site.</p>	
Failure to contain firefighting water	Emissions to ground and ground water of contaminated firefighting water entering soil and/or groundwater. Run-off from site to surface water courses.	Low	Medium	Low	<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Site surfaces fall to the site drainage system which has been designed to sufficient capacity to contain firefighting water.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	Harm to aquatic flora and fauna. Chronic effect on water quality				Arrange for off-site tankering of firefighting water, if required.	
Accidental explosion of biogas	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population. Injury to staff, fire fighters or arsonists/vandals. Pollution of water or land	Low	High	Medium	Follow site Incident Response Plan and inform relevant authorities. Management systems requires DSEAR assessment which is adhered to by site operations. Designated ATEX zones on site and lightning protection system in place around biogas storage. Fire alarm systems installed and maintained. Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop gas flows, electric temperature sensor, pressure monitors, flame arrestors, etc. Lightning protection system installed Likelihood reduced by availability of multiple on site uses of biogas (CHP, boilers and emergency flares) and use of pressure release valves as a safety measure.	Low
Significant leak of biogas to atmosphere	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population.	Low	Medium	Low	Site assets are protected by physical means to prevent vehicle strike and exposed pipework is guarded.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	Global warming potential of greenhouse gases.				<p>Regular proactive and preventative maintenance and regular visual checks.</p> <p>Pressure relief valves are present to avoid over-pressurisation of biogas system.</p>	
Gas transfer systems, gas storage tank, gas engines, flares or PRVs failure causing emissions of biogas	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Odour impact. Global warming potential. Risk of fire and explosion	Low	Medium	Low	<p>The plant is designed to capture and utilise all biogas possible, combusting the biogas in order to maximise recovered value from the biological treatment of sludge.</p> <p>The gas system utilised is subject to regular preventative maintenance to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected.</p> <p>Personnel on site wear portable gas detectors in order to alert staff to presence of biogas.</p> <p>A waste gas burner (emergency flare) is utilised for the safe disposal of surplus gas in the event of plant breakdown, or a surplus of gas above the level that can be safely stored or utilised. Use of emergency flare is recorded.</p> <p>PRVs are in place on the gas holder to be operated in the event of failure of the emergency flare to prevent over pressurisation and catastrophic failure.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Leaks of emission to air, but principally NOx.	<p>Emissions to air and dispersion leading to harm to protected nature conservation sites – SSSIs, SAC and SPA.</p> <p>Harm to protected site through toxic contamination, nutrient enrichment, disturbance etc.</p>	Medium	Low	Low	<p>Site is not located within the boundaries of an AQMA.</p> <p>The nearest designated protected habitat is a SSSI 450m from the site. There is one additional SSSI and two LNRs within 2 km of the site and one SAC within 10 km of the site. There are also six non-statutory designated LWS's within 2 km of the site, with the Maple Lodge LWS and Springwell and Stocker's Lakes LWS located adjacent to the boundaries of the site.</p> <p>Previous emissions modelling submitted shows that deposition and impacts on habitats sites are unlikely to be unacceptable. There are no changes to emissions sources with this variation</p> <p>Site operations will be subject to emission limits under current Regulations with infrastructure designed to minimise uncontrolled releases. Checks, monitoring and preventative maintenance will further minimise fugitive emissions.</p>	Low
Spillage of sludges or liquid during tanker transfer operations e.g. pipework leaks	<p>Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses.</p> <p>Harm to aquatic flora and fauna.</p> <p>Chronic effect on water quality</p>	Low	Low	Low	<p>Transfer operations of waste materials is largely an automatic process controlled by the Process Controllers and parameters set within the SCADA system.</p> <p>All pipework is standardised, including tanker couplings. Tanker offloading area at the inlet and sludge reception tank is of concrete construction with kerbing to prevent release to ground.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					<p>Tanker offloading operations are supervised.</p> <p>In event of a spillage, follow site spillage response plan and inform relevant site personnel and relevant authorities.</p> <p>Spill kits are provided around the site which can be used to contain a spillage and direct it towards site drainage. Site drainage returns to works inlet providing treatment process for sludge or arrange off-site tankering of waste to another site.</p> <p>Sludge is relatively viscous and not highly mobile.</p>	
<p>Spillage of raw materials during (e.g. fuel oil, polymer, anti-foam) during use, transfer and disposal operations.</p>	<p>Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses.</p> <p>Harm to aquatic flora and fauna.</p> <p>Chronic effect on water quality</p>	Low	High	Medium	<p>Parts of the site lie within Groundwater Source Protection Zone 1 although raw materials are not generally stored within these areas.</p> <p>Raw materials are stored on made ground, within bunded containers and/or on bunds to contain spillages of 110% of the volume. Raw materials are stored away from surface water bodies. Contents of bunds are regularly checked during environmental audits and after periods of heavy rainfall and emptied as required. Transfer pipework is aboveground and double walled, with a leak detection system.</p> <p>In event of a spillage, follow site spillage response plan and inform relevant site personnel. COSHH data sheets available.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					<p>Deliveries to site are made by approved suppliers. Use of raw materials is carried out by trained personnel or automatically controlled processes.</p> <p>Penstock valves available within fuel oil and chemical delivery areas to contain large spillages. In the event of a minor spillage, spill kits are provided around the site which can be used to contain a spillage and direct it towards site drainage if suitable.</p> <p>Site drainage returns to works inlet providing treatment process for suitable materials or arrange off-site tankering of waste, if required.</p>	
Spillage of sludges (e.g. raw sludge, digested sludge) during processing and transfer operations e.g. tank overtopping, pipework leaks	<p>Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses.</p> <p>Harm to aquatic flora and fauna.</p> <p>Chronic effect on water quality</p>	Low	High	Medium	<p>Parts of the site lie within Groundwater Source Protection Zone 1.</p> <p>Open topped tanks are in close proximity to surface water bodies.</p> <p>Processing and transfer operations of waste materials is largely an automatic process controlled by the Process Controllers and parameters set within the SCADA system.</p> <p>Storage and digestion tanks are fitted with sensors to monitor levels within a tank and can inhibit additional pumping if high alarms activate.</p> <p>Preventative maintenance programme and maintenance plans are in place in order to maintain</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					<p>equipment effectively and minimise the risk of spillages.</p> <p>In event of a spillage, follow site spillage response plan and inform relevant site personnel and relevant authorities.</p> <p>Spill kits are provided around the site which can be used to contain a spillage and direct it towards site drainage. Site drainage returns to works inlet providing treatment process for sludge or arrange off-site tankering of waste to another site. Sludge is relatively viscous and not highly mobile.</p>	
Spillage of screenings material during processing and transfer operations e.g. pipework leaks	<p>Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses.</p> <p>Harm to aquatic flora and fauna.</p> <p>Chronic effect on water quality</p>	Low	Low	Low	<p>Screening machinery is situated on made ground and connected to site drainage. Machinery is specifically designed to accept this type of waste for screenings.</p> <p>Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively and minimise the risk of spillages.</p> <p>In event of a spillage, follow site spillage response plan and inform relevant site personnel and relevant authorities.</p> <p>Spill kits are provided around the site which can be used to contain a spillage and direct it towards site drainage. Site drainage returns to works inlet</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					providing treatment process. Litter picking of solid wastes arranged as required.	
Failure of sludge storage tanks / digester tanks	<p>Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses.</p> <p>Harm to aquatic flora and fauna.</p> <p>Chronic effect on water quality.</p>	Low	High	Medium	<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Regular infrastructure inspections for tanks and pipework and planned preventive maintenance system in place. Regular visual inspections for tanks and pipework and reactive maintenance.</p> <p>In-line flow monitoring in key locations and tank level monitoring would identify losses and enable a quick response.</p> <p>Sludge is relatively viscous and not highly mobile limiting the distance it can spread in a short time period. Spillages to made ground connect to site drainage, which returns to the head of the works. Spillages to unmade ground are removed as soon as possible to minimise infiltration.</p>	Low
Acceptance of non-conforming wastes and wastes that are incompatible with the waste treatment process	<p>Impacts on the normal performance of site treatment processes leading to emissions to ground and ground water contaminating soil and/or groundwater.</p> <p>Harm to aquatic flora and fauna and chronic effect on water</p>	Low	Medium	Low	<p>Waste materials subject to waste pre-acceptance checks prior to delivery to site and subject to waste acceptance checks prior to discharge.</p> <p>Site has physical security measures to prevent unauthorised access to the site and all discharge points.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	quality. Harm to aquatic flora and fauna				<p>Waste can only be accepted at the site if it is suitable for the biological treatment process.</p> <p>Site processes are monitored automatically with alarms to alert staff in the event of abnormal situations.</p> <p>Staff conduct regular monitoring of all plant and equipment during routine site activities.</p>	
All on-site hazards: machinery	<p>Direct physical contact with human population and /or livestock after gaining unauthorised access to the installation</p> <p>Bodily injury</p>	Low	High	Medium	<p>Direct physical contact is minimised by activity being carried out within enclosed digesters and tanks.</p> <p>Site activities are managed and operated in accordance with a management system. Site physical security measures, including site security personnel, perimeter fence, CCTV and access control to prevent unauthorised access. Site is manned 24/7.</p> <p>Assets are protected by various physical means including fencing, kerbing and bollards to prevent vehicle strikes.</p> <p>Site has traffic management including partial one-way systems to minimise the need to reverse. Use of banksmen as appropriate.</p> <p>Vehicles equipped with reversing alarms.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Vandalism causing the release of polluting materials to air (smoke or fumes), water or land.	<p>Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population</p> <p>Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p>	Low	High	Medium	<p>Unauthorised access is unlikely to happen and minimised by physical site security measures and effective management systems.</p> <p>Site has access controlled barrier entry for all vehicular access. Fence runs the perimeter of the site.</p> <p>Additional security fences around some assets and other assets are kept within locked containers or buildings. Warning signs are displayed.</p>	Low
Flooding from rivers, streams and groundwater	<p>Emissions to surface water course and harm to aquatic flora and fauna. Infiltration to ground and groundwater. Harm to aquatic flora and fauna and chronic effect on water quality.</p>	Medium	Medium	Medium	<p>Large areas of the site are within a Flood Zone 2 and parts of the site are within Flood Zone 3. Part of the site is protected by flood defences.</p> <p>Import areas and sludge dewatering plant is within Flood Zone 2, indicating there is a medium risk of flooding. Sludge digestion tanks and the cake pad are within Flood Zone 1 meaning there is a low probability of river flooding for these assets.</p> <p>General wider works designed to minimise risk of localised works flooding due to storm surges.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Take appropriate corrective and preventative actions to minimise environmental impact.</p> <p>Site has implemented flood resilience works on some assets, but site is not known to suffer from flooding.</p>	
Flooding due to drain blockages and/or excessive rainfall causing localised on-site surface water flooding	Emissions to surface water course and harm to aquatic flora and fauna. Infiltration to ground and groundwater. Harm to aquatic flora and fauna and chronic effect on water quality.	Medium	Low	Low	<p>Site wide drainage system linked to main sewage works, which includes additional capacity in storm tanks within the works to manage additional flows.</p> <p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Take appropriate corrective and preventative actions to minimise environmental impact</p>	Low
Extreme weather conditions leading to abnormal conditions / release of potentially polluting substances	<p>Emissions to air and dispersion leading to inhalation by local human receptors and impacts on local ecological receptors. Respiratory irritation, illness and nuisance to local population. Harm to flora and fauna.</p> <p>Emissions to ground and ground water contaminating soil and/or groundwater. Run-off from site polluting surface water courses.</p>	Low	Medium	Low	<p>The treatment process can be controlled from off-site locations in the event of the site being inaccessible due to extreme weather e.g. snow, flooding.</p> <p>Storage tanks for potentially polluting substances have been designed to relevant industry standards at the time of construction.</p> <p>Lightning protection is installed at relevant locations to protect assets from lightning strike.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	Harm to aquatic flora and fauna and chronic effect on water quality.				<p>Potentially polluting substance are stored in accordance with MSDS requirements and away from sensitive receptors.</p> <p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Take appropriate corrective and preventative actions to minimise environmental impact.</p>	
Loss of mains power leading to failure of pumps / control systems and possible leaks and escape of sludge.	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna.	Low	Medium	Low	<p>Site CHP engine is able to supply electricity to the site using biogas supplies on site. Standby generators provide back-up power / contingency plans to provide power to critical operations in the event of an electrical outage.</p> <p>Failsafe systems in place to ensure sludge remains in situ in the event of a loss of power and that systems are promptly returned into operation.</p> <p>Site wide drainage system linked to main sewage works in the event of a spillage.</p>	Low
Vandalism	Damage to plant or equipment on site due to unauthorized access to the site.	Low	Medium	Low	<p>Site accessed restricted at all times, including electronically controlled gates and 2 metre fencing. CCTV present at site.</p> <p>During normal operating hours, there is a culture of challenge around non-staff on site</p>	Low

6 Reporting and Recording

6.1 Reporting

If an incident with potentially significant environmental consequences occurs, TWUL will notify the Environment Agency without delay. TWUL will also inform the Environment Agency should any complaints be received directly to the site as a result of the incident and will advise what remedial measures or actions have been taken to address the issue. Copies of material complaints received will be made available to the Environment Agency for review on request.

Details of the information that should be reported to the Environment Agency are found in the most recent variation of the site's Environmental Permit but is reproduced as Appendix B of this document.

6.2 Recording

The procedure employed by TWUL for recording, investigating and responding to incidents or breaches of the permit is the EPR notification procedure. Notifications must be made to the Environment Agency without delay and within 24 hours of the detection of an accident that has caused, is causing or may cause significant pollution or a breach of a limit specified in the site's Environmental Permit.

In the event of an accident, a Schedule 5 notification is completed following an incident with potentially significant environmental consequences. Relevant information that must be recorded includes:

- Date, time and location of the event;
- Substances involved, including estimated quantities; and
- Immediate measures taken to minimise environmental impacts.

A copy of the Schedule 5 notification form is provided in Appendix B. Part A must be completed within 24 hours of detection of the incident and Part B is completed as soon as practicable.

Records will be made of all incidents with potentially significant environmental consequences that occur at the installation. The associated actions arising will be held on Sharepoint. All records of events with potentially significant environmental consequences and the associated actions arising will be retained as required by the Environmental Permit. Where an incident with potentially significant environmental effects occurs, and the nature of the incident supports further investigation, a post incident review may be required.

6.3 Post-incident Review

Following an incident where potentially significant environmental effects occur, and the nature of the incident warrants it, an investigation will take place to determine both the root cause of the incident and how to prevent the incident reoccurring. The findings of the investigation will be reported to TWUL's management and shared with all relevant employees to enable the incorporation of good practice into future works.

A formal 'event learning' review of all on site processes and procedures will be undertaken by TWUL following any incident with potentially significant environmental consequences, if the processes are determined to be contributory to the cause of the incident. Any changes to processes or procedures required as a result of the formal review will be communicated to TWUL management and employees.

If, as a result of the incident, this Accident Management Plan is subject to revision, it should be updated as part of this post-incident review and communicated to relevant TWUL management and employees.

All safety equipment used to respond to an incident should be checked and replenished as required.

6.4 Contacts

The key emergency contacts in the event of an accident or incident are:

Contact	Number
Thames Water Utilities Limited Customer Services	08459 200800
Environment Agency	0800 807060 (incident number) 03708 506506 (normal number)
Emergency services	999

Appendix A

Site Specific Key Contacts

Role	Name	Email address	Phone Number
Area Operations Manager			
Site Performance Manager			
Technically Competent Manager			
Customer Centre			
Thames Water Environmental Compliance Manager			
Thames Water Health and Safety Manager			

Appendix B

Notification Forms

To be inserted from relevant permit document.